Agenda item 7.4
For decision

Council

CNL(08)17

Interim Report of the Socio-Economics Working Group

CNL(08)17

Interim Report of the Socio-Economics Working Group

1. In both 2003 and 2004 the Council held Technical Workshop meetings on the social and economic aspects of the wild Atlantic salmon (see documents CNL(03)18 and CNL(04)23 respectively). These meetings resulted in the development of:

   - a listing of all the elements making up the wild Atlantic salmon's economic value and impacts;
   - broad guidelines on the type of economic analysis that would be needed to produce estimates of value and the data required;
   - guidelines for incorporating social and economic factors in decision under the Precautionary Approach CNL(04)57.

2. It is clear from the information presented at these technical Workshops that the Atlantic salmon has many aspects to its value and that, in addition to the values associated with the fisheries, the salmon is a highly prized species and an indicator of environmental quality. This 'existence value' of the wild salmon, although rarely quantified, may greatly exceed the values associated with the commercial and recreational fisheries, because of its iconic status with the general public. NASCO's guidelines (CNL(04)57) were intended to assist administrators and decision-makers by ensuring that the long-lasting and widespread values associated with the wild Atlantic salmon are fully incorporated and given due weight in decisions in relation to management of the resource and its habitats.

3. Under the Strategic Approach for NASCO's 'Next Steps', CNL(05)49, the key issues identified in relation to the social and economic aspects of the wild Atlantic salmon are:
   - ensuring that appropriate emphasis is given to the social and economic aspects of the wild Atlantic salmon;
   - strengthening the socio-economic data as a basis for managing salmon;
   - integrating socio-economic aspects in decision-making processes; and
   - disseminating socio-economic information to ensure due weight is given to the salmon compared to other important commercial and public interests.

4. To progress these aspects the Council established a Working Group on Socio-Economics which met in Reykjavik during 4 - 6 March 2008. The report of the meeting is attached. This is only an interim report and the Group's Terms of Reference allow for more than one meeting.

5. The Group noted that the collection, analysis and integration of socio-economic information to aid management is far behind the collection, analysis and integration of biological information. The main task for the Group was, therefore, to develop an international collation of available social and economic information on the wild Atlantic salmon so as to allow the wild Atlantic salmon to be assessed at its rightful social, economic and cultural levels. This collation is contained in Annex 3 of the report. Summary tables of the information were developed although the Group stresses that these are intended only to aid review of the large volume of information presented. The Group urges the Council to request that those countries that have not

yet provided information contribute to this important new data resource. With regard to integration of social and economic information into decision-making, the Group reviewed progress in developing a bio-economic model which has been adapted for use with recreational fisheries. This model will now be tested using data from Scotland and/or Norway. The Group also noted that there has been little exchange of experience in using NASCO's socio-economic guidelines and welcomed the proposed inclusion of social and economic aspects in the Focus Area Reports under the Implementation Plans.

6. The Group noted that there are many threats to the wild stocks and that those advocating salmon conservation and restoration will need all the factual information available to support their case. In this regard the results of a new study on the 'existence value' of salmon in England and Wales suggest that consideration of these values will add enormously to the total value of the resource. This study indicated a willingness-to-pay to prevent a severe decline in salmon stocks from a disease (an analogy for *G.salaris*) totalling £350 million per year when aggregated across all households. Thus consideration only of the values associated with **use** of the resource will greatly under-estimate the salmon's full value. The **existence** value dwarfs the user values. The Group will continue to work inter-sessionally through a sub-group with a further full working group meeting prior to the next Annual Meeting when a more comprehensive report will be made to the Council.

Secretary
Edinburgh
9 April 2008

WGSE(08)19

Report of the Meeting of the Working Group on Socio-Economics

Grand Hotel, Reykjavik, Iceland

4-6 March 2008

1. Opening of the Meeting

1.1 The Chairman, Dr Malcolm Windsor, opened the meeting and welcomed participants to Reykjavik. He noted that the level and extent of socio-economic advice available to NASCO and the Parties is, on the whole, far behind the biological advice. Given that fisheries management is largely about managing what people do and not what the fish do the Council had asked that NASCO start the process of incorporating social and economic data into management. When NASCO started its work on the Precautionary Approach in the late 1990s it was stressed that incorporating social and economic factors in management decisions should not undermine the effectiveness of the approach. Technical workshops had been organised by NASCO in 2003 and 2004 and had resulted in the development of:

- a listing of all the elements making up the salmon's economic value and impacts;
- broad guidelines on the type of economic analysis that would be needed to produce estimates of value and the data required;
- guidelines for incorporating social and economic factors in decisions under the Precautionary Approach.

He noted that the salmon is a complex species with many aspects to its value and that the non-use values may greatly exceed the values associated with the fisheries. He concluded that the challenge for the meeting would be to attempt the first comprehensive international collection and collation of information on the social and economic aspects of salmon and to consider further approaches for assessing social and economic values and for integrating social and economic factors into management decisions. He concluded that the Group's work should assist those charged with conserving wild salmon in ensuring that the salmon 'punches at its full weight' when it faces threats from other industries or endeavours. He thanked Mr Arni Isaksson for his help in arranging the meeting and the US and Norway for developing the Terms of Reference.

1.2 Mr Arni Isaksson of the Icelandic Food and Veterinary Authority and Vice-President of NASCO welcomed participants to Iceland.

1.3 A list of participants is contained in Annex 1

2. Adoption of the Agenda

2.1 The Working Group adopted its agenda, WGSE(08)17 (Annex 2) after including a new item 8 'Conclusions and Recommendations'.

3. Consideration of the Terms of Reference and Working Methods

3.1 The Working Group reviewed its Terms of Reference as agreed by the Council of NASCO, CNL(07)59. It was noted that these TORs had been drafted in a broad way to allow the Group some flexibility in the way it worked but the objective was to further develop information on the social and economic aspects of the wild Atlantic salmon, and make recommendations for its integration into management decisions, so as to support salmon conservation.

3.2 Prior to the meeting a discussion document with proposals for the focus of the Group's work had been developed by Norway, WGSE(08)2. This document proposed that the first task for the Group is to identify the basic key data and information that is available and needed to assist in describing the status of the social and economic aspects of wild salmon. Norway had developed a listing or 'wish list' of the information that might be collected, WGSE(08)3, and each jurisdiction had been requested to supply this information prior to, or at, the meeting. Such a collation of information by country, if updated, would assist in identifying changes in certain social and economic aspects over time and might encourage the collection of additional information to address deficiencies in a consistent way. The Group felt that, in a similar manner to the scientific advice, this collation of information could be beneficial to managers and inform their decision-making even if modelling approaches could not be developed in the short-term. The discussion document also proposed that the Working Group could devote some time to further consider approaches to assessing economic values and their integration into management decisions. The Working Group agreed with this approach.

4. Presentation of basic key data and information necessary to describe the social and economic aspects of wild salmon

4.1 The Group discussed to what extent the information requested in the 'wish list', WGSE(08)3, was duplicating the information already provided to NASCO through the Implementation Plans developed by the Parties and their relevant jurisdictions. The Assistant Secretary presented an overview of the background to the development of the Implementation Plans and the progress to date. While it was recognised that there may be some duplication of information, particularly with regard to the description of the fisheries, the Implementation Plans detail the management measures to be taken over a five year period to implement NASCO's agreements but do not contain the social and economic data sought by the Working Group. Furthermore, while the focus area reports on the Implementation Plans should provide an outline of how social and economic factors are being incorporated into management decisions these reports would also not be expected to provide the social and economic data.

4.2 The Group agreed that the 'wish list' should be amended so as to allow for presentation of information on subsistence fisheries separately from commercial fisheries and that information on the profitability of commercial fisheries should also be provided. Using the revised format for the 'wish list' WGSE(08)18, social and economic information was presented for EU - UK (Scotland), WGSE(08)4, EU - UK (England and Wales), WGSE(08)5, the Russian Federation WGSE(08)6, Greenland, WGSE(08)7, Iceland, WGSE(08)10, EU - Ireland, WGSE(08)11, Canada, WGSE(08)13, the United States, WGSE(08)14 and Norway, WGSE(08)15. The Group noted that this information provided a valuable snapshot of social and economic information that would be of value in support of salmon conservation. It may also assist the Council in developing its 'State of the Salmon' report which will be one of the main public relations' tools for the

Organization. The Group noted that for modelling purposes there would be a need for time-series of trends in, for example, the number of fishermen, market values etc.

4.3 It was also noted that while there was valuable social and economic information particularly with regard to the fisheries, there were major gaps in the available information particularly with regard to the non-consumptive uses and existence values. However, a study conducted since the second Technical Workshop in 2004 indicated that the existence values of salmon could be enormous and greatly exceed the values associated with the fisheries. This assessment of the total value of salmon to the general public in England and Wales showed that the average willingness-to-pay per household to prevent a severe decline in salmon stocks from the parasite *G. salaris* amounted to £350 million per year when aggregated over all households.

4.4 The complex and very hard to quantify values of subsistence fisheries to dependent communities were also lacking. With regard to food, social and ceremonial fisheries, First Nations of eastern Canada have, since time immemorial, accessed and used natural resources found within their traditional territories for the benefit of community, family and individual. First Nations continue to rely on Atlantic salmon for food, social and ceremonial purposes. This is a priority right to fish for food, social and ceremonial purposes over recreational and commercial fisheries. Atlantic salmon continue to be fished by forty First Nations communities and by the larger population of off-reserve peoples in eastern Canada. With regard to subsistence fisheries, according to the agreement between NASCO and Denmark (in respect of the Faroe Islands and Greenland), Greenland has agreed temporarily not to set a quota although it is entitled to do so. Instead, Greenland allows a subsistence fishery for salmon which is considered necessary for the food supply of the Greenlandic population especially considering the population of the settlements of the coast of Greenland. This fishery is important for upholding the variety of food supply and is considered an essentiel supplement for the low income groups in Greenland. Self-sufficiency from natural resources is an integral part of the Greenlandic culture and has through generations been considered necessary for sustaining life.

4.5 The compilation of social and economic data, the first such compilation for the North Atlantic area, is contained in Annex 3. The Group recognised that there was a need to avoid an excessive burden of reporting but agreed that in order to be able to assess changes in the social and economic data it believes that the information in the 'wish list' should be kept current by each country and reviewed by NASCO on a five year cycle.

5. Approaches used and results from any new studies to estimate different types of social and economic value and impacts:

5.1 A table providing an overview of existing information on the social and economic values of Atlantic salmon together with a bibliography of studies that had been developed at the first Workshop and updated in 2004 was further updated by the Group, WGSE(08)16 (Annex 4).

5.2 The Group recognized that various methods have been used to estimate economic impacts. The lack of consistency in the methods used in the various studies of economic impacts of Atlantic salmon makes comparisons among studies difficult. With respect to cost benefit analyses there is a similar variation in the methods used and some studies have estimated use values while others have estimated use and existence values. The values derived from these cost benefit studies are potentially additive, but only with care.

The Group considers that an exercise should be undertaken to audit the methods used with a view to developing guidelines on how the results of particular studies might be deployed to inform salmon management. The bibliography contained in document WGSE(08)16 referred to above should be expanded into an annotated bibliography, which would give further guidance on the extent to which the estimates from studies may be added to inform on Atlantic wide issues.

5.3 The Group noted that under its TORs it is requested to consider the social and economic values of the environmental aspects of the salmon. The Group reviewed a table developed by Ireland which showed the number of rivers affected by various environmental impacts such as hydro-electricity generation, water abstraction etc. The Group was advised that in England and Wales economic values can already be assigned to a number of environmental impacts. The Group felt that the development of such a summary table providing details of the number of rivers affected by various impacts and where possible the economic cost of those impacts could be a valuable initiative for further consideration by the Group.

6. Identification of data and information needs and deficiencies and approaches to address them

6.1 The Group recognised that the information contained in Annex 3 is extremely informative. There is, however, a need to consider separately cost benefit analyses and estimates of economic impacts. The Group, therefore, developed matrices summarising the information presented under the headings of 'Participation', 'Cost-benefit Analyses' and 'Economic Impacts'. These matrices are contained in Tables 1-3. The Group stressed that the information presented in these tables is purely a summary to illustrate the available information and data deficiencies and for a number of reasons should not be interpreted in any other way. While the Group had not summarised the information on the legal basis for fisheries in the various countries it recognised that there are very different legal regimes around the North Atlantic with different permitted gear types, private and publicly owned fisheries, open access and restricted access public fisheries, and different fishing seasons. More detailed information on the legal basis for the fisheries is contained in Annex 3 and the Parties' Implementation Plans.

6.2 The Group noted that at the first Technical Workshop in 2003 (see document CNL(03)18) an outline of the analytical methods that can be used to estimate the various economic values and impacts of wild salmon and the data needed had been developed. The Group believes that review of the information in Tables 1 - 3 should assist identification of gaps in the available social and economic information and that the methods and data needs identified in CNL(03)18 might be used by individual jurisdictions to address these gaps as resources permit.

6.3 The Group recognised that in 2005 the Council of NASCO had adopted 'Guidelines for Incorporating Social and Economic Factors in Decisions under the Precautionary Approach', CNL(04)57, but that because of the changes to the annual reporting on NASCO's agreements, as a consequence of the 'Next Steps' for NASCO review process there had been little exchange of information on experience in using the guidelines to date. However, the Group was aware that the guidelines were being used in some jurisdictions and noted that under the focus area reporting on Implementation Plans the Parties are requested to report on how social and economic factors have been incorporated in management decisions. The Group welcomed this development and

noted that both the case study approach and bio-economic modeling depend on the availability of specific types of data.

7. Developing and improving the integration of social and economic factors into management decisions, including the proposed future development of a bio-economic model

7.1 A bio-economic modeling approach that would allow social and economic factors to be integrated into a theoretical management model for Atlantic salmon was outlined by the US, WGSE(08)12. Since the second technical Workshop in 2004 the model had been adapted for use with recreational fisheries. It was recognized that this model was not predictive because of the lack of information on future trends in stock status. It does, however, provide a qualitative method for evaluating potential management actions to help inform decision making. The Group welcomed this approach. Dr Ward indicated that the next step would be to apply the model to a particular fishery and in this regard would hope to cooperate with the participants from Scotland or Norway. Mr Alan Radford agreed to liaise with Dr Ward with a view to obtaining input data for the model from Scotland in association with the Scottish Government. The results of the trial run of the model will be reported to the Group.

7.2 The Group recognised that there is scope for economic information to be misused even after separating the cost-benefit and economic impact information as it has done in Tables 2 and 3. Therefore, the Group intends to develop guidelines to assist NASCO and its Parties in interpreting social and economic information.

8 Conclusions and recommendations

8.1 The TORs allow for more than one meeting of the Working Group and this is therefore only an interim report.

8.2 It is not the intention that this Working Group would carry out socio-economic analyses for the Parties. It is for them to decide taking into account their own situation and resources. Rather, the Group sees NASCO's role as an international forum for cooperation, leading to cost-effective exchange of information and experience and for developing guidelines and promoting best practice.

8.3 The Group believes that the collection, analysis and integration of socio-economic information to aid salmon management is far behind the collection, analysis and integration of biological information (the Group is aware, for example, that the ICES Working Group on North Atlantic Salmon Group meets annually for about ten days). It is not suggested that this practice be followed by this Group but it is recognised that there remains a need to focus on the social and economic aspects.

8.4 The Group has made a first attempt to construct a 'wish list' of social and economic information to support management (Annex 3).

8.5 The Group has started to collate the available information to populate this list and, so far, nine countries have contributed. The Group urges the Council to request that the other countries contribute available information to this important new data resource. The Group has also made a first attempt to summarise some of this information in a series of tables (see Tables 1 -3). The Group has some concern that the data in these summary tables **may be misinterpreted and stresses that they are simply summaries** to aid in

reviewing the large volume of information presented. In this regard, the Group has agreed to develop guidelines to assist with the interpretation of social and economic data (see paragraph 7.2). The Group also updated a summary of studies and a bibliography concerning social and economic values (see document WGSE(08)16, Annex 4).

8.6 It is recognised that there are costs associated with the collection and analysis of social and economic information just as there are in collecting the biological data but that is, again, a matter for the individual Parties to decide. However, there are many benefits from having this information and the Group urges the Parties to fill these gaps in our knowledge.

8.7 There are many threats to the wild stocks and those supporting and advocating salmon conservation and restoration will need all the factual information they can get to support their case. In this regard, the Group is impressed with the preliminary indications of the significance of the existence value of wild salmon. If the little information that we have on this aspect of value applies broadly, the existence value of wild salmon for some Parties will add enormously to the total value of the resource. The Group does not believe that this value has been fully recognised. The Group has not made any progress in describing the social, ceremonial, cultural and food values of salmon to dependent communities. These aspects are hard to quantify. Some noted that there may be a need to be express these values in narrative rather than in monetary terms.

8.8 The Group reviewed a bio-economic model. Such models could be valuable in the future and the model will be tested using Scottish and/or Norwegian data and expertise.

8.9 In order to contribute a socio-economic element for the 'State of Salmon' report which the Council of NASCO is developing, the Group asked a small group of experts (John Ward, Gudni Gudbergsson, Oystein Aas, Alan Radford, Guy Mawle) to work by correspondence. The Secretariat would be asked to contact the other countries to ask if they would be willing to provide a contact person to assist the Group with points of clarification and additional data.

8.10 In short, the Group has compiled the first international collation of available social and economic information on the wild salmon. It now aims to complete this and deliver to NASCO and its Parties the social and economic data and approaches to allow the wild Atlantic salmon to be assessed at its rightful social, economic, cultural levels.

9. Any other business

9.1 There was no other business.

10. Date and place of next meeting

10.1 The Group noted that its Terms of Reference allowed for the possibility of more than one meeting. However, the Group decided that it would not be possible to meet again prior to the 2008 Annual Meeting of NASCO and agreed that it should aim to meet again before March 2009. However, some of the work listed above will be progressed inter-sessionally by correspondence.

11. Report of the meeting

11.1 The Group agreed a report of its meeting.

Table 1: Summary information on participation in salmon related activities

Jurisdiction	Recreational		Commercial		Food, social and ceremonial	Non-consumptive	Subsistence
	Number of anglers/value	Number of fish caught/weight	Number of fishermen/value	Number of fish caught/weight			
Canada	41.7k CAN$58.4m	54.8k retained 45.8k released	NR - closed	NR - closed	Catch 44 - 63 tonnes Number of First Nation fishers varies with land claims, agreements and licence regimes	ID	ID
Denmark - Greenland	ID	ID	ID	ID	See subsistence	ID	Catch 20-25 tones. In 2007 there were 261 license holders
Denmark - Faroe Islands							
EU - Denmark							
EU - Finland							
EU - France							
EU - Germany							
EU - Ireland	30k Euro11m	30.8k (45% released)	450 Euro700k (first value) + Euro450k (smoking)	9k 27 tonnes	ID	ID	ID
EU - Spain							
EU - Sweden							
EU - UK (England and Wales)	23K £125m	20k (55% released) 80 tonnes 135k days fished, average 8 days per fish caught	945 £0.5m	13.5k 50.5 tonnes	ID	NR	ID
EU - UK (Northern Ireland)							
EU - UK (Scotland)	467k angler days £61.6m	38.4k retained, 117 tonnes 47.4k released, 156 tonnes	503 £1.1m	24.9k 72.9 tonnes	ID	NR	ID
Iceland	ID Euro111m 70,000 local anglers not all salmon	36.8k retained 8.7k released	ID Euro110k	5.9k 16.5 tonnes	ID	NR	ID
Norway	100k Euro114m	225k fish 499 tonnes	1400 Euro3.5m	128k (20% farmed) 512 tonnes	see Subsistence	75k visitors/Euro0.75m + several other visitor sites + festivals	ID
Russian Federation	15.5k NR	NR	294 NR	NR	ID	NR	NR
USA	NR	NR	ID	ID	ID	ID	ID

Note: The information presented in Summary Tables 1 - 3 should not be summed unless the information is converted to common currencies and common years. Even then the information may not be additive. The summary information should be considered together with the more detailed information presented in Annex 3 of this report.
Canada expects to be able to provide additional socio-economic information on the salmon fisheries at NASCO's 2008 Annual Meeting.
Key: NR = not relevant; ID = information deficient

Table 2: Summary information on costs and benefits of Atlantic salmon

Jurisdiction	Recreational	Commercial	Food, social and ceremonial	Non-consumptive	Subsistence	Existence value
Canada	CAN$58.4m	NR - closed	NR	ID	ID	ID
Denmark - Greenland	NR	NR	NR	NR	ID	NR
Denmark - Faroe Islands						
EU - Denmark						
EU - Finland						
EU - France						
EU - Germany						
EU - Ireland	Euro11m	ID	NR	NR	ID	ID
EU - Spain						
EU - Sweden						
EU - UK (England and Wales)	£125 m	£0.5m	ID	ID	ID	£350m
EU - UK (Northern Ireland)						
EU - UK (Scotland)	£511.05m	ID	NR	ID	NR	ID
Iceland	Euro111m	Euro110m	NR	ID	NR	ID
Norway	ID	ID	ID	ID	ID	ID
Russian Federation						
USA						

Note: The information presented in Summary Tables 1 - 3 should not be summed unless the information is converted to common currencies and common years. Even then the information may not be additive. The summary information should be considered together with the more detailed information presented in Annex 3 of this report. Canada expects to be able to provide additional socio-economic information on the salmon fisheries at NASCO's 2008 Annual meeting
Key: NR = not relevant; ID = information deficient

Table 3: Summary information on the economic impact of Atlantic salmon

Jurisdiction	Recreational	Commercial	Food, social and ceremonial	Non-consumptive	Subsistence	Existence value
Canada	Expenditure CAN$58.4m	NR - closed	NR	ID	ID	NR
Denmark - Greenland	NR	NR	See subsistence	NR	ID	NR
Denmark - Faroe Islands						NR
EU - Denmark						NR
EU - Finland						NR
EU - France						NR
EU - Germany						NR
EU - Ireland	Net contribution (2002) after displacement Euro11m	70 FTEs draft nets	NR	NR	NR	NR
EU - Spain						NR
EU - Sweden						NR
EU - UK (England and Wales)	Expenditure 36.9 million, income £29m, 1200 FTE's supported, 450 net loss. Various ratios available. Estimates available for regions	ID	NR	ID	NR	NR
EU - UK (Northern Ireland)						NR
EU - UK (Scotland)	Expenditure £61.65m, expenditure loss £44.8m, household income loss £34.5m, employment loss 1966 FTEs	Market value of the catch £1.1 m	NR	ID	NR	NR
Iceland	Data on distribution of angler expenditure. Expenditure loss of ISK 2-3billion with closure, 1200 jobs (not FTE,s) supported,	Value of catch ISK 9.9 m	NR	ID	NR	NR
Norway	Expenditure Euro160m, 2,900 FTEs supported Net impact Euro66m	Euro3.0m 150 FTE's	ID	ID	ID	NR
Russian Federation	119 full time direct jobbs and 264 part time direct jobs	ID	ID	ID	ID	NR
USA						NR

Note: The information presented in Summary Tables 1 - 3 should not be summed unless the information is converted to common currencies and common years. Even then the information may not be additive. The summary information should be considered together with the more detailed information presented in Annex 3 of this report.
Canada expects to be able to provide additional socio-economic information on the salmon fisheries at NASCO's 2008 Annual Meeting.
Key: NR = not relevant; ID = information deficient

ANNEX 1

WGSE(08)Partic

List of Participants

CANADA

Mr Tim Young	Department of Fisheries and Oceans, Ottawa

DENMARK (IN RESPECT OF THE FAROE ISLANDS AND GREENLAND)

Ms Jeanette Holding	Greenland Home Rule, Nuuk, Greenland
Mr Torsteen Overgaard	Department of Fisheries, Hunting and Agriculture, Nuuk, Greenland

EUROPEAN UNION

Ms Carmen Beraldi	Secretaria General Pesca Maritime, Madrid, Spain
Mr David Dunkley	Scottish Government Marine Directorate, Edinburgh, UK
Dr Paddy Gargan	Central Fisheries Board, Swords, Co. Dublin, Ireland
Ms Heather Jones	Scottish Government Marine Directorate, Edinburgh, UK
Mr John McCartney	Loughs Agency, Londonderry, UK
Mr John O'Connor	Central Fisheries Board, Swords, Co. Dublin, Ireland
Dr Alan Radford	Glasgow Caledonian University, Glasgow, UK

ICELAND

Mr Gudni Gudbergsson	Institute of Freshwater Fisheries, Reykjavik
Mr Arni Isaksson	Icelandic Food and Veterinary Authority, Selfoss

NORWAY

Dr Oystein Aas	Directorate for Nature Management, Lillehammer
Mr Raoul Bierach	Directorate for Nature Management, Trondheim
Mr Arne Eggereide	Directorate for Nature Management, Trondheim

RUSSIAN FEDERATION

Dr Boris Prischepa	PINRO, Murmansk
Dr Svetlana Krylova	PINRO, Murmansk
Dr Sergey Prusov	PINRO, Murmansk
Ms Elena Samoylova	PINRO, Murmansk

USA

Ms Kimberly Blankenbeker	National Marine Fisheries Service, Silver Spring, Maryland
Dr John Ward	National Marine Fisheries Service, Silver Spring, Maryland

NGO Representative

Mr Paul Knight	The Salmon & Trout Association, London, UK

SECRETARIAT

Dr Malcolm Windsor	Secretary
Dr Peter Hutchinson	Assistant Secretary

ANNEX 2

WGSE(08)17

Agenda

1. Opening of the Meeting
2. Adoption of the Agenda
3. Consideration of the Terms of Reference and Working Methods
4. Presentation of basic key data and information necessary to describe the social and economic aspects of wild salmon
5. Approaches used and results from any new studies to estimate different types of social and economic values and impacts:
   (a) commercial and subsistence salmon fisheries
   (b) recreational salmon fisheries
   (c) non-consumptive values
   (d) the existence of salmon
   (e) social, ceremonial and cultural aspects
   (f) environmental aspects, with particular reference to biodiversity value
6. Identification of data and information needs and deficiencies and approaches to address them
7. Developing and improving the integration of social and economic factors into management decisions, including the proposed future development of a bio-economic model
8. Conclusions and Recommendations
9. Any other business
10. Date and place of next meeting
11. Report of the meeting

ANNEX 3

WGSE(08)20

Listing of Socio-Economic Information

Prior to the meeting of the Working Group Norway had developed a format for providing socio-economic information. This format was amended at the meeting and each jurisdiction was given the opportunity to provide the information according to the revised format. In the revised format, information on subsistence fisheries is included under the section for `Food, Social, Ceremonial, Cultural Aspects' rather than under `Commercial Fisheries'. Where this information was submitted using the revised format it has been included in that format. Otherwise the information is in the format originally submitted to the Working Group. Some information has been provided by Canada but in a different format. This is also included. Canada has advised that it hopes to make additional information available at the Twenty-Fifth Annual Meeting. Compilation of this information is an on-going project and the Working Group hope that information will be made available for those jurisdictions that have not yet provided it.

Denmark (in respect of Faroe Islands and Greenland)

Greenland

Commercial salmon fisheries (including heritage fisheries)	
Identification of Stakeholders	The Greenlandic salmon fisheries cannot be described as commercial – see "Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries".
Fishing right holders	
Fishermen other than fishing right holders	
Commercial fishing related industries	
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	
Number of fishermen including trends	
Demographic characteristics of fishermen: e.g. age, gender	
Catch, CPUE, (mean annual reported catch)	
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	
Type(s) of gear in use, number of gear	
Costs associated with the activity	
Motivations for fishing …(important for combined types of fishing)	
Profitability	

Recreational salmon fisheries	
Identification of main stakeholders	The Greenlandic salmon fishery cannot be described as recreational although 'recreational' fishery is a possibility – see "Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries".
Fishing right holders	
Fishermen	
Sport fishing related industries	
Guiding	
Tourist businesses and local/rural service businesses (grocery, fuel…)	
Sport fishing equipment producers and retailers	
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	
Number of rivers	
Number of fishermen	
Number of fishing days	
Demographic characteristics: e.g. age, gender	
Catch, CPUE, mean annual reported catch	
Market value (e.g. of catch, including trends, fishing rights)	
Gear in use, preferences of gear	
Types of fishing licensing – prices, indicators	
Costs connected with the activities	
Willingness to pay (if possible, divided into marginal and total willingness to pay)	
Motivation	
Magnitude of and attitude towards Catch & Release	
Number of businesses/number of jobs created by /depending on a salmon fishery	

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	N/A
Demographic characteristics: e.g. age, gender of users	N/A
Costs connected with the activities	N/A
Willingness to pay (if possible, divided into marginal and total willingness to pay)	N/A
Motivation	N/A
Number of businesses/number of jobs created/depending these activities	N/A

Existence of salmon	
Main stakeholders	N/A
General public also including Fishing right holders, Fishermen and Fishing related industries	N/A
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	N/A

Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries	
Main stakeholders	Greenland does not have its own home-water stock, and therefore it is the mixed stock made up of both North American and European stocks that contributes to this fishery. Salmon fisheries in Greenland can be broken down into: • subsistence fisheries for sale in open air markets or to hotels, institutions, etc. • subsistence fisheries for personal consumption • sport and leisure fisheries Open market sale fishery requires a licence. Licences are issued by the Department of Fisheries, Hunting and Agriculture to applicants who meet

	the following requirements: • They must have a permanent affiliation with Greenland. • They must own their own salmon nets and a vessel suitable for salmon fishing of length not exceeding 12.8 metres (42 feet). • They must, together with the application, submit information on the number and type of salmon nets they have. Recreational salmon fisheries do not require a licence but all catches have to be reported. Recreational salmon fishery is allowed to those who have: • Danish citizenship and are domiciled in Greenland. • Or for those who does not hold a Danish citizenship but have been domiciled in Greenland for at least two continuous year. In 2005 there were 185 license holders and the catch was estimated at 15,304 kilo. In 2006 there were 165 license holders and the catch was estimated at 23,016 kilo. In 2007 there were 261 license holders and the catch was estimated at 24,646 kilo.
Indigenous people (Sami people, first nations…)	
People carrying out historic fishing activities	Greenland has temporarily agreed to not setting a quota although entitled to do so. Instead Greenland allows subsistence fisheries, which are considered

	necessary for the food supply of the Greenlandic population, especially the part of the population living in small settlements on the coast. This fishery is important for upholding a varied food supply and is considered an essential supplement for the low-income groups in Greenland. Self-sufficiency from natural recourses is an integrated part of Greenlandic culture and has through generations been considered necessary for sustaining life.

Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	N/A
Genetic reserve for aquaculture	N/A
Genetic reserve for the survival of the species under changing (climate) conditions	N/A
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	N/A

European Union

EU-Ireland

Commercial salmon fisheries (including heritage fisheries) and subsistence fisheries	
Identification of Stakeholders	
Fishing right holders	Prior to 2007, there were 1,535 commercial fishing licences available. This number was capped by the Minister for the Marine in 1996. In 2007 a hardship scheme was introduced for commercial fishermen. Approx 1,100 licence holders have availed of the hardship scheme. Post 2007 the number of commercial licences was specified in the Control of Fishing for Salmon Orders 2007 (Nos 129 and 154 and limited the number of licences to approc 200)
Fishermen other than fishing right holders	Only licensed fishermen can commercially fish for salmon. There may be three crew members involved
Commercial fishing related industries	Twelve companies smoking wild salmon. The scale of the wild smoked salmon industry has greatly reduced since the cessation of drift net fishing in 2007
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	It is the Irish Government's strongly held view that our salmon stock is a national asset, which must be conserved and protected, as well as being exploited as a resource, by all on a sustainable and shared basis. As a result, a delicate balancing exercise is necessary between the needs of the coastal and inland communities who depend on fishing resources for their livelihood and the recreational users, including tourists, who each pursue the salmon for their own end. The Irish Government believes that this fundamental principle is in keeping with overall European Union policy regarding the development of rural areas as well as the key principle of the Habitats Directive 92/43/EEC, which is that sustainable use of the resource, including exploitation, should be achieved. The Minister, in exercise of the powers conferred by the Fisheries Acts and in compliance with the requirements of Regulation 31 of the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), makes appropraite regulations governing the fishery. The number of commercial licences issued is regulated by the Minister for Communication, Energy and Natural Resources. The Control of Fishing for Salmon Order (2007 S.I. No. 129) authorises the

	issue of commercial fishing licences by regional fisheries boards and sets out the criteria under which those licences may be issued and prescribes the maximum number of commercial licences which may be issued by regional boards. The Order also provides for the allocation of licences that may become available in 2007 because a person who would be eligible to be awarded a licence accepts an offer from the hardship fund. Wild Salmon and Sea Trout Tagging Scheme Regulations 2007 S.I. No. 849 of 2007 provide, among other things, the quotas of fish that can be harvested by commercial fishing engines and rod and line from those rivers which are identified in the regulations as having a surplus above the conservation limit. Conservation of Salmon and Sea Trout Bye-law No. 822, 2007 prohibits drift Net, Snap Net and Other Engine fishing for salmon and trout (salmon includes sea trout as defined in the Fisheries Consolidation Act 1959) in all fishery districts. The Bye Law also prohibits having on board a boat or vehicle these nets with the intention of fishing for salmon or trout. The legislation is held under constant review and the Minister receives advice from the National Salmon Commission and the National Fisheries Management Executive on proposals for changes.
Number of fishermen including trends	As a result of the introduction of the salmon hardship scheme in 2007, the number of commercial fishermen licence holders has fallen from 1,535 to approximately 200 (see above). These remaining licences can only operate in estuaries / rivers where there is an identified exploitable salmon surplus above spawning requirements. For 2007, 158 commercial licences were fished. The Minister for Communications, Energy and Natural Resources has requested development of an equitable mechanism for the allocation of surplus between the commercial and recreational fisheries.
Demographic characteristics of fishermen: e.g. age, gender	Almost exclusively male. A 2003 study indicated that 43% of commercial salmon fishermen were in the 35-54 year age category and 27% over 55 years.
Catch, CPUE, (mean annual reported catch)	The annual commercial salmon catch has been regulated by quota since 2002. The commercial quota has been progressively reduced since 2002. 2002 commercial catch - 206,899 salmon

	2003 commercial catch – 183,478 salmon 2004 commercial catch – 143,606 salmon 2005 commercial catch – 121,180 salmon 2006 commercial catch – 86,176 salmon 2007 Estimated commercial catch – 9,013 The Minister for Communications, Energy and Natural Resources has requested development of an equitable mechanism for the allocation of surplus between the commercial and recreational fisheries.
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	The first sale price for wild salmon in 2007 was €25 / kg compared to €5 / kg for farmed salmon. Organic farmed salmon prices are higher than other farmed salmon prices. An estimated commercial salmon catch of 9,000 salmon in 2007 gives a gross first sale value of €675,000. A hardship fund was established by Government comprising a Salmon hardship scheme and associated community support scheme. The value of the hardship fund was €25 M with a further €5m for community support schemes.
Type(s) of gear in use, number of gear	158 draft net licences were issued in 2007. No drift net or other licences were issued
Costs associated with the activity	Commercial fishermen have costs for the annual commercial fishing licence, boat fuel, nets and crew wages. Repair of boats or purchase of new boats is also an added cost.
Motivations for fishing …(important for combined types of fishing)	Commercial salmon fishermen are inshore fishermen who fish for salmon during the months of June and July. Data show that for salmon fishermen 42% of time was spent on salmon fishing, 12.7% on other fishing, and 7.8% on farm work. Furthermore, 14.6% of time was spent on other employment, and 7.4% in unemployment. Salmon has traditionally been an important seasonal source of income for inshore fishermen.

Recreational salmon fisheries	
Identification of main stakeholders	
Fishing right holders	Recreational salmon fisheries are both private and State owned. Rod fishing rights on many rivers in the west are privately owned and rates are paid to the Fisheries Board annually. On larger rivers, sections of the fishing rights may be privately owned and other sections owned by the State. The Electricity Supply Board hold the fishing rights on the four major rivers

	impounded for hydro-electricity.
Fishermen	There were 31,000 salmon rod licences taken out annually over the 2001-2006 period. Approx 59% are Irish, 15% from Northern Ireland, and 6% from the UK. Just under 20,000 licenses were issued in 2007 [see below]
Sport fishing related industries	
Guiding	Salmon angling guides, hotels, B&B's,
Tourist businesses and local/rural service businesses (grocery, fuel…)	Most salmon angling takes place in rural areas where added value from salmon angling is important
Sport fishing equipment producers and retailers	Salmon angling contributes to local fishing tackle shops, wholesalers etc but no estimate of expenditure are available
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	The Minister, in exercise of the powers conferred by the Fisheries Acts and in compliance with the requirements of Regulation 31 of the European Communities (Natural Habitats) Regulations 1997 (S.I. No. 94 of 1997), makes appropraite regulations governing the fishery. These are just some of the instruments in force. A comprehensive list is available at www. Wild Salmon and Sea Trout Tagging Scheme Regulations 2007 S.I. No. 849 of 2007 provide, among other things, the quotas of fish that can be harvested by commercial fishing engines and rod and line from those rivers which are identified in the regulations as having a surplus above the conservation limit. Salmon Rod Ordinary Licences (Alteration of Licence Duties) Order 2007, S.I. No. 794 of 2007. This Order prescribes the licence fees payable from 1 January 2008 in respect of salmon rod ordinary fishing licences and the Foyle Area extension licence including a salmon conservation component equivalent to 50% of the licence fee. The proceeds of this will be invested in wild salmon management initiatives designed to rehabilitate wild salmon stocks and habitats. Conservation of Salmon and Sea Trout Bye-Law No. 829 of 2007 provides for an annual bag limit of 10 fish in rivers identified as being above their conservation limits for the 2008 season and a season bag limit of 3 fish in the period 1 Jan to 11 May, a daily bag limit of 3 fish from 12 May to 31 August and a daily bag limit of 1 fish from 1 September to the end of the season.

<table>
<tr><td></td><td>The Bye-law also provides for the use of single hooks and prohibits the use of worms as bait once the specified number of fish have been caught in the specified periods.

Conservation of Salmon and Sea Trout Bye-Law No. 830 of 2007 provides for catch and release in respect of salmon and sea trout (over 40 cm) in specified rivers and associated conditions.

Conservation of Salmon and Sea Trout Bye-Law No. C.S. 293, 2007 prohibits angling for salmon and sea trout (over 40 cm) in specified rivers that are not meeting their conservation limits.</td></tr>
<tr><td>Number of rivers</td><td>In Ireland, there are 148 designated salmon rivers.

Approximately 70 are small rivers with an annual rod catch less than ten salmon annually but are important from a bio-diversity perspective.

About 45 rivers can be described as important rod angling salmon fisheries with an annual average rod catch exceeding 100 salmon while a further 20 record a rod catch exceeding 50 salmon annually.

In 2007, of the total number of salmon rivers in Ireland (148), 41 rivers were open for taking salmon. A further six rivers were open for catch & release.</td></tr>
<tr><td>Number of fishermen</td><td>There were 19,879 salmon rod licences issued in 2007.

<table>
<tr><th>Licence Type</th><th>Number issued in 2007</th></tr>
<tr><td>All District</td><td>2,559</td></tr>
<tr><td>Single District</td><td>7,786</td></tr>
<tr><td>Juvenile</td><td>1,127</td></tr>
<tr><td>21 day licence</td><td>5,892</td></tr>
<tr><td>1 Day licence</td><td>2,044</td></tr>
<tr><td>Foyle Extension</td><td>365</td></tr>
<tr><td>Local Area Licence</td><td>106</td></tr>
</table>
</td></tr>
</table>

	Total 19,879 Prior to rivers being closed on conservation grounds in 2007, the average number of salmon rod licences taken out over the 2001-2006 period was 31,088.
Number of fishing days	It is not possible to determine the number of fishing days from salmon rod licence logbooks as anglers generally do not record days when no salmon were captured.
Demographic characteristics: e.g. age, gender	*The INDECON report (2003) reported on the breakdown of overseas salmon anglers by age. The data indicates that almost one-half of visitors were between 35 and 54 years of age. In fact, overseas salmon anglers tend to be slightly older on average than overseas holidaymakers as a whole.* *Data was also presented on overseas salmon anglers according to social class. Overall, 45% of visitors were in the managerial/professional (AB) social class, 38% were white collar (C1) workers, 13% were skilled workers (C2), while 5% were unskilled workers (5%).* No current data is available for domestic salmon anglers.
Catch, CPUE, mean annual reported catch	Since the introduction of the tagging and logbook scheme in 2001, anglers are obliged to tag rod caught salmon. The total reported number of salmon caught by rod and line and tagged in 2007 is estimated at 30,826 fish. A raising factor is applied to this number to account for anglers not returning logbooks.The previous 5 year average (2002-2206) was 24,268 rod caught salmon. In 2007, of the total number of salmon rivers in Ireland (148), 41 rivers were open for taking salmon in 2007. A further six rivers were open for catch & release.
Market value (e.g. of catch, including trends, fishing rights)	Salmon angling has been estimated (Indecon Report, 2003) to generate €11 per annum. The Report of the Independent Group (2006) concluded that the 2003 *Indecon* analysis presents an absolutely minimal estimate of the value of salmon angling and that the real value is a multiple of the estimates given. The contribution of overseas anglers to the Irish economy could be as high as €38 million while a domestic angler total value of €51 million could be derived. Since 2001, salmon and sea trout > 40cm caught by rod and line are prohibited to be sold.
Gear in use, preferences of gear	For salmon caught and retained over the 2006 & 2007 season, 38% were taken on fly, 29% on spinner,

	25% on worm and 7% on prawn/shrimp. For salmon caught and released, 55% were caught on fly, 29% on spinner, 10% on prawn and 5% on worm. There are angling regulations in place restricting the angling method on some rivers, .i.e. some rivers are fly only rivers. National regulations impose single barbless hooks and no worm fishing on rivers only open for catch and release.
Types of fishing licensing – prices, indicators	There are a range of salmon licences available for salmon fishing; • Annual licence to fish all Fishery Districts, price; €134 • District only licence (only permits fishing in one specific District) price; €64 • 21 day all District licence, price; €50 • Juvenile licence, price; €20 • Special one day licence price €36 A salmon conservation component was introduced for salmon rod licences in 2007. The conservation component was equal to the existing licence fee. The conservation component was introduced to implement a programme for rehabilitation of salmon stocks giving priority to rivers below their conservation limits in special areas of conservation which have the greatest prospect of recovery. Once an angler is in posession of a valid salmon fishing licence, a permit must be obtained to fish any particular stretch of water. Some salmon angling clubs operate an annual permit which can range from €50- €200 per season. Day permits on private salmon beats can cost from €75 - €200 per day.
Costs connected with the activities	In a 2002 report (INDECON, 2003) overseas anglers were estimated to make an average of two trips to Ireland each year, spending an average of €406 per visit giving an annual gross spend of €10 million. To gain an idea of the net worth to the economy however *Indecon* discounted this figure by 40% to take account of the import component of that spend leaving a total value of overseas angling of €6 million. However a more recent report (Report of the Independent

	Salmon Group, 2006) concluded that this is likely to be a considerable underestimate and given that reported daily spends ranging from a low of €20 to a high of €3,000, an average spend as high as €2,642 per visit could be derived which would value their contribution to the Irish economy at €38 million. Domestic anglers account for the bulk of the licences issued. *Indecon* found that these anglers made frequent (6) but short (2.5 days) trips. Their average daily spend was estimated at €136.50 giving a total value of €51 million. *Indecon* suggested that as much as 85% of this total would have been spent on alternative activities in Ireland were the anglers not salmon fishing. The resulting total was discounted by 40% giving a value of €4.6 million to the Irish economy. No evidence is provided for this presumption and given the fact that anglers tend to be very faithful to their sport, not participating in alternative activities to any great degree, this was questioned in the Report of the Independent Group (2006).. The Report of the Independent Group concluded that the 2002 *Indecon* analysis presents an absolutely minimal estimate of the value of salmon angling and that the real value is a multiple of the estimates given.
Willingness to pay (if possible, divided into marginal and total willingness to pay)	No data is available on anglers willingness to pay. The closure of a large number of rivers to salmon angling since 2007 has had an impact of angling opportunities for some anglers. Introduction of the salmon conservation component in the licence fee may also have been a contributory factor to the one third reduction in licences issued in 2007. Conversely, the cessation of drift net fishing has resulted in increased runs of salmon to rivers. No recent studies are available on this subject
Motivation	There is no commercial motivation for salmon angling as there is a ban on the sale of rod caught salmon.
Magnitude of and attitude towards Catch & Release	The practice of catch and release has been increasing in recent years and in 2006, anglers returned 22% of the salmon catch taken by rod and line, up from 12% in 2005 and 10% in 2004. In 2007, river specific quotas were in place on 41 rivers. Anglers could not harvest more than the number of salmon available in the angling quota for a specific river. This resulted in many salmon being caught and released. A further six rivers were open for catch and release only in 2007. In total, 13,893 salmon were estimated to be caught and released from a total provisional estimated rod catch of 30,826, giving a provisional catch and release estimate of 45.1% for

	2007. With river specific angling quotas in place on rivers, daily and season bag limits in place for anglers and some rivers only open on a catch & release basis, catch & release will represent a significant proportion of the Irish salmon catch into the future.
Number of businesses/number of jobs created by /depending on a salmon fishery	No current data available

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	No formal salmon watching takes place. Irish and foreign tourists do watch salmon jumping at locations below falls or weirs, (Aasleagh falls on the R.Erriff, Galway salmon weir, Ballysodare falls, etc). A number of educational facilities are in place (Burrishoole Visitor Centre, River Eske Centre, Galway Fishery live camera, Waterville Development Association facility).
Demographic characteristics: e.g. age, gender of users	N/A
Costs connected with the activities	N/A
Willingness to pay (if possible, divided into marginal and total willingness to pay)	N/A
Motivation	N/A
Number of businesses/number of jobs created/depending these activities	N/A

Existence of salmon	
Main stakeholders	
General public also including Fishing right holders, Fishermen and Fishing related industries	The importance of the salmon is mainly linked to commercial, recreational and cultural aspects rather than just the existence of salmon *per se*. However, this concept is unassessed and may be more important than known presently given the general public are aware of the importance of such issues as legacies for future generations etc Commitments arising from the designation of SACs for salmon under the habitats directive place a real onus on the conservation of stocks and imply investment in the protection and restoration where necessary.
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	No survey has been carried out in this regard

Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries	
Main stakeholders	
Indigenous people (Sami people, first nations…)	Salmon and themes relating to salmon are prevalent in Irish folklore and mythology and are therefore an integral part of the social and cultural lives of the Irish people. There are few if any ceremonial aspects to Irish life relating to salmon apart from some specific festivals surrounding the start or high points of the salmon season e.g the Ballina salmon festival etc.
People carrying out historic fishing activities	Draft netting and other traditional inshore commercial fishing methods such as snap nets, loop nets, bag nets and head weirs have been fished for hundreds of years in Ireland. Snap netting is a traditional form of salmon fishing in the Southern region. No licences for snap nets were issued in 2007 to allow river stocks to recover and meet conservation limit. Loop nets were fished in Donegal while bag nets were fished in Cork and Kerry. Head weirs have been fished on the larger rivers like the Moy, Corrib and Boyne. Records of a head weir/ trap fishery for salmon exist since the thirteenth century on the River Corrib. While it is argued that the salmon fishery is a very important and irreplaceable part of the income of certain sectors for example the island communities' commercial fishery, continued indiscriminate harvest at sea and in river that do not meet their conservation limits has been discontinued on conservation grounds in compliance with the habitats directive and alternative hardship payments and assistance towards identifying alternative sources of income have been provided by the State.

Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	Salmon are perceived by the general public and stakeholders in Ireland to be representative of clean environments. The plight of the Atlantic salmon and current low population sizes are well publicised and there is an appreciation of the pressure the species is under from human influences including environmental and climate changes
Genetic reserve for aquaculture	Not an aspect considered generally
Genetic reserve for the survival of the species under changing (climate) conditions	Considered important by general public and stakeholders in terms of legacy issues and the responsibilities of this generation for safe-guarding the species into the future
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	Listing salmon as an Annex II species under the Habitats Directive has had major implications. In 2006, the Standing Scientific Committee provided the following advice to the National Salmon Commission, • The overall exploitation in most districts should be immediately reduced, so that Conservation Limits can be consistently met. • Furthermore, due to the different status of individual stocks within the stock complex, mixed stock fisheries present particular threats to the status of individual stocks. • Thus, the most precautionary way to meet national and **international objectives** is to operate fisheries on river stocks that are shown to be within precautionary limits i.e. those stocks which are exceeding their Conservation Limits. • Fisheries operated in estuaries and rivers are more likely to fulfil these requirements. The Irish Government committed to aligning with scientific advice in 2007 thus implementing NASCO and ICES recommendations and complying with the Habitats Directive. As a result of this decision, there was a cessation of mixed stock fishing around the Irish coast. Of the 148 salmon rivers, 43 rivers were open for harvesting salmon in 2007. The remaining rivers were closed to salmon exploitation to allow salmon stocks to recover.

EU-UK(England & Wales)

1.0 Commercial salmon fisheries (including heritage fisheries) and subsistence fisheries

1.1 Identification of stakeholders

1.1.1 Fishing right holders:

- No comprehensive list of fishery owners exists for either fresh or tidal waters.
- In practice, fishing with methods other than rod and line (covered in section 2) is now limited almost entirely to tidal waters.
- Except in a few places, there is a public right to fish in tidal waters though in practice this is constrained.

1.1.2 Fishermen other than fishing right holders:

- Everyone fishing for salmon in England and Wales must have a licence.
- In 2006, there were 337 licensees for salmon fishing with instruments other than rod and line (excluding the sea trout fisheries in Anglian region). In addition, there were 608 'endorsees', authorised to assist licensees, totalling 945 people.
- All but about 20 licences relate to public fisheries.

1.1.3 Commercial fishing related industries:

- These would include fishmongers, fish smokers, hotels, and restaurants, but they have not been documented.
- Few would have wild salmon as a major component of their business.

1.1.4 Legal basis for commercial fisheries, fishing regulations:

- The number of licences issued is limited by law for almost all fisheries, whether public or private.
- The price of a licence for 2006 ranged from £67 to £1113, depending on the instruments licensed.
- Existing licensees usually have the right to retain a licence from year to year, provided that they are 'dependent on fishing for their livelihood', creating a pseudo-private fishery in public waters,.
- The areas of operation, methods, seasons and weekly times for fishing are constrained by byelaw.
- A fuller description of the fisheries and their allowable effort can be found in the Annual Assessment of Salmon Stocks and Fisheries, 2006, a preliminary assessment prepared for ICES by CEFAS & Environment Agency in April 2007 (Link 1 below).

1.1.5 Number of fishermen:

- The number of fishermen (licensees plus endorsees) has been falling steadily, from 2456 in 1985 to 935 in 2006.

1.1.6 **Demographic characteristics:**

- These are not documented but most, if not all, are male and middle-aged or older.

1.1.7 **Catch, CPUE (mean annual reported catch)**

- 13,578 salmon in 2006 with a weight of 50.5 tonnes
- The 5-year mean is 26, 427 salmon but fishing effort has been greatly reduced over this period, so is not a good indicator of the average catch that might currently be expected.

1.1.8 **Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)**

- **First sale** prices paid by fishmongers to netsmen: average rates for salmon range from £6.50/kg (Solway) and £10/kg (Severn estuary) to about £11/kg (North East coast) in 2007. A price of £10/kg for 50 tonnes gives a **gross first sale value** of the salmon net catch of £0.5 million for 2006. The price paid to netsmen has increased from about £4.80/kg in 1996 (adjusted to 2007 prices).
- Price of salmon at Billingsgate **fish market**, London (courtesy of the Fishmongers Company): Having declined in real terms from the late 1970s to the mid-1990s, following the price of farmed salmon, the price of wild salmon in August has since trebled to £17.50/kg in 2007. The price of farmed salmon was £3.25/kg and has changed little over the past decade. So the market will pay a substantial and increasing premium for wild salmon. While this is in part due to reduced supply, wild salmon is now widely considered as superior to farmed. Harrods in London is reported to now sell 90 percent wild salmon, compared to 50 percent ten years ago.
- Price of wild **smoked salmon** (from internet, 2008): from £45/kg (Severn & Wye Smokery) to £89/kg for a side (H. Forman, London). Smoking and marketing adds value, and again smoked wild salmon carries a high premium over farmed.
- **Buyouts**: where netsmen have accepted compensation to surrender their right to a licence, this might be a measure of their perception of the capitalised stream of their potential future nett benefits from the fishery. The buyout of 52 licensees of the North East coast drift nets indicates an approximate, average value of about £34/kg of salmon and sea trout relative to the size of the catch in 2002. Other factors than current catch are thought to have influenced individual netsmen's willingness-to-accept a buyout, including the future potential of the local fisheries for salmon and alternative species.

1.1.9 **Types of gear in use, number of gear**

- These are described annually in the report to ICES for England & Wales, see section 1.1.4 above.
- Of the 327 salmon licences issued in 2006: 52 were for gillnets; 58 for sweep nets; 147 for hand-held nets; 65 for fixed engines; and 5 for both drift net and T-net.

1.2 **Costs associated with the activity:**

- No assessment has been made of the licensed netsmen's costs since 1996, when they were estimated as about £1 million (adjusted to 2007 prices).
- It is inappropriate to extrapolate from these because of major changes in fishing effort – there are only about half the number of licensees now, a substantially shorter season, and the balance of instruments is different.

1.3 **Motivations for fishing:**

- While most netsmen sell a large part or all of their catch, it is probable that for many the activity is not purely commercial.
- In past consultations over regulations, some netsmen have indicated that they fish for enjoyment rather than profit. Notably, the Solway Haafnetters Association, about 96 licensees, have previously asked to be considered as recreational fishermen, like anglers. However, these netsmen do sell large numbers of salmon and sea trout.
- Most fishermen use traditional fishing techniques, some going back hundreds of years and/or are a locally specific – for example: putchers, haaf, lave or coracle nets. For some, maintaining local traditions seems to be a significant motivation.

2.0 Recreational salmon fisheries

2.1 **Identification of stakeholders**

2.1.1 **Fishing right holders:**

- Almost all fishing rights for salmon in freshwater are privately held. Owners usually charge anglers for permission to fish.

2.1.2 **Fishermen:**

- In addition to having permission of the fishery owner, every salmon angler must have an Environment Agency rod licence.

2.1.3 **Sport fishing related industries:**

- Salmon angling contributes directly to a range of businesses though no descriptive statistics are available.

2.2 **Legal basis for recreational fisheries:**

- On most rivers, especially where the fishing is owned or managed by clubs or fishing associations, access to fishing can be obtained for a fee. On some rivers, opportunities to fish are limited because the owners restrict access.
- No comprehensive list of fishery owners is maintained.

2.3 **Number of rivers:**

- The Environment Agency reported salmon rod catches for 74 named rivers in England and Wales (including the Border Esk on the Scottish border) in 2006. In sixteen of these, the declared catch was less than ten salmon. The Tyne produced most, having a declared rod catch of 3,795 salmon.

2.4 **Number of salmon fishermen:**

- From almost 27k in 1994, when the current national licence structure was created, the number of annual licences declined to about 18k in 1999 before increasing again in recent years.
- In 2007, about 23k annual rod licences and 9k short-term rod licences were sold for salmon fishing. Some anglers may buy more than one short-term licence.
- In 2005, when about 34k salmon rod licences of all types were sold, about 26k people held rod licences to fish for salmon. Almost all were residents of England or Wales.

2.5 **Number of fishing days:**

- Anglers are required to declare the number of days fished for migratory salmonids each year.
- Over the past five years, about 180k days fishing for migratory salmonids, salmon and/or sea trout are declared on catch returns. In 2006, a follow-up survey indicated that about 25 per cent these were targeted at sea trout only so that about 135k of the declared days are fished for salmon.
- Actual totals will be higher than those declared. Though most licence holders make a catch return, not all declare their fishing effort as required.

2.6 **Demographic characteristics of anglers:**

- Over 95% of salmon rod licence holders are men, most of whom have been fishing for many years.
- A survey in 2001 indicated that they tend to be older than freshwater anglers in general: about 60% were over 45 years old.
- They come from all classes, but a higher proportion (about 25%) are in social classes A&B (professional and managerial) than anglers or the population in general.

2.7 **Catch, CPUE, mean annual reported catch**

- The declared rod catch in 2006 was just under 20k salmon, close to the 5-year mean, of which slightly more than half were released.
- The average weight was about 4kg, giving a total rod catch of about 80 tonnes.
- 61% were less than 3.6kg; 33% were >3.6-6.4 kg; 6% were>6.4kg
- On average, it took about 8 days fishing for salmon to catch one.

2.8 **Market value (e.g. of catch, including trends, fishing rights)**

- Although angling is generally considered a recreational activity and a ban on the sale of rod-caught salmon is imminent, some anglers currently sell their catch. As indicated in section 1.1.8, they might expect to obtain about £10/kg for a fresh-run salmon. So, on average, each fish caught might be sold for about £40. However, many fish are not fresh-run and would fetch a lower price.
- In their 1991 study, Radford and his colleagues surveyed fishery owners and estimated that, on average across England and Wales, owners considered that

each salmon in the 5-year average rod catch ('per capita value') contributed about £9000 (at 2007 prices) to the value of their fishing rights.

- Since then, land agents have indicated that the market value of salmon fishing rights declined sharply. Though it has been rising again it has not reached the levels in the early 1990s. Judging from prices reported in the angling press, the current per capita value for salmon in England and Wales is probably between £5k and £8k.
- This market value might be taken as the average, capitalised value of the future stream of nett benefits per fish to the fishery owners. If each fish weighs on average 4 kg, that indicates a capitalised value of £1k to £2k per kg in the 5-year mean rod catch.
- The total value of salmon angling rights in England and Wales is in the order of £100-£150 million.

2.9 **Gear in use, preferences of gear:**

- Of the 2006 salmon rod catch, 43% were taken on spinner; 38% on fly; and 16% on bait.
- These proportions may not represent preferences as many rivers restrict the use of bait and/or spinner at certain times.

2.10 **Types of fishing licences:**

- An annual Environment Agency salmon rod licence cost £66.50 in 2007; with a half-price concession for disabled, senior (over 65) or junior (12-16) anglers. A one-day licence cost £7.
- Permits from fishery owners, where they are available, vary enormously in price. Day permits are generally from £15 to £60 reflecting the size and quality of the beat and the number of people fishing. On the Wye, a Visa rover permit offers access every day to a range of beats at £750 for the 2008 season. However, fishing for one day per week on some beats can exceed £1200 for the season. Permits on more crowded association waters are significantly cheaper, for example, £142 for the season at Llandysul on the Teifi.

2.11 **Costs connected with the activities:**

- In a recent study (Annex 1, Link 2) annual expenditure by salmon and sea trout anglers was estimated to be about £30 million for 430k days fished in England and Wales, indicating a mean expenditure per day of about £70.
- This estimate not only included trip costs, (such as travel, bait, permit, accommodation) but also non-specific costs (such as magazines, equipment, specialist clothing and footwear).

2.12 **Willingness to pay:**

- No recent studies have been made of salmon anglers' nett willingness to pay, that is their consumer surplus.
- A study of willingness-to-pay in 2001 estimated average consumers' surplus for game anglers at about £3.30/day (adjusted to 2007 prices). However, most game anglers fish for non-migratory trout not salmon. Given the generally higher expenditure by salmon anglers, this may be an underestimate for salmon fishing.

2.13 **Motivation:**

- There has been no study of salmon anglers specifically. A recent study (see Annex 1, Link 3) confirmed that freshwater anglers in general fish for pleasure and recreation.
- However, as indicated in 2.8 above, some anglers also derive some commercial benefit from their catch.

2.14 **Magnitude and attitude towards catch & release:**

- 56 percent of the declared catch was released in 2006. This has risen from 10 percent in 1993.
- While the need for at least some catch & release is widely accepted amongst anglers, a proportion has been strongly against it. It has been mandatory before 16 June since 1999, and angling effort has fallen subsequently.
- Licence sales fell by 12 percent from 1998 to 1999 but have since recovered almost to previous levels.
- The number of days fished over the season, declared on catch returns, fell by 21 percent but has not recovered significantly since.
- A telephone survey of anglers indicated that fishing effort before 16 June fell by about 40 per cent after the introduction of mandatory catch-and-release.
- However, the voluntary practice of catch and release from 16 June has been increasing indicating an increased acceptance of the practice.
- Also recent consultation on continuing mandatory catch and release before 16 June indicates broad support, compared with significant antipathy to its introduction in 1999.

2.15 **Number of businesses/ number of jobs created by/ depending on a salmon fishery**:

- As part of a wider project, summarised in Annex 1 (Link 2), an economic impact study has just been completed for freshwater angling in England and Wales which assesses impacts on both regional and national economies.
- For England and Wales as a whole, salmon and sea trout angling contributes (through direct, indirect and induced effects) about £29 million to household incomes (gross value added or GVA), supporting about 1200 full-time job equivalents (FTEs).
- However, if salmon fishing were to cease (for example, because of *Gyrodactylus*) only some of these jobs, about 450 FTEs, would be lost, as current expenditure on salmon angling would be diverted elsewhere within the national economy.
- Specific estimates are separately available for the local economies of Wales and each of the nine English regions.
- For example, salmon and sea trout angling contributes about £32 million to household incomes in Wales, supporting about 260 full-time job equivalents (FTEs). If it were to cease entirely, 140 jobs would be lost in Wales and with them about £3 million income to Welsh households.

- Estimates of average marginal impact are also available nationally and for each region. For example, nationally, roughly one FTE job would be generated for every extra 1000 days salmon fishing generated or lost.

3.0 Non-consumptive uses

3.1 Description of non-consumptive uses:

- Salmon tours of salmon leaps and spawning areas are organised by local rivers trusts in the autumn which are fully subscribed usually by angling interests.
- Informal watching of salmon and sea trout is common wherever accessible 'salmon leaps' exist. At one well-known falls in Wales, Annual expenditure by visiting coach parties in the vicinity of a well-known falls has been estimated at £50k annually.
- Links with local art projects, such as the Tyne Salmon Trail ('an iconic interactive art project celebrating the Tyne as England's premier salmon river').
- The scale and impact of these uses are generally not documented.

4.0 Existence of salmon

4.1 General public including fishing right holders, fishermen and fishing related industries, willingness-to-pay:

- An assessment of the total value of salmon to the general public, has just been completed for England and Wales (Link 3); Annex 1 is a summary of the whole project.
- The average willingness-to-pay per household to prevent a severe decline in salmon stocks from a disease (an analogy for *Gyrodactylus*) was £15.80 per year for 25 years.
- Willingness–to-pay was highly variable and skewed: about a third were not willing to pay anything, whilst a few would pay a hundred or more pounds per year.
- Aggregating across all households gives a total of willingness to pay of £350 million per year.
- If it were deemed appropriate to capitalise this over the 25 years, it would equate to a present value of £6 billion. This is about 50 times greater than the estimated capital value of fishing rights (see 2.8 above) indicating that the existence value is the most significant component.
- Efforts were made in this evaluation to separate the public's valuation of salmon from that of general river quality.
- Estimates were made of the contribution of individual rivers to the total. The Thames was estimated to contribute £3.2 million per year and the Wye at £4.9 million per year. These estimates are an order of magnitude less than previous estimates of 'existence value' for these two rivers. In part this probably reflects the recent evaluation's separation, in part at least, of salmon from general river quality.
- A separate assessment, a choice experiment, looked at proportional changes in willingness-to-pay relative to stock status. As indicated in Figure 1, any improvement in stock status for salmon was significantly valued. In contrast,

stocks of other freshwater fish were apparently not valued by the public if they were poor.

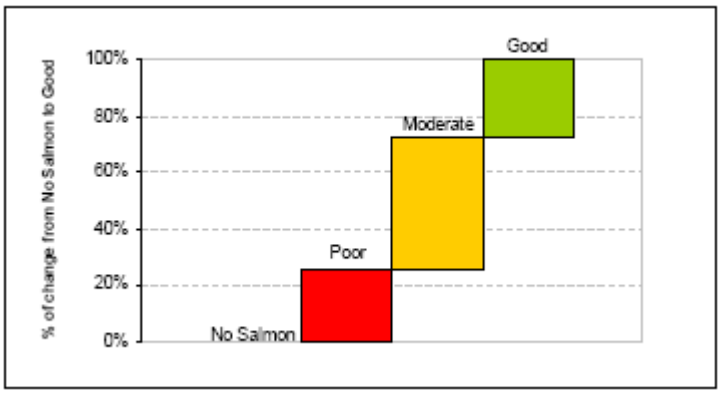


Fig. 1: Willingness to pay to move between different levels of salmon stocks

5.0 Social ceremonial and cultural aspects

5.1 Main shareholders

5.1.1 Indigenous people:

- Salmon are linked into local culture in various parts of England and Wales.
- Example: the 'salmon of knowledge' in the Welsh folk tales – the Mabinogion.
- Example: they appear on pub signs and in the names of hotels.
- Example: the salmon is one of the four Dacre beasts, heraldic symbols.
- Example: they appear in modern sculptures such as at Ross-on-Wye.

5.1.2 People carrying out historic fishing activities:

- Most salmon fishing methods other than rod and line in use on England and Wales have a long tradition and at least some local cultural significance.
- Example: there is a mural next to the Exe estuary depicting seine netting.
- Example: the haaf net fishery in the Solway estuary is reputed to go back over a thousand years to Viking times.
- In 2004, a contingent valuation of coracle fishing (Link 4) , specific to Wales, indicated that the Welsh people would be willing to pay £1.5 million, as a one-off payment, to maintain a minimal fishery, though little more to sustain a higher level of fishing. The Welsh Assembly Government has recognised the cultural significance of certain salmon net fisheries.
- The same study valued a minimal traditional fishery on the Severn estuary (putchers, stop boats, seine nets and lave nets) at in excess of £5 million. Willingness to pay was higher on average for people living locally.
- 38 percent of the people surveyed expressed an interest in visiting the Severn to observe traditional fishing.
- There are a few open days and a visitor centre for some traditional net fisheries in the Severn Estuary.
- It is likely that raising awareness of these historical methods would also raise their value to the general public.

6.1 Environmental aspects with particular reference to biodiversity value:

6.1.1-6.1.3 No information available.

6.1.4 **Value and impact of listing salmon, such as under the EU Habitats Directive:**

- no evaluation has been made of the costs associated with reviews of consents on rivers listed under the Habitats Directive.
- techniques are being developed to evaluate benefits derived from improving the ecological status of rivers in line with the Water Framework Directive but these do not consider the salmon separately.

Links:

1. Annual Assessment of Salmon Stocks and Fisheries in England and Wales 2006
   http://www.environment-agency.gov.uk/subjects/fish/165773/169852/1748738/?version=1&lang=_e

2. Economic evaluation of inland fisheries: the economic impact of freshwater angling in England and Wales.
   http://publications.environment-agency.gov.uk/pdf/SCHO1207BNNW-e-e.pdf

3. Economic evaluation of inland fisheries: Welfare benefits of inland fisheries in England and Wales.
   http://publications.environment-agency.gov.uk/pdf/SCHO1207BNNV-e-e.pdf

4. Method for assessing the heritage value of net fisheries.
   http://publications.environment-agency.gov.uk/pdf/SCHO0904BIDF-e-e.pdf

Annex 1: Economic evaluation of inland fisheries
Environment Agency Science Summary, SC050026/SS

science summary

www.environment-agency.gov.uk

Economic evaluation of inland fisheries

Science Summary SC050026/SS

Research commissioned by the Environment Agency and the Department for Environment, Food and Rural Affairs (Defra) has looked at economic aspects of freshwater fish and fishing. Expenditure by freshwater anglers in England and Wales supports about a billion pounds of household income equating to 37,000 fulltime jobs. A separate study assessed the total economic value of salmon. It concluded that, on average, the public would be willing to pay £15.80 per household per year to prevent a disease causing a severe decline in salmon stocks. Across England and Wales this amounts to a value of around £350 million per year.

Two reports, Module A and Module B, were produced for this study. Module A used a contingent valuation survey to estimate the general public's willingness topay (WTP) to preserve salmon stocks. Choice experiments examined the relative values to the public of changes in salmon stocks; stocks of other freshwater fish; and general river quality. The health and social benefits of angling are touched on. Module B estimated the annual expenditure on different types of freshwater angling in England and Wales, along with the economic activity and jobs supported by this angling, and the likely impact on regional economies of changes in the level on angling activity.

Module A: Welfare benefits of inland fisheries in England and Wales

i) Contingent valuation method: Impact of a severe decline in salmon

A face-to-face survey of 911 members of the general public was carried out in the summer of 2006 in 23 locations, with the profile of respondents broadly representative of the population of England and Wales. The contingent valuation survey found that mean WTP to prevent "a severe decline in all salmon populations across [England and Wales], with 95 per cent of salmon being lost for at least 25 years" was £15.80 per household per year.
Aggregated across all households in England and Wales, this amounts to a total of around £350 million per year.

Potential biases were considered and addressed. The most likely source of bias was if some respondents included general river quality (rather than just salmon stocks) when considering their WTP; if so, the above figure would be an overestimate. This was minimised by using a scenario that focused on salmon alone, analogous to the impact of the introduction and spread of a parasite on salmon, *Gyrodactylus salaris.*

WTP was higher in people who used rivers more frequently, had higher incomes, had some educational qualifications, were older or had fewer children.

Follow-up questions investigated how this total WTP should be allocated between individual rivers. WTP was higher for longer rivers than for shorter ones, but was not affected by the river being in an urban/rural setting or having protected status for salmon. Evidence was found of 'distance decay', with WTP for a named river decreasing as the distance between the place of residence and the river increased.

ii) Choice experiment: Value of different changes

The public survey incorporated a choice experiment, which looked at the magnitude of WTP for changes between four levels of quality (good, moderate, poor and dead/none), for each of three attributes (number of salmon; other fish; general river quality).

Policies that aimed to improve rivers from 'dead' to a 'poor' state had little impact on welfare, but moving from 'poor' to 'moderate' had a large WTP effect. A further improvement to 'Good' would generate significant further benefits.

Substantial 'loss aversion' was also found, where WTP to prevent a loss in quality was significantly greater than WTP for a comparable improvement.

iii) Health and social welfare

Module A assessed the physical exercise gained from angling through a survey of anglers. No evidence was found of a significant increase in physical exercise compared to alternative activities. Aspects such as the relaxation obtained and the "break from everyday life" were found to be much more important benefits.

Module B: The economic impact of freshwater angling in England and Wales

The Environment Agency holds a list of all anglers licensed to fish in England and Wales. Three thousand anglers from this list were telephoned to identify,:

1) The number of angler days undertaken in the last year for three fish species (coarse; trout; salmon and sea trout) and three surface water types (canals; stillwaters; rivers).

2) Angler expenditure whilst fishing for the three fish species

3) Anglers' likely action if the types of angling they did were not available.

Separate results are presented for Wales and for each Government Office region in England, as well as for England and Wales as a whole.

An internet survey, using the same questionnaire as the phone survey, received a further 4,000 responses.

The number of licence holders in each 'region' was used to scale up observations on the average number of angler days for each fish species/region/surface water combination. The study found that licensed anglers undertook a total of 30 million angler days on inland fisheries in England and Wales in 2005, with 26 million on coarse angling.

For each species, estimates were made of the total expenditure by anglers, looking at the proportion of expenditure that had a regional impact and the magnitude of that (direct) effect. The project used the DREAM® suite of models developed by CogentSI Ltd to estimate the direct effect and subsequent knock-on effects, calculating the total number of jobs and household income supported by angling expenditure. For example, across England and Wales, anglers' gross expenditure was £1.18 billion, which supported around 37,000 jobs and £980 million of household income.

The economic impact of ceasing a type of angling was then assessed for each species/region combination, by identifying how much expenditure would be lost and what the impact would be on income and employment.

Average estimates are presented of the economic impact of marginal changes in the level of each type of angling in each region. With caution, these could be used to indicate the regional and national economic impact of increases or decreases in angling activity.

Summary

Module A estimated the welfare benefits of angling and the value of fish stocks to the general public. Module B explored the expenditure by anglers in England and Wales. These reports should be of interest to decisionmakers at national, regional and local levels. Specific uses could include informing the Periodic Review; selecting measures under the Water Framework Directive; prioritising investment in fisheries; developing Salmon Action Plans; and designing programmes to control outbreaks of fish disease.

This summary relates to information from Science Project SC050026/SR, reported in detail in the following output(s):-

Science Project SC050026/SR1

Title: Economic Evaluation of Inland Fisheries: Welfare benefits of inland fisheries in England & Wales

ISBN: 978-1-84432-850-5 December 2007 Product Code: SCHO1207BNNV-E-P

Science Project SC050026/SR2
Title: Economic Evaluation of Inland Fisheries. The economic impact of freshwater angling in England & Wales

ISBN: 978-1-84432-851-2 December 2007
Product Code: SCHO1207BNNW-E-P

Internal Status: Released to all regions
External Status: Publicly available

The project was initiated and managed for the Environment Agency by Guy Mawle, Fisheries Policy Manager, Environment Agency, Rio House, Waterside Drive, Bristol, BS32 4UD

Lead Research Contractor: Jacobs UK Ltd., 27 Abercromby Place, Edinburgh EH3 6QE. Keith Lawrence and James Spurgeon were authors of Module A in collaboration with Professor Ken Willis of the University of Newcastle; and Rainbow Research.

Module B Research Contractor: Alan Radford, and Geoff Riddington, both of Glasgow Caledonian University, and Hervey Gibson of CogentSI Ltd.

This project was funded by the Environment Agency's Science Group and Defra. The Science Group provides scientific knowledge, tools and techniques to enable us to protect and manage the environment as effectively as possible.

Further copies of this summary and related report(s) are available from our publications catalogue on or our National Customer Contact Centre T: 08708 506506
or E: enquiries@environment-agency.gov.uk.

EU-UK(Scotland)

Commercial salmon fisheries	
Identification of Stakeholders	
Fishing right holders	All salmon fisheries are privately owned. Owners may be individuals, companies, Local Authorities, Crown Estate, Scottish Government (not let).
Fishermen other than fishing right holders	Some fisheries are operated by tenants.
Commercial fishing related industries	Boat-building; net supply; rope, chain and anchor supply; fish box supply; ice machine supply; road haulage; salmon smoking
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	**All** salmon fishing in Scotland, including in the sea, is operated by way of **private, heritable titles which may be held in association with or separate from any land**. Fisheries may be operated by the owners of the rights or by tenants. Methods of fishing are prescribed in the **Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003**, and methods of construction of nets (including dimensions of nets, mesh size, twine thickness, hanging ratios) are defined in the **Salmon (Definition of Methods of Net Fishing and Construction of Nets) (Scotland) Regulations 1992**, as amended in 1993 and 1994. Monofilament twine may not be used in any part of a net used in fishing for salmon. No part of any net may be designed, constructed or used to catch salmon by enmeshing them. The 2003 Act specifies a weekly close time of 60 hours, and an annual close time of a continuous period of not less than 168 days (153 days in the Tweed District). Start and finish dates of the annual close time differs slightly in different districts, but the fishing season generally extend from mid February until end August. Members of the Salmon Net Fishing Association of Scotland have agreed not to fish before 1 April. In the Esk salmon fishery district, the end of the annual close time has been changed from 15 February until 30 April (**The Annual Close Time) Esk salmon Fishery District Order 2005**) i.e. netting not permitted until 1 May, and netting effort in the period 1 May

	until 31 May has been capped (**The Conservation of Salmon (Esk Salmon Fishery District) Regulations 2005.)**
Number of fishermen including trends	Net & Coble – annual index of no employed [(max+min)/2] for period 1994-2006. Declined from 925 (1994) to 259 (2006) Fixed Engine - annual index of no employed [(max+min)/2] for period 1994-2006. Declined from 547 in 1995 to 228 in 2001, then rose to 254 in 2005, and 244 in 2006. NB – these data exclude fixed engine fishermen in the Solway, where effort recording comparable with that for fixed engines elsewhere in Scotland has not been possible.
Demographic characteristics of fishermen: e.g. age, gender	This has not been documented, but there are few under 50 years of age, and almost exclusively male.
Catch, CPUE, (mean annual reported catch)	Catch – 2006 figures (wild salmon only): Net & Coble – 4461 Grilse (8.8 t) - 1700 MSW salmon (7.7 t) Fixed Engines – 13091 Grilse (28.8 t) - 5709 MSW salmon (27.6 t) CPUE – 2006 figures (1SW+MSW) Net & coble – 75.1 fish per crew month Fixed Engine – 55.6 fish per trap month NB CPUE derived by: Net & Coble – catch/median crew month value Fixed Engine – catch/median trap month value NB – these data exclude fixed engine fishing in the Solway, where effort recording comparable with that for fixed engines elsewhere in Scotland has not been possible because of the way gear units are recorded in different fisheries. ***See annexed graphs for 1952-2006, netting catch, effort and CPUE.***
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	Market value of catch – first sale estimate based on an average price of £15/kg and 73 tonnes catch - £1.1M. Catch has declined from 1800 tonnes in 1967 to 73 tonnes in 2006. Prices have risen, however, and exceed £30/kg early in the season and on fish exported to Continental Europe.

	Smoked wild salmon prices from specialist smokers in Scotland are quoted at about £120/kg. Prices for fresh wild salmon are on average about 6 times that of farmed salmon. Smoked farmed salmon prices from specialist smokers in Scotland are quoted at about £50/kg. Capital value of all commercial salmon fisheries not known. Recent sales of individual stations have realised up to £0.5M, including land and properties.
Type(s) of gear in use, number of gear	Inside estuary limits – net and coble (sweep net) Outside estuary limits – net and coble; bag net, fly net or other stake net. In Solway Firth there are also haaf net and poke net fisheries. 2006 figures: Net and coble – 32 active stations Fixed engines – 45 active stations (including haaf and poke nets)
Costs associated with the activity	Coble (boat) – bag net fishing (with inboard engine) ~£15k Net and coble fishing (oars) ~£4k Nets – fixed engine + moorings e.g. 1 bag net +moorings ~£2k sweep net e.g. 80m net ~£2k Sweep net is expensive because of the materials used and the amount of work involved in rigging – different hanging ratios in different parts of the net. Information provided by working netsmen.
Motivations for fishing …(important for combined types of fishing)	Salmon fishing provides the principal source of income in many cases. Many fishermen are from salmon fishing families dating back several generations. Haaf net fishermen in Solway maintain that method dates back to Viking times, is a tradition of significant local importance, and undertaken largely for recreational purposes (although fish are sold).
Profitability	No data available

Recreational salmon fisheries	
Identification of main stakeholders	
Fishing right holders	All salmon fisheries are privately owned. Owners may be individuals, companies. Local Authorities, Crown Estate.
Fishermen	Owners, guests, paying tenants
Sport fishing related industries	
Guiding	Numerous companies, fishing organisations and individuals providing guiding facilities. Many beats on larger rivers provide a gillie as part of the lease.
Tourist businesses and local/rural service businesses (grocery, fuel…)	VisitScotland is promoting angling in general as a tourist attraction. On-line booking services provide real time data on catches, river levels, beat availability, accommodation etc.
Sport fishing equipment producers and retailers	Numerous tackle shops throughout Scotland, significant mail order and on-line sales of equipment.
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	**All** salmon fishing in Scotland is operated by way of **private, heritable titles, which may be held in association with or separate from any land**. Fishing may be operated by the owners of the rights or by persons with written permission from the owners (2003 Act). Rod and line fishing is defined in the **as amended by the Aquaculture and Fisheries (Scotland) Act 2007**. Certain baits and lures may be **prohibited** in specified areas and at specified times by Regulations made by Scottish Ministers. Such regulations are **in force in 22 salmon fishery districts**. These regulations are Statutory Instruments and prohibit the use of various baits, such as prawns, shrimps, worms and the use of certain types of lure and/or barbed hooks. No salmon caught by rod and line may be sold in Scotland (**The Conservation of Salmon (Prohibition of sale) (Scotland) Regulations 2002**. The **2003 Act** provides for a **weekly close time (Sunday) and periods within the annual close time when angling may continue**. Some angling fisheries start in **mid January**, and some continue until **end November**. Mandatory catch and release,

	and the mandatory use of barbless hooks is required until 31 May each year in the Esk salmon fishery district under **The Conservation of Salmon (Esk Salmon Fishery District) Regulations 2005.** Mandatory catch and release is required until 31 May each year in the Annan salmon fishery district under **The Conservation of Salmon (Annan Salmon Fishery District) Regulations 2005.)**
Number of rivers	383 - in NASCO database
Number of fishermen	Not known
Number of fishing days	~467000[a]
Demographic characteristics: e.g. age, gender	Not documented. Perception is that salmon anglers predominantly male and generally middle-aged.
Catch, CPUE, mean annual reported catch	Catch - 2006 figures (wild salmon only): Grilse – 18625 (36.5 t) MSW salmon – 19805 (80.9 t) ***See annexed graph for 1952-2006 figures (relating to catches of wild Atlantic salmon in Scotland)*** No effort data collected
Market value (e.g. of catch, including trends, fishing rights)	Offence to sell, in Scotland, salmon caught by rod and line - (**The Conservation of Salmon (Prohibition of sale) (Scotland) Regulations 2002).** Capital value of Scotland's salmon rod fisheries estimated at **£511.05M[a]** Sales of rod fisheries on some major salmon rivers have realised in excess of £1.5M. Fishing rights may also be sold on a time-share basis – certain weeks during the season, each season for a number of years. Prices realised may be up to £250000 for 2 weeks per season for 30 years.
Gear in use, preferences of gear	Rod and line – fly, spinning, bait (invertebrate only) – NB baits and lures regulations in force in 22 salmon fishery districts. Some haaf net fishermen in the Solway maintain that their

	fishery is recreational, although the fish caught are sold.
Types of fishing licensing – prices, indicators	No licences. Fishing by owners of rights or by those with written permission of the owners. Permit prices vary between £10 and £several hundreds per day.
Costs connected with the activities	Costs include: Owners – District Salmon Fishery Board assessments - Gillie wages - fishery maintenance (banks, boats etc) Anglers[a] - £61.65M per annum angler spend on salmon fishing includes permits, accommodation, tackle, travel etc.
Willingness to pay (if possible, divided into marginal and total willingness to pay)	**See** An Economic Evaluation of the Impact of the Salmon Parasite *Gyrodactylus salaris* (Gs) Should it be Introduced into Scotland[a]
Motivation	No commercial motivation. Angling organisations indicate that anglers' primary motivation is pleasure/recreation.
Magnitude of and attitude towards Catch & Release	2006 figures – Grilse 50% C&R - MSW salmon 59% C&R In some rivers, such Dee (Aberdeen), C&R is nearly 100% Levels of C&R for grilse and salmon have risen from 6% and 9% respectively since records first kept in 1994.
Number of businesses/number of jobs created by /depending on a salmon fishery	Economic Impact Assessment[a] in 2006 estimated some 1966 FTE jobs would be lost if Scotland lost salmon as a result of Gs being introduced and becoming widespread.

[a] - An Economic Evaluation of the Impact of the Salmon Parasite *Gyrodactylus salaris* (Gs) Should it be Introduced into Scotland – Published by the Scottish Executive 2006. Authors: Glasgow Caledonian University - Riddington, G, and Radford, A; University of Stirling – Paffrath, S, Bostock, J and Shinn, A.

may be accessed at: http://www.scotland.gov.uk/Resource/Doc/1062/0042434.pdf

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	Visitors (numbers not known) to facilities such as Salmon Ladder at Pitlochry Dam, Phillipshaugh Visitor Centre on Ettrick (tributary of Tweed), Tugnet Ice House (Spey), Scottish Fisheries Museum (Anstruther). Visitors (numbers not known) to natural falls such as Falls of Rogie (Conon), Linn of Dee (Aberdeenshire), Loups of Burn (Esk), Buchanty Spout (Tay). Fisheries Trusts throughout Scotland organise field trips, and "Salmon in the Classroom" educational initiatives.
Demographic characteristics: e.g. age, gender of users	No information
Costs connected with the activities	No information
Willingness to pay (if possible, divided into marginal and total willingness to pay)	No information
Motivation	No information – likely to be general public interest in salmon/environment
Number of businesses/number of jobs created/depending these activities	No information

Existence of salmon	
Main stakeholders	
General public also including Fishing right holders, Fishermen and Fishing related industries	No information
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	No information

Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries	
Main stakeholders	
Indigenous people (Sami people, first nations…)	Salmon long held to be iconic species in Scotland. In ancient Celtic folklore, salmon was symbol of wisdom. Carvings of salmon on Pictish stones at e.g. Roseilse (Morayshire), (Glamis (Tayside) and Robertlaw (Borders). Salmon in Coat of Arms of e.g. Glasgow, Peebles.
People carrying out historic fishing activities	Haaf net fishery in Solway reputed to date back to Viking times. Records of net fishing on River Tweed date back to 11th century. Long tradition of angling for food. Angling as a sport developed quickly as railway network expanded.

Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	Atlantic salmon listed on Annex II of EC Habitats and Species Directive. 17 rivers designated with Atlantic salmon as a species of interest (either principal or secondary interest).
Genetic reserve for aquaculture	Recognition of value of wild salmon stocks as reserve.
Genetic reserve for the survival of the species under changing (climate) conditions	383 salmon rivers on NASCO database. Likely that there are many more distinct genetic populations than this. Large rivers may support many more-or-less reproductively isolated populations.
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	No separate evaluation of salmon resource. EC Water Framework Directive requires improvement/maintenance of ecological status of aquatic environment – salmon inevitably included in this.

Management Costs	
District Salmon Fishery Board (DSFB) Funding	~£3.5M per annum across Scotland raised by way of DSFB Fishery Assessments on salmon fisheries[b]
Separate Private Funding	Monies paid by individual owners of salmon fisheries to maintain their fisheries, employ gillies etc. No figures are available but the total spend may be of a similar magnitude to DSFB funding.

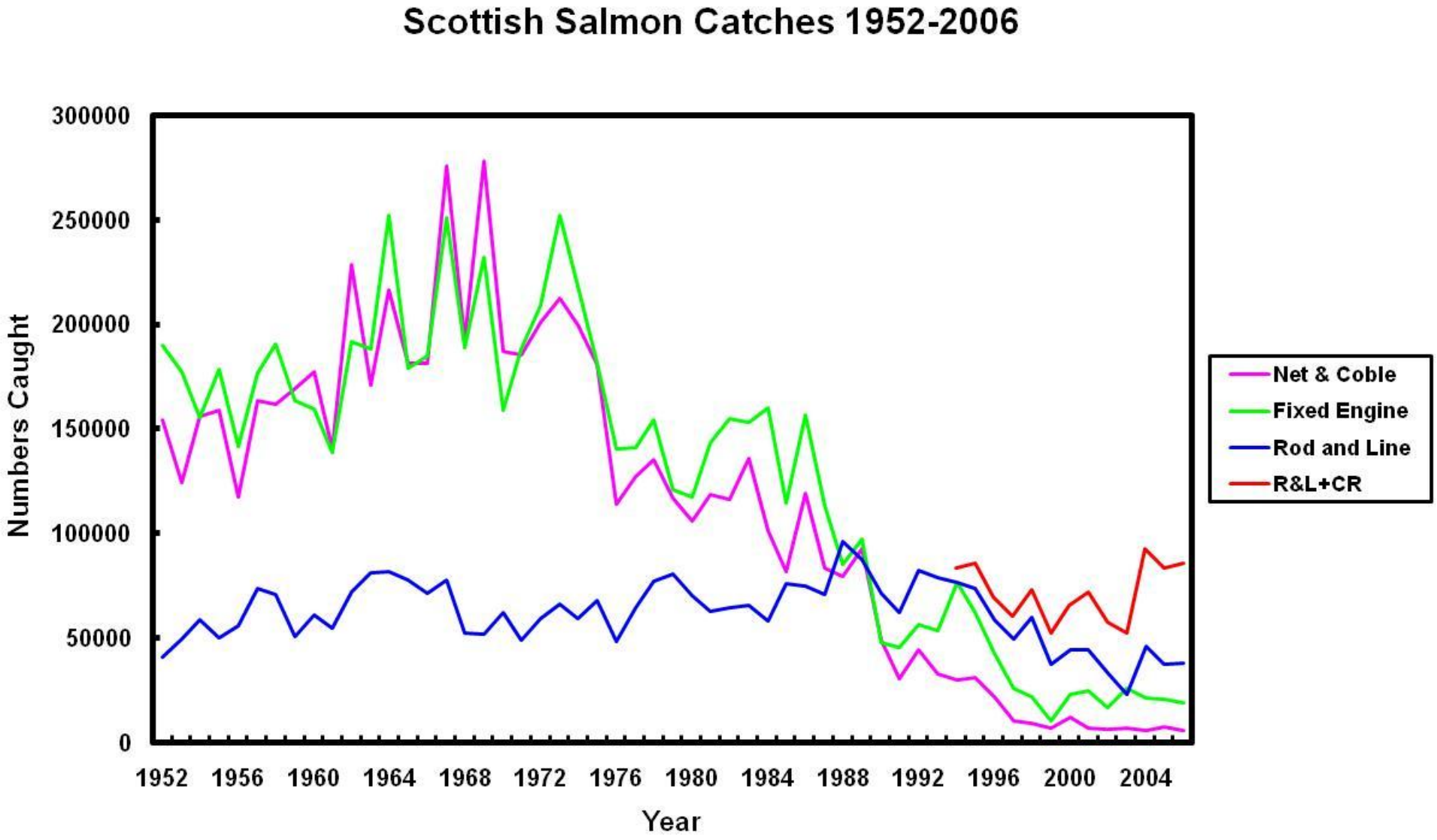
[b] A Strategic Framework for Scottish Freshwater Fisheries: A Consultation Document. Published by the Scottish Government 2007

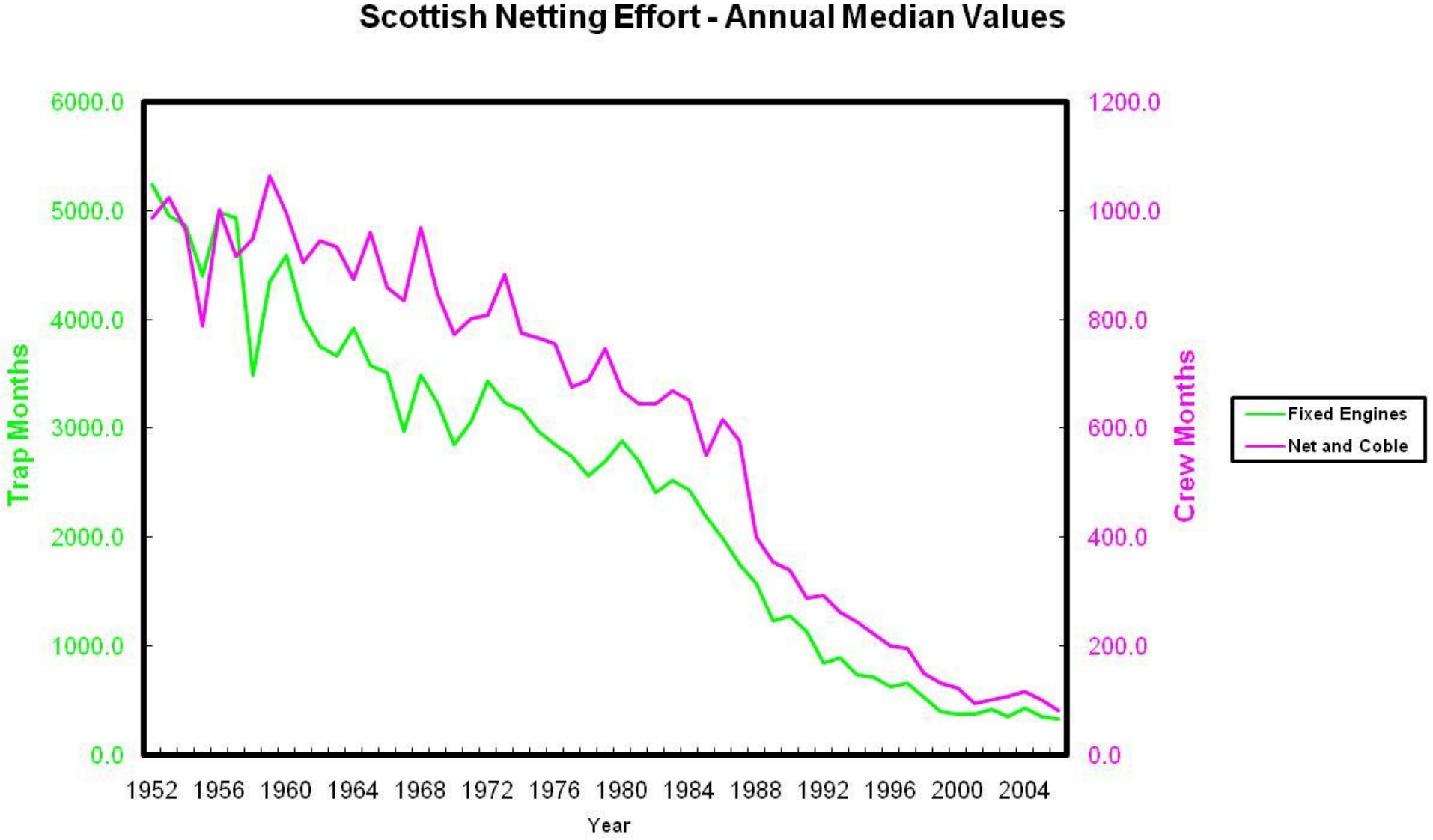
may be accessed at: http://www.scotland.gov.uk/Publications/2007/09/13103142/0

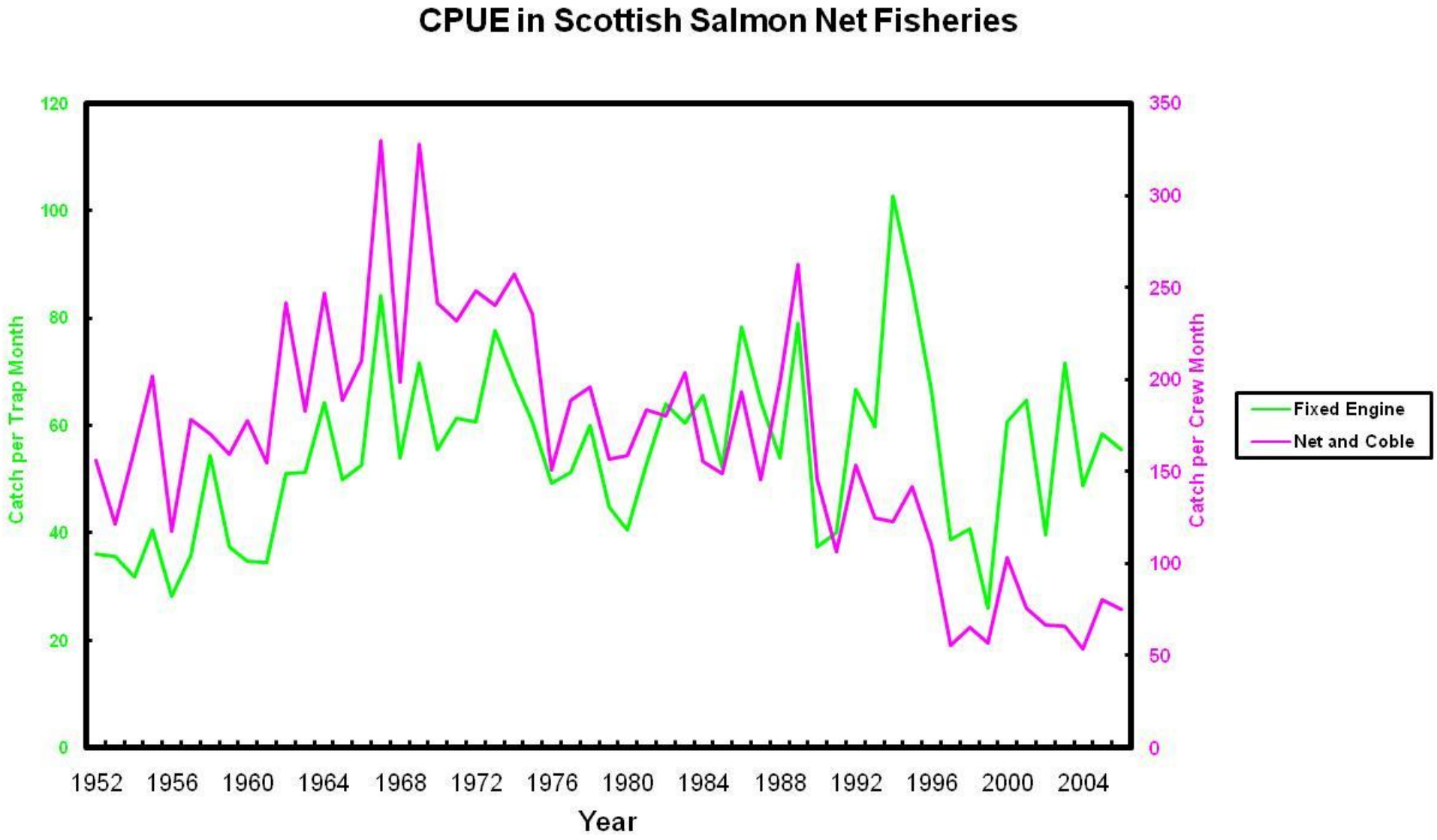
ANNEX 1

Note:

The graphs that follow show trends in salmon catch by all gears, netting effort and CPUE in net fisheries for Scotland. The data used in these graphs is available in spreadsheet format if required.


Scottish Salmon Catches 1952-2006
Numbers Caught
300000
250000
200000
150000
100000
50000
0
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004
Year
Net & Coble
Fixed Engine
Rod and Line
R&L+CR


Scottish Netting Effort - Annual Median Values
6000.0
5000.0
4000.0
3000.0
2000.0
1000.0
0.0
Trap Months
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
Crew Months
1952 1956 1960 1964 1968 1972 1976 1980 1984 1988 1992 1996 2000 2004
Year
Fixed Engines
Net and Coble


CPUE in Scottish Salmon Net Fisheries
Catch per Trap Month
Catch per Crew Month
Year
Fixed Engine
Net and Coble
0
20
40
60
80
100
120
0
50
100
150
200
250
300
350
1952
1956
1960
1964
1968
1972
1976
1980
1984
1988
1992
1996
2000
2004

Iceland

Commercial salmon fisheries (including heritage fisheries) and subsistence fisheries	
Identification of Stakeholders	
Fishing right holders	All salmon fisheries are privately owned. Fishing rights goes with adjacent land and can't be sold separately. All landowners have to form a Fisheries association that manages the fishing rights within each river or tributary. Each fishery association are founded by law with agreements that need to be accepted by the Ministry of Fisheries and Agriculture. It includes a list of all farms/landowners. Within its jurisdiction the Fishery Association is to local authority responsible for sustainable harvest of the salmon stocks within the frame of the law.
Fishermen other than fishing right holders	Commercial net fishery can only be operated by landowners.
Commercial fishing related industries	Small scale salmon smoking industry, marketing of fresh fish.
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	All salmon fisheries for salmon in Iceland are in freshwaters. The number of gear (gillnets) and fishing methods must remain the same as operated in the five year period before 1957. Annual fishing time is at a maximum of 105 days from 20 May to 30 September. The weekly fishing time is for Tuesday 10AM to Friday 10PM i.e. 84 hours weekly closure over weekends. There are restrictions on mesh size to the minimum of 45 mm (knot to knot). The allowed length of each net may not exceed 1/3 of the river width with an open passage in the main stream of the river.
Number of fishermen including trends	The number of nets operated varies between years. Costal fishery for salmon ended with a buy out in 1997. Fishery with 62 nets in lower part of the glacier river, River Hvita, West-Iceland have not been operated since 1991 with a lease agreement of net fishing rights of the Fisheries Associations in clear water tributaries operating rod fisheries. This is and agreement based on a business ground. The higher prospects of rod catch increases the value of rod fishery and is used to pay for the non-netfishing. This model is likely to be used in the other remaining net fisheries due to the much higher price for salmon in angling fisheries than net fisheries.
Demographic characteristics of fishermen: e.g. age, gender	This has not been documented, but there are relatively few farmers under 50 years of age, and almost exclusively males.
Catch, CPUE, (mean annual reported catch)	A comprehensive catch records is available. The annual average catch 1974-2006 is 12440 fish. The catch in 2006 was 5.953 fish, 16.544 kg.
Market value (e.g. of catch, including trends,	The value is approximately 110.000 € (9.9 million ISK). The market price follows the

fishing rights, compensation arrangements, comparison with value of farmed salmon)	fish market price for reared salmon. No compensation paid.
Type(s) of gear in use, number of gear	Gillnets. The number of gear used can vary between years and within the fishing season due to i.e. water level
Costs associated with the activity	Not available – low (nets, ice, transport, etc.).
Motivations for fishing …(important for combined types of fishing)	Salmon fishing provides an additional income for farmers in many cases. In recent years farmers operates their nets to show activity and catch figures in case of possible buy-out or lease of fishing rights from anglers following the River Hvita model for net lease.

Recreational salmon fisheries	
Identification of main stakeholders	
Fishing right holders	All salmon fisheries are privately owned. Fishing rights goes with land adjacent and can't be sold separately. All landowners have to form a Fisheries Association that manages the fishing rights. Each Fishery Association is founded by law with agreements accepted by the Ministry of Fisheries and Agriculture. It includes a list of all farms/landowners. The shear of income/expenditures is mainly based on the share of river bank length, historical catch records, size and quality of nursery areas. This can be re-evaluated every 8 year. Lease of angling rights is allowed for the maximum of 10 years.
Fishermen	Anglers, usually from rural or semi-rural areas and foreigners on prime time.
Sport fishing related industries	Companies leasing rod fishing rights and selling licenses to anglers. Operation of fishing lodges, fishing hotels, general tourist activities. The salmon fishing industry supports 1200 jobs, mostly in rural areas.
Guiding	Companies, leasing rod fishing rights and selling licenses to anglers, fishing organisations and individuals provide guiding facilities for anglers. On prime time, in larger rivers, a gillie is provided as part of the lease.
Tourist businesses and local/rural service businesses (grocery, fuel…)	Several companies are operating in this business directly or indirectly.
Sport fishing equipment producers and retailers	Tackle shops selling equipment related to angling and "angling fashion".
Legal basis for recreational fisheries, fisheries	Annual fishing time is at a maximum of 105 days from 20 May to 30 September.

regulations, (e.g. public or private; if public, whether they are open-access or restricted)	Daily fishing time is 12 hours from 7AM to 10AM. There is a restricted number of rods allowed (fishing licences) in each river decided on a basis of harvest plan for their each Fisheries Association. In the harvest plan status of each salmon stock needs to be taken into account (from 2006). The harvest plan needs to bee renewed every 5 year (from 2006) and needs approval by The Icelandic Food and Veterinary Authority. Fishing licenses are bought by anglers. Recording of catch in log-books is mandatory.
Number of rivers	Approximately 120
Number of fishermen	30,9% of Icelanders (Age 16-69) regard them selves as anglers. Approx. 70.000 people in total. Number of salmon fishermen not known.
Number of fishing days	Approximately 34.000 rod-days are sold for salmon fishery annually.
Demographic characteristics: e.g. age, gender	60% of fishermen are from urban areas and 27% from semi-urban areas. 75% males, 25% females (based on information from a Nordic survey conducted in 1999).
Catch, CPUE, mean annual reported catch	Catch - 2006 figures: Catch 45.454 Catch and release 8.735 Catch landed 36.810 Grilse landed – 32.244 (74,5 t) MSW (mostly 2SW) salmon landed – 4.566 (22,2 t) Average long term CPUE is close to 1fish/rod/day.
Market value (e.g. of catch, including trends, fishing rights)	The market value is mainly through leasing/selling rod fishing licenses. The estimated total economic value of the salmon fishing industry is 11 billion ISK, 111 million €. An estimate of a sudden closure of all salmon fisheries would cause a loss of 2, – 3 billion ISK , 31-33 million € from the Icelandic economy. The market value of fishing licenses is decided on an open market following supply and demand. The price for salmon fishing licenses has steadily raised for the past 60 years and is still raising. The average salmon price for the landowner is close to 30.000 ISK (330 €) per fish. That will say
Gear in use, preferences of gear	Rod and line – fly, spinning, bait (mostly worm). Limited number of rods for each

	river. Fly fishing only, bag limit and/or catch and release requirements are common.
Types of fishing licensing – prices, indicators	No fishing fee paid to the state. Every fisherman needs a fishing licence. The price of fishing licenses commonly changes throughout the fishing season based on historical in-season catch records. Highest price when the in mid summer during the peak in the salmon run.
Costs connected with the activities	No fishing fee paid to the state. A percentage distribution of detailed fishing expenditures of Icelandic anglers – based on an Nordic survey form 1999. Automobile transport 25% Boating 3% Other transportation 1% Lodging 8% Licences 43% Journals, books, film 4% Extra food and drink 8% Other 3%
Willingness to pay (if possible, divided into marginal and total willingness to pay)	No recent estimates available. A survey form 1999 showed an extra willingness to pay for fishing activities was 30% of the total sum paid for fishing activities that year.
Motivation	No commercial motivation. Primary motivation is pleasure/recreation – Business motivation relates to that big companies and banks commonly invite there biggest costumers to salmon fishing trips covering there expenditures.
Magnitude of and attitude towards Catch & Release	2006 figures – Grilse 15,2% C&R - MSW salmon 39,3% C&R Levels of C&R for grilse and salmon have risen from 2,3% since records first kept in 1994 to the total of 19,2% in 2006. There is an increasing interest for C&R in order to maintain sustainable fisheries and to prevent the existence of the MSW stock components. This also partly follows the low marked value of salmon. C& R is almost exclusively practised by foreign anglers. A three year study of 4 Icelandic rivers show that 26% of the fish recorded released are caught more than once.
Number of businesses/number of jobs created by /depending on a salmon fishery	Economic Impact Assessment[a] in 2004 estimated some 1200 jobs are supported by the salmon fishing industry. The income from salmon fishing is important for farmers/landowners. Approximately 50% of the income to farmers in West Iceland, an

	area with many large salmon rivers (according to Icelandic scale), is form leasing of salmon fishing rights. Many Fishery Associations have enhancement programs, with a release of hatchery reared smolts to improve the angling catch. The hatchery operations support xx jobs. In one river, River Ranga with previously low natural salmon production close to 1 million smolts are released annually. The angling catches in River Ranga in 2007 exceeded 14.000 fish. This is close to 1/3 of the total salmon catch in Iceland in 2007. Ranching to the rods is a growing industry in Iceland and in the case of River Ranga creating a salmon base on the business model used in other rivers apart from the part that the smolts are produced in hatcheries. The possible impacts from hatchery reared fish on natural populations are of concerns. There a raising demand for knowledge on the possible impacts of hatchery reared fish to naturally produced fish stocks in time and space. One Icelandic company is a producer of fish counters (River Watcher) and another is a producer of DST fish tags that have been used for tagging of adult salmon as well as salmon smolts.

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	No information
Demographic characteristics: e.g. age, gender of users	No information
Costs connected with the activities	No information
Willingness to pay (if possible, divided into marginal and total willingness to pay)	No information
Motivation	No information
Number of businesses/number of jobs created/depending these activities	No information

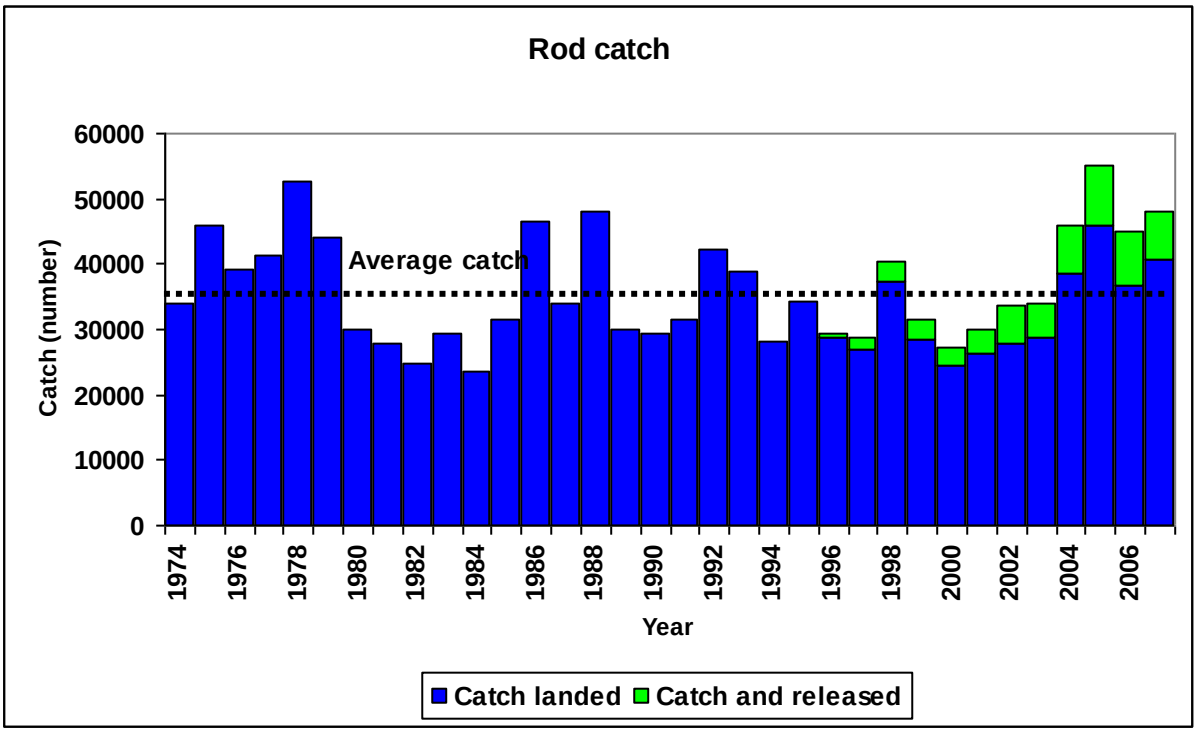
Existence of salmon	
Main stakeholders	
General public also including Fishing right holders, Fishermen and Fishing related industries	No information
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	Information from 1999, no recent surveys to relay on.

Social ceremonial and cultural aspects	
Main stakeholders	
Indigenous people (Sami people, first nations…)	Salmon fishing rights have been important in Iceland since the first settlement (year 900). Conflicts related salmon fishing is described in the Icelandic Saga's. There are acts on salmon fishing in the first written laws from year 1200. The acts outlines how to shear the fishing rights and how to allow fish to enter higher regions in the rivers.
People carrying out historic fishing activities	Angling was brought to Iceland from England in 1890s. Angling as a sport took over most of the earlier subsistence fishery. It is likely that at that time salmon stocks were at low levels after cold periods in the late 1700s.
General public also including Fishing right holders, Fishermen and Fishing related industries	
Description and magnitude of the uses	
Number of users	No information
Demographic characteristics: e.g. age, gender	No information
Costs connected with the activities	No information
Willingness to pay (if possible, divided into marginal and total willingness to pay)	No information
Motivation	No information.
Number of businesses/number of jobs created/depending these activities	No information.

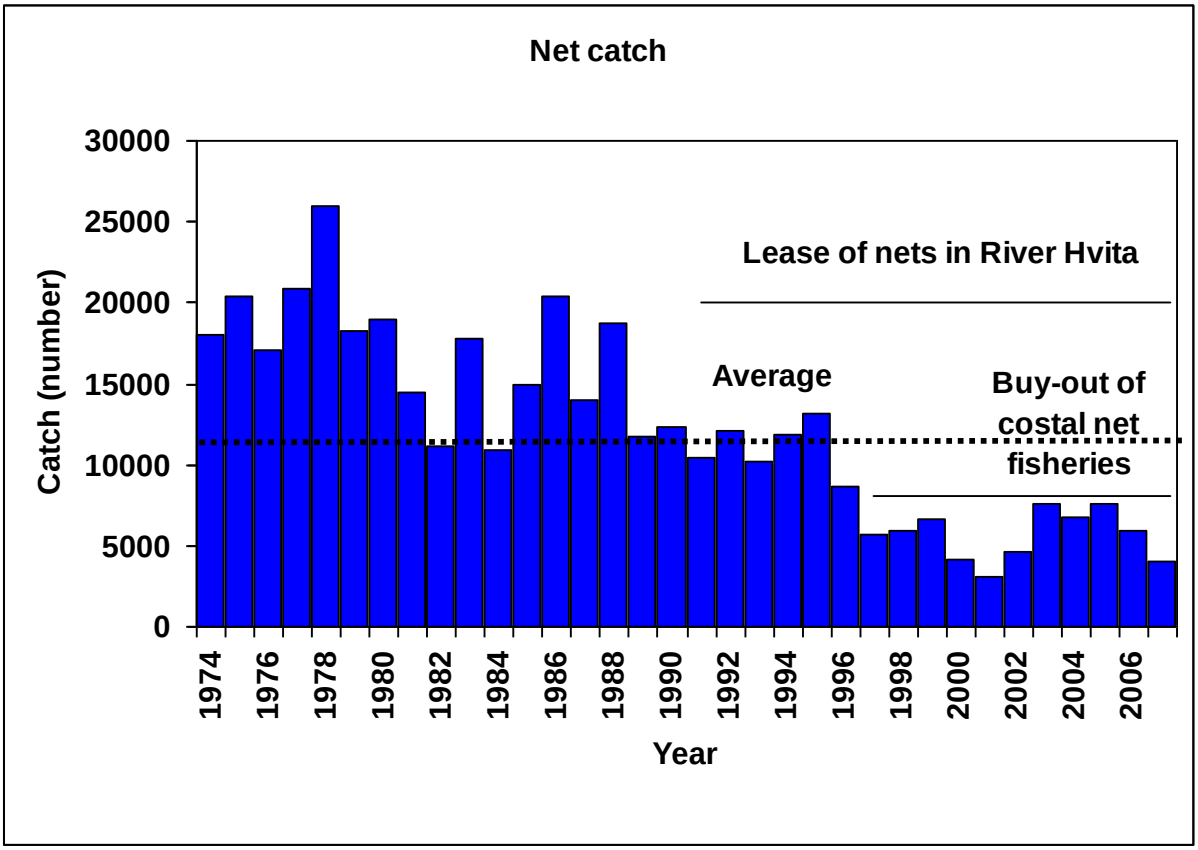
Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	No official protection of areas/rivers are listed as important for there salmon stocks. The use and value of the salmon resources is, however, well known. In recent years salmon production in boundary areas, cold rivers and areas high above sea-level has increased. The grow rate in rivers has increase following a raise in temperature especially in spring and autumn. Smolt age has decreased in the most recent years.
Genetic reserve for aquaculture	Recognition of value of wild salmon stocks as reserve has previously been acknowledged by aquaculture free areas.
Genetic reserve for the survival of the species under changing (climate) conditions	???
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	???
Management Costs	
District Salmon Fishery Board (DSFB) Funding	There is no official breakdown of salmon districts in Iceland. Approximately 25 million ISK (280.000€) is spent on the The Icelandic Food and Veterinary Authority administration and inspection of potential illegal fisheries. Approx. 75 million ISK (830.000 €) is spent on the Institue of Freshwater fisheries research activities and administration (includes others fish species and limnolocical reasearch in fresh water. Additionally lokal Fishery Associatons spend approx 40 million ISK (440.000€) on resarch and in river assesments in their river systems.
Separate Private Funding	Money paid by individual owners on salmon fisheries to maintain their fisheries, employ gillies, enhancement programs, building of fish ladders etc.

ANNEX 1

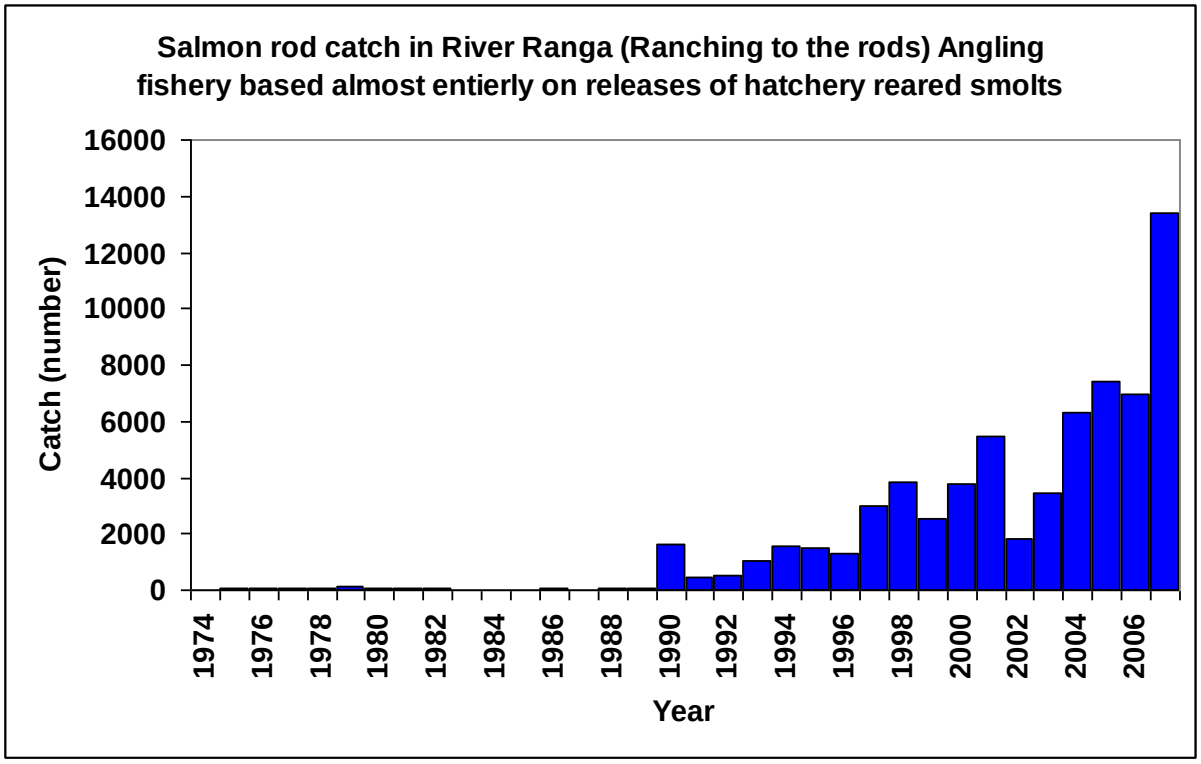
Note:
The graphs that follow show trends in salmon rod and netcatch catch for Iceland.



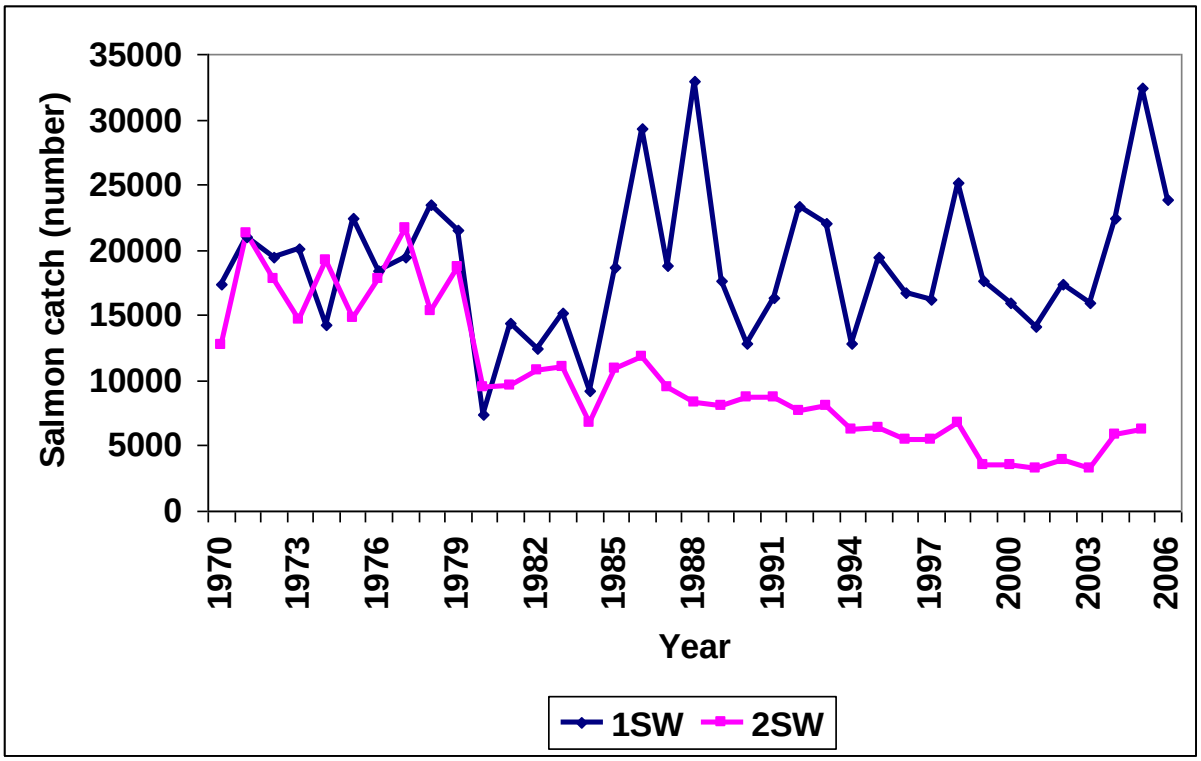
Rod catch in Icelandic rivers 1974-2007. The catch figures for 2007 are provisional.The rod catch figures includ the catch in River Ranga, see below.



Net catch in Iceland 1974-2007. The catch figures for 2007 are provisional. Periods of net lease in Ruver Hvita and buy-out of costal fisheries are markt on the grap.



Rod catch in River Ranga. Angling fishery based almost entierly on releases of hatchery reared smolts.



Trends in sea age domposition of the rod catch in Icelandic rivers 1970-2006. The decline of the MSW salmon stock componant is of major conserns. If the declining trend continues the MSW salmon will be close to extinction in 2020.

Norway

Commercial salmon fisheries (including heritage fisheries) and subsistence fisheries IN THE SEA	
Identification of Stakeholders	
Fishing right holders	Landowners along the coasts and fjords have the right to fish if it is opened for fishing and within the regulations set by the authorities
Fishermen other than fishing right holders	Yes, right holders might lease out their right to fish to others. Number n/a
Commercial fishing related industries	Small, mostly none, some local smokehouses. Suppliers of small boats and gear. No estimates are available.
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	Fishing right belongs to the landowner. On public land (such as in most of Finnmark in Northern Norway), there is a system with leasing of places to fish for salmon.
Number of fishermen including trends	2006: 1380 active fishers* 2002: 1805 active fishers 1998: 1905 active fishers * Buy out Trondheim fjord reduced with 100 fishers
Demographic characteristics of fishermen: e.g. age, gender	Male, middle-aged – old
Catch, CPUE, (mean annual reported catch)	**2007: 426 tonnes (94 000 fish),** **2006: 512 tonnes (128 000 fish), estimated 20 % escaped farmed salmon** **2005: 466 tonnes (115 000 fish)** **CPUE (bagnet per day): 1,02 (1sw) 1,33 (2sw), 0,27 (3+ sw),** **CPUE (bendnet per day: 0,72 (below 3 kg), 0,86 (3 – 7 kgs), 0,29 (above 7 kgs)**
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	Market price for wild salmon varies, but is considered to be in the range of NOK 30 – 60 per kg, depending on size, quality, location/nearness to market. A larger buy-out project in Tronheim 2005 – 2009 has agreed on a price of NOK 70,-/kg.
Type(s) of gear in use, number of gear	Two types of gear are in use: Bag nets (Kilenot), along all of Norway. Total nets number of nets: 1283 (2006)

	Bend nets (Krokgarn), allowed only in Finnmark. Total number of nets: 685 (2006)
Costs associated with the activity	From Krokan (1997).
Motivations for fishing …(important for combined types of fishing)	This fishing is a combination of commercial, subsistence and recreational fishing.
Comments	There is also a regular autumn salmon fishery in several regions directed towards escaped farmed salmon, but rather few participates in this.

Commercial salmon fisheries (including heritage fisheries) and subsistence fisheries IN RIVERS	
Identification of Stakeholders	Fishing right holder
Fishing right holders	Fishing with traps, nets and cages is currently allowed in four Norwegian rivers: Tana river, Neiden river (Finnmark), Numedalslågen river (Vestfold) and Mandal river (Vest-Agder). The fishing in Tana and Neiden are for a significant part old saami/skolte/kven subsistence practices.
Fishermen other than fishing right holders	Families, and some (few) tourists/visitors
Commercial fishing related industries	Mostly none, except for local smokehouses and some tourism in Numedal, Tana and Neiden
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	Net and trap fishing in rivers was with the above exceptions closed down during the 1970s. Private rights. Landowners and/or farmers.
Number of fishermen including trends	Unknown
Demographic characteristics of fishermen: e.g. age, gender	Male, middle-aged – old
Catch, CPUE, (mean annual reported catch)	**2006: estimated 30 000 kgs or 7500 fish, CPUE not available**
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	Market price for wild salmon varies, but is considered to be in the range of NOK 30 – 60 per kg, depending on size, quality, location/nearness to market.
Type(s) of gear in use, number of gear	River specific: **Numedal:** Nets, Traps: Annually between 2000 and 9000 kgs 2002 – 2006, 10 – 40 % of overall catch. **Neiden:** One seine net in a specific waterfall, annual catch 1000 – 3000 kgs 2002 - 2006. **Tana (Norway):** Driftnets: 16 %, Weirs: 29 %, Gillnets: 10 %, of average total catch 40 000 kg or 10000 salmon each year 2004 - 2007 **Mandal:** One seine on lower parts, annual quota 500 kgs (2006 – 2008).
Costs associated with the activity	No estimates are available.
Motivations for fishing …(important for combined types of fishing)	Fishing is done for subsistence, food, recreational, tourist, and cultural heritage reasons, and for taking care of fishing rights, commercial aspects reduced
Number of jobs/business	n/a

Recreational salmon fisheries IN RIVERS	
Identification of main stakeholders	
Fishing right holders	Riparian owners along the rivers, private and public owners. On some northern rivers all local inhabitants have the right to rod fishing.
Fishermen	Local, regional, national and international anglers and angling clubs
Sport fishing related industries	Tackle, travel, licences sales
Guiding	Little compared to for instance Scotland, but growing, no estimates
Tourist businesses and local/rural service businesses (grocery, fuel…)	Significant in many districts but no
Sport fishing equipment producers and retailers	Significant at national and regional level. No specific statistics exists on salmon fishing tackle gross value, but general sport fishing tackle accounts for about 10 % of the overall sales in Sport shops in Norway
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	Privately owned fishing right. The basis for fisheries regulation is The act releating to salmonids and fresh-water fish etc.
Number of rivers	445 according to NASCO statistics of which appr. 380 are fished
Number of fishermen	Estimates based on public fishing fee: 100.000 anglers
Number of fishing days	Rough estimates: 10 days per angler = 1.000.000 angling days
Demographic characteristics: e.g. age, gender	Middle aged males dominate
Catch, CPUE, mean annual reported catch	2006: 499 tonnes (225 000 fish), 2007: 412 tonnes (172 000 fish) CPUE: 1 salmon per 5 angling days, however, great variation between rivers and tackle. Case studies exist as well.
Market value (e.g. of catch, including trends, fishing rights)	Gross expenditures Euro 150 mill (2002 estimate, believed not changed much)
Gear in use, preferences of gear	Spoon, worm and fly. Fly fishing increases and soon

	dominate on most attractive rivers
Types of fishing licensing – prices, indicators	State licence: Every salmon angler needs a state licence. Private permit: Also needed either fishing on private or public land. Salmon fishing is rented out either as ticket water, as weekly packages (beats), or season rental of beats. It is believed that weekly fishing packages is growing on the costs of the other forms of rental
Costs connected with the activities	River based surveys exist giving average value estimates for angler expenditures: Details can be provided
Willingness to pay (if possible, divided into marginal and total willingness to pay)	Case studies in a number of rivers during different years focussing on different aspects of use and non-use values, however many are several years old. Details can be provided when specific purpose for use is known.
Motivation	Varied, focussed on recreation, leisure
Magnitude of and attitude towards Catch & Release	n/a, generally little but growing somewhat, variations between rivers and angler groups. Generally, 100 % C&R not popular, but C&R as part of quota acceptable. Foreigners and fly anglers more positive.
Number of businesses/number of jobs created by /depending on a salmon fishery	Estimates based on gross income indicate jobs in the range of 2900 FT job equivalents for all of Norway

Recreational salmon fisheries IN SEA	
Identification of main stakeholders	Sport fishers, fishing clubs, coastal boat owners
Fishing right holders	Open access fishery
Fishermen	Recreational fishers, from shore and boat
Sport fishing related industries	Fishing tackle and leisure boating
Guiding	Little, n/a
Tourist businesses and local/rural service businesses (grocery, fuel…)	Little, n/a
Sport fishing equipment producers and retailers	Little, n/a
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	Open access, no licencing, no system for catch reports
Number of fishermen	Estimates based on national recreation surveys are inaccurate and too high (case studies do not confirm them), and number of fishers have probably been reduced much last three decades. No distinction made between sea trout and salmon fisheries in these estimates, and this fishing is supposed to be directed more towards sea-trout. Taken this uncertainty into account, a crude estimate of total number of salmon and sea trout anglers should be in the range 50.000 – 70.000 anglers.
Number of fishing days	n/a
Demographic characteristics: e.g. age, gender	Middle aged males, some younger targeting sea trout on fly fishing
Catch, CPUE, mean annual reported catch	n/a
Market value (e.g. of catch, including trends, fishing rights)	n/a
Gear in use, preferences of gear	Trolling from boat, fly fishing and spinning from shore.
Types of fishing licensing – prices, indicators	No licence needed
Costs connected with the activities	n/a
Willingness to pay (if possible, divided into marginal and total willingness to pay)	n/a
Motivation	n/a – recreation, leisure
Magnitude of and attitude towards Catch & Release	n/a
Number of businesses/number of jobs created by /depending on a salmon fishery	n/a

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	Three visitor centres focussing on wild salmon: - Norsk villakssenter in Lærdal (annually 20 – 25.000 visitors, income range NOK 1,7 mill/year) - Namsen salmon aquarium in Grong (annually 25 – 30.000 visitors, income range NOK 1,2 mill/year) - Gaula Natursenter, Storen: (annually +30.000 visitors, free entrance) Several organised or unorganised viewing locations: - Målselvfossen (fish ladder) entrance fee NOK 30,- (no visitor counts) - Sandsfossen, Suldal (fish ladder and counter) - Egga fossen, Gaula - Støvelfossen, Stordalselva, Fosen - Kjerrafossen Numedal - Hellefossen, Drammen - Steinsdal river, Fosen Salmon diving: - a few tourist operators offer scuba diving/river floats viewing salmon - Suldal – Mo Laksegård, Winsnes in Gaula, probably other places as well "Salmon Festivals": - Several places arrange festivals and markets related to salmon. Their orientation towards salmon varies; some might have a fishing competition, others have a seminar, while some just use the name "salmon" in a festival focussing on concerts, shopping and fun. Norwegian River Owners Organisation launches "National Wild Salmon Day 21 June as a day for wild salmon activities.
	Visitor centres: A mix of round trip tourists (mostly foreign) and anglers
Costs connected with the activities	Entrance fee Namsen: NOK 70,- / 50,- (groups)/ 40,- (children) Entrance fee Lærdal: n/a

	Entrance fee Gaula: Free access to exhibition Entrance fee Målselv: NOK 30,-
Willingness to pay (if possible, divided into marginal and total willingness to pay)	n/a
Motivation	Mixed; nature studies, wildlife viewing, general nature experience
Number of businesses/number of jobs created/depending these activities	Namsen: 3 – 4 part time jobs Lærdal: 3 – 5 part time jobs Gaula: 2 full time jobs and 3 – 4 part time jobs

Existence of salmon	
Main stakeholders	
General public also including Fishing right holders, Fishermen and Fishing related industries	General public, tourists at sites/destinations, students, school children
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	Case studies exist but no updated, or overall for wild salmon for all of Norway. Existing studies might be applicable for more specific studies if adapted and updated

Social ceremonial and cultural aspects	
Main stakeholders	
Indigenous people (Sami people, first nations…)	See above on commercial and subsistence fisheries
People carrying out historic fishing activities	See above on commercial and subsistence fisheries
General public also including Fishing right holders, Fishermen and Fishing related industries	
Description and magnitude of the uses	n/a
Number of users	n/a
Demographic characteristics: e.g. age, gender	n/a
Costs connected with the activities	n/a
Willingness to pay (if possible, divided into marginal and total willingness to pay)	n/a
Motivation	n/a
Number of businesses/number of jobs created/depending these activities	n/a

Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	n/a
Genetic reserve for aquaculture	A gene bank is operated in Norway for conservation purposes – costs associated with program this can be provided if needed
Genetic reserve for the survival of the species under changing (climate) conditions	See above
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	n/a

Russian Federation

Commercial salmon fisheries	
Identification of Stakeholders	
Fishing right holders	There are a number of identified fishing right holders in each region. A fishing right holder is allocated a fishing site on the basis of agreement with the state fisheries management authorities. Each fishing right holder is allocated a fixed percentage of the total commercial quota set for a region on an annual basis. The percentage is subject to revision every 10 years.
Fishermen other than fishing right holders	No
Commercial fishing related industries	There are related industries, but no estimates are available.
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	Legal basis for fishery is the Federal Law on Fisheries # 166-FZ, 2004. Quota for the commercial fishery is set annually by the Russian Government on the region-by-region basis and then allocated to the fishing right holders in accordance with their fixed percentages. The allocated quota can be only used within an allocated fishing site. The fishing is conducted in accordance with the fishery regulations for the North Russia fishery basin (Order of the Ministry of Agriculture # 245, 2007).
Number of fishermen including trends	There were 153 fishermen in Murmansk region and 141 fishermen in Archanglesk region in 2007, which was at the same level as in previous 5 years and slightly less then the average for previous 10 years. In 2006 there were 15 fishermen on the Pechora river.
Demographic characteristics of fishermen: e.g. age, gender	Males 25-60. 90% over 40.
Catch, CPUE, (mean annual reported catch)	Catch statistics is available for all regions since 1960. Commercial catches declined drastically from about 600 tonnes in 1980th to about 60 tonnes in recent years. 20 tonnes were harvested in Murmansk region and 14 tonnes in Archangelsk region in 2007. This reduction

	was mostly due to implemented management measures including prohibition of some important in-river fisheries, aimed at reducing the commercial fishing effort and enhancing the development of recreational fisheries. CPUE data is available for commercial fisheries in Archangelsk region. It shows a slight decline over the last 10 years for coastal fishery and no trend for in-river fishery.
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	One kilo of wild salmon costs on the market approximately the same price as farmed salmon - 250 RUB (10 USD). The market value of commercial catch in 2007 can be estimated as 8,5M RUB (340K USD)
Type(s) of gear in use, number of gear	A trap net is the most common gear used in the fishery now. There's no commercial in-river fishery in Murmansk region since 2004 whereas 10-15 barrier fences were in operation annually on the largest rivers before. The effort on in-river commercial fishery in the Archangelsk region shows a decline over the last 10 years from 200-300 gear down to 60-70 (24 in 2007) while the effort in the coastal fishery in the White sea shows no trend for the time series available (60-90 gear in use).
Costs associated with the activity	No estimates are available.
Motivations for fishing …(important for combined types of fishing)	This fishery is viewed more as a social measure – a traditional way of fishing by indigenous people from Pomor villages along the White sea cost.
Profitability	No estimates are available.

Recreational salmon fisheries	
Identification of main stakeholders	
Fishing right holders	There are a number of identified fishing right holders in each region. A fishing right holder is allocated a fishing site where recreational fishing is organised on the basis of quota allocated annually.
Fishermen	There are two major groups of fishermen: anglers

	(tourists) buying trips from fishing right holders and fishermen buying only a fishing licence. Last group includes fishermen who go fishing for food only.
Sport fishing related industries	
Guiding	Services are provided, but there are no estimates available.
Tourist businesses and local/rural service businesses (grocery, fuel…)	Services are provided, but there are no estimates available.
Sport fishing equipment producers and retailers	Services are provided, but there are no estimates available.
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	Legal basis for fishery is the Federal Law on Fisheries # 166-FZ, 2004. Quota for the recreational fishery is set annually by the Russian Government on a region-by-region basis and then allocated to the fishing right holders by regional administrations. The allocated quota can only be used within an allocated fishing site. The fishing is conducted in accordance with the fishery regulations for the North Russia fishery basin (Order of the Ministry of Agriculture # 245, 2007).
Number of rivers	There are 79 salmon rivers in Murmansk region, 18 rivers in Karelia and 23 in Archangelsk region.
Number of fishermen	In 2007 there were about 2,000 foreign and 3,500 Russian anglers who bought fishing trips and approximately 10,000 Russian (mostly local) anglers, who bought fishing licences.
Number of fishing days	Over 20,000 fishing days in 2007 (catch-and-release only) which was 30% higher then the average for previous 10 years.
Demographic characteristics: e.g. age, gender	n/a
Catch, CPUE, mean annual reported catch	Catch statistics is available for Murmansk region for 1991-2007. Over 44,000 fish (catch-and-release) were reported in 2007, which was twice as much as the average for the previous 10 years. CPUE data are available for a number of rivers for 1991-2007. About 5,000 fish were reported for catch-and-retain fishing in

	2007, which was at the same level as the mean for the previous 10 years.
Market value (e.g. of catch, including trends, fishing rights)	The total investments into infrastructure of the recreational fishery in Murmansk region is roughly estimated to be over 25 millions USD. The investments in 2007 were over 2.5 millions USD.
Gear in use, preferences of gear	Fly rod in catch-and-release, spinning rod in catch-and-retain. Gill nets on the Pechora river.
Types of fishing licensing – prices, indicators	There are licences or fishing permits for both catch-and-release and catch-and-retain fishing. The lowest price for one-day (half-day) bag limit permit for catch-and-retain can be as low as 10 USD per fish. The average price was about 20 USD in 2007. The price for one-day (half-day) non-bag limit permit for catch-and-release was slightly higher. The fishing trip price varies from 1,000 USD to 20,000 USD per week, and includes the cost of fishing permit.
Costs connected with the activities	n/a
Willingness to pay (if possible, divided into marginal and total willingness to pay)	Demand is higher than what the fishery can sustain. Willingness to pay is high, but there are no estimates available.
Motivation	The recreational salmon fishery in the Russia's Kola Peninsula (Murmansk region) today is seen as one of the most prestigious in the North Atlantic, because of the quality of fishing. Local people go fishing for food.
Magnitude of and attitude towards Catch & Release	Around 80% of the total rod catch are released annually. The development of recreational fishing in Russia has been based on catch-and-release principle and this has been accepted by foreign anglers and now, increasingly, by Russian anglers. The system of allocating a catch-and-retain harvest to local fishermen, in addition to the catch-and-release fishery, seems to work well.
Number of businesses/number of jobs created by /depending on a salmon fishery	10 companies were organizing recreational fishery in 2007 in Murmansk region. Number of full time employees – 119, number of part time employees – 264.

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	There is a diving centre on the Keret river. Major activity is diving in the White sea but some go diving in the river to see salmon. There are over 20 guesthouses and camping along the sea shore in Republic of Karelia for tourists.
Demographic characteristics: e.g. age, gender of users	n/a
Costs connected with the activities	n/a
Willingness to pay (if possible, divided into marginal and total willingness to pay)	Willingness to pay is high, but there are no estimates available.
Motivation	To see wild salmon in natural environment. Wilderness of the environment.
Number of businesses/number of jobs created/depending these activities	1 diving centre and over 20 guesthouses and camping in the Republic of Karelia. Number of employees – around 200.

Existence of salmon	
Main stakeholders	n/a
General public also including Fishing right holders, Fishermen and Fishing related industries	n/a
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	n/a

Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries	
Main stakeholders	n/a
Indigenous people (Sami people, first nations…)	First nations of the North have rights to carry out subsistence fishery. Legal basis for fishery is the Federal Law on Fisheries # 166-FZ, 2004. Quota for the subsistence fishery is set annually by the Russian Government on the region-by-region basis and then allocated to the First nations by regional administrations. No quota has been utilized since 2004 when the Federal Law came into force.
People carrying out historic fishing activities	Indigenous people from Pomor villages along the White

	sea cost. This group has no rights for subsistence fishery but has been allocated fishing sites and quotas for commercial fishery on the basis of historic fishing activities.
Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	Atlantic salmon in Russia is recognised as an indicator of clean environment.
Genetic reserve for aquaculture	Most of rivers have genetically unpolluted wild Atlantic salmon populations.
Genetic reserve for the survival of the species under changing (climate) conditions	Most of rivers have genetically unpolluted wild Atlantic salmon populations.
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	n/a

USA

Commercial salmon fisheries –Section not applicable to the United States	
Identification of Stakeholders	
Fishing right holders	
Fishermen other than fishing right holders	
Commercial fishing related industries	
Legal basis for commercial fisheries, fisheries regulations (e.g. public or private; if public, whether they are open-access or restricted)	
Number of fishermen including trends	
Demographic characteristics of fishermen: e.g. age, gender	
Catch, CPUE, (mean annual reported catch)	
Market value (e.g. of catch, including trends, fishing rights, compensation arrangements, comparison with value of farmed salmon)	
Type(s) of gear in use, number of gear	
Costs associated with the activity	
Motivations for fishing …(important for combined types of fishing)	
Profitability	

Recreational salmon fisheries	
Identification of main stakeholders	
Fishing right holders	Not Applicable
Fishermen	The recreational fisheries for Atlantic salmon are small in scale and very limited. Therefore, fishermen that participate in the limited Atlantic salmon recreational fishery opportunities in the US likely primarily target other species.
Sport fishing related industries	Due to the small scale and limited nature of the Atlantic salmon recreational fishery opportunities in the US, sport related industries primarily rely on other target species.
Guiding	There are no known guiding businesses for any Atlantic salmon recreational fisheries in the US.
Tourist businesses and local/rural service businesses (grocery, fuel…)	Due to the small scale and limited nature of the Atlantic salmon recreational fishing opportunities in the US, tourist industries

	primarily rely on other target species. The fishery recently implemented in the Penobscot River did attract some out of state residents; however, it was a small number of individuals. The fisheries on excess broodstock from the Connecticut and Merrimack River restoration programs are very popular.
Sport fishing equipment producers and retailers	Due to the small scale and limited nature of the Atlantic salmon recreational fishery opportunities in the US, sport related industries primarily rely on other target species.
Legal basis for recreational fisheries, fisheries regulations, (e.g. public or private; if public, whether they are open-access or restricted)	The New Hampshire Fish and Game Department manages the Atlantic salmon broodstock fishery in the mainstem of the Merrimack River and lower portion of the Pemigewasset River. The Connecticut Department of Environmental Protection, Bureau of Natural Resources Inland Fisheries Division manages the recreational salmon fisheries in the Shetucket and Naugatuck rivers. Lastly, in Maine the Maine Department of Marine Resources Bureau of Sea Run Fisheries manages the catch and release fishery. The Gulf of Maine (GOM) Distinct Population Segment (DSP) is protected under federal law (i.e., the Endangered Species Act). Therefore, for the populations in the GOM DPS, federal law prohibits all recreational fishing.
Number of rivers	New Hampshire: Merrimack and Pemigewasset Rivers. (broodstock fishery) Connecticut: The Naugatuck and Shetucket Rivers. (broodstock fishery) Maine: Penobscot River (sea-run fishery)
Number of fishermen	Proxy based on licenses sold. New Hampshire: Merrimack and Pemigewasset Rivers 1,447 licenses sold in 2006 1,395 Licenses sold in 2007 Connecticut: No data available

	Maine: Penobscot River - In 2006, 241 Licenses sold, 147 anglers complied with reporting requirements, and there were 247 angler trips reported In 2007, 90 Licenses sold, approximately 30 anglers complied with reporting requirements, and 83 angler trips were reported.
Number of fishing days	Data available on days only. New Hampshire: Merrimack and Pemigewasset Rivers creel limits are one fish per day, five fish per season with a minimum length of 15 inches. The season is open all year for taking salmon with a catch and release season from 1 October to 31 March. Connecticut: For the Shetucket and Naugutuck rivers from October 1 to March 31, angling for all species in the salmon broodstock areas is restricted to fishing methods that are legal for Atlantic salmon. Creel limits for these rivers are - December 1, 2007 through March 31, 2008 ONE (1) SALMON PER DAY; April 1, 2008 to 6:00 am, April 19, 2008 Salmon fishing closed; April 19, 2008 through September 30, 2008 ONE (1) SALMON PER DAY (6:00 am-opening day); October 1, 2008 through November 30, 2008 CATCH AND RELEASE ONLY December 1, 2008 through March 31, 2009 ONE (1) SALMON PER DAY. Maine: In the Penobscot River the fishery is 30 days (season open Sept 15-Oct 15 unless water temperatures exceed 68°F); additional spring fishery authorized for May 2008 (30 days)
Demographic characteristics: e.g. age, gender	New Hampshire: In Spring 2007, 479 (age 3 and 4) domestic broodstock were released for the fishery. In Fall 2007, an additional 1,081 (age 2) broodstock were released for a combined total release of 1,560 fish to support the fishery in the main stem of the Merrimack River and the lower portion of the Pemigewasset River.

	Connecticut: The Department of Environmental Protections stocks broodstock that are typically two to five years old and weigh from 2 to 20 pounds. Maine: In the Penobscot River, of the 916 sea-run salmon returning to the trap in 2007, 260 were 1 sea winter (1SW) fish, or 28% of the total run. Most of the U.S. origin salmon spend 2 winters at sea, between 1967-2003 approximately 10% wild/ naturally reared origin adults were grilse and 86% were 2 sea winter. The grilse rate for the Penobscot did increase in the 1970s.
Catch, CPUE, mean annual reported catch	No data are available on the reported catch for the fisheries in Connecticut and New Hampshire. However, it is known that in these fisheries, broodstock are killed and kept for consumption. Maine: In 2006 in the fishery on the Penobscot River, anglers had the opportunity to fish over at least 29 Atlantic salmon based on the catch of salmon at the Veazie trap. One Atlantic salmon was captured and released just after 7 a.m. on September 27th and an additional 14 Atlantic salmon raised/observed. In 2007, a total of 83 angler trips were reported. Anglers had the opportunity to fish over at least 31 Atlantic salmon based on the catch of salmon at the Veazie trap. Three Atlantic salmon were captured and released and an additional 10 Atlantic salmon raised/observed.
Market value (e.g. of catch, including trends, fishing rights)	There is no real market value associated with the recreational fisheries for Atlantic salmon in the US as they are currently being executed given that they are very small in scale and limited.
Gear in use, preferences of gear	Connecticut: Fishing for Atlantic salmon is limited to use of a SINGLE FLY or artificial LURE WITH A SINGLE FREE-SWINGING HOOK. Additional weight may not be added to the line. Snagging is strictly prohibited.

	New Hampshire: The required gear is described by the following definitions and regulations. "Fly-fishing" means casting with only fly rod, fly reel and fly line combination with an artificial fly attached, to which no additional weight has been added to the fly line or leader, and does not include the use of spinning, spincast, and casting rods and reels and lead core lines. A fly shall be a single- or double-pointed hook, unweighted, and shall not be baited. A fly is defined as a hook dressed with feathers, hair, thread, tinsel or any similar material to which no spinner, spoon or similar device is added. The fly is unweighted if the material is added to the fly as an attractant only and will not make the fly sink. Maine: Only catch and release angling was allowed. Any salmon hooked had to be released immediately, without injury; No salmon shall be removed from the water for any reason; Fly fishing only (fly must be tied on single pointed barbless hook); and only one fly or hook can be fished at any one time.
Types of fishing licensing – prices, indicators	New Hampshire: Recreational salmon license costs $11 US. Connecticut: Recreational Licenses for Inland Fisheries range from $20 to $40 US depending on resident status. Main: Permit cost is $15 US
Costs connected with the activities	No data
Willingness to pay (if possible, divided into marginal and total willingness to pay)	The USFWS and NMFS are required to assess the economic impacts of critical habitat designation. As a result, the NMFS used data gathered as part of that process on willingness to pay. Given that the economic impacts being assessed were in relation to critical habitat, the information below does not represent an extensive analysis of the economic benefits and costs of recreational fisheries. However, it does present a general idea of

	what the willingness to pay may be in the US. Recreational fishing value is measured in willingness to pay for the opportunity to fish which can be evaluated using stated preference techniques or revealed preferences techniques. Revealed preference techniques examine individuals' behavior in markets in response to changes in environmental or other amenities (i.e., people "reveal" the value they hold for an amenity by their behavior). Travel cost models are one way to assess an individual's willingness to pay for fishing opportunity as well as random utility models and property value models. Kay et al. (1987) funded by the USFWS, was one of the most relevant studies that assessed the cost-effectiveness of a range of alternatives for continued implementation of the Service's Atlantic Salmon Restoration Program. The study estimates that annual willingness to pay for an Atlantic salmon fishing license ranges from $35.87 for those who might fish to $50.78 for those who will certainly fish. Separate from these use values, the study reports that willingness to pay for Atlantic salmon restoration (a one-time payment) ranges from $17.20 to $50.79 per household. Kay, et al. also develop aggregate benefit results, applying the individual willingness to pay figures to estimates of the total number of households in New England; this yields a total economic value for the Atlantic Salmon Restoration Program of about $129 million. IEC states that there are some problems with these results due in part to the methodology used to collect information. Therefore, in comparison with other angler value studies, the actual use values may be quite a bit higher. This study, however, is more than 20 years old and is based on methods that may not produce reliable estimates. In light of these considerations, a transfer of the results of the Kay, et al. study to estimate the benefits of efforts to protect and restore the Gulf of Maine DPS of Atlantic salmon is not justified.

Motivation	The motivation for all three of the fisheries discussed in Maine, New Hampshire, and Connecticut is recreational entertainment and opportunity to engage in recreational fisheries in general.
Magnitude of and attitude towards Catch & Release	Catch and release fishing is widely accepted and practiced. As noted in previous sections, catch and release is required in Maine and in some Connecticut fisheries and at certain times of the year in New Hampshire. With respect to motivation, information is limited. Permit sale information is provided as a proxy although it covers both kill and catch and release fisheries. New Hampshire: Permit sales have remained steady in recent years, with a slight increase from 1,395 sold in 2006 to 1,446 in 2006. Data from the 2007 season is not yet available. Permit sales suggest that anglers continue to value this unique opportunity to fish for Atlantic salmon in northern New England. Connecticut: No permit data could be found; however, the broodstock fishery seems to continue to be supported by angler participation on an annual basis. Maine- License sales declined from 2006 to 2007. According to anglers this decrease in participation is attributed to a desire to have the State authorize a spring fishery. The State did authorize a spring fishery this past winter for the spring of 2008. It is difficult to predict if angler participation would have increased once again in the fall had the spring fishery not been authorized.
Number of businesses/number of jobs created by /depending on a salmon fishery	There are no businesses or jobs that depend on Atlantic salmon recreational fisheries in the U.S.

NON-consumptive uses – salmon watching/Visitor centres … description, magnitude of each activity	
Description of non-consumptive uses	Visits to viewing windows at fishways, visits to hatcheries
Demographic characteristics: e.g. age, gender of users	Variety, families, school groups
Costs connected with the activities	Unlikely that there are any costs associated with these public outreach opportunities.
Willingness to pay (if possible, divided into marginal and total willingness to pay)	No data.
Motivation	No data.
Number of businesses/number of jobs created/depending these activities	While Federal and State agencies, as well as Non governmental organizations do engage in public outreach, it is not the sole mission of any of these entities. The mission of these entities is largely salmon recovery and restoration, thus public outreach is just one element of this overall mission. As a result, no businesses/ jobs rely on these activities.

Existence of salmon	
Main stakeholders	
General public also including Fishing right holders, Fishermen and Fishing related industries	Citizens of Maine, New Hampshire, and Connecticut specifically. However, salmon restoration and recovery are an issue of national interest in the US given that the populations in Maine represents the last remnant populations of wild Atlantic salmon in the US. Conservation and sportsmen groups are also typical stakeholders that have an interest in recreational fisheries.
Willingness to pay by the general public (if possible, divided into marginal and total willingness to pay)	No data

Food, Social, Ceremonial, Cultural aspects and Subsistence fisheries	
Main stakeholders	
Indigenous people (Sami people, first nations…)	The Penobscot Indian Nation and Passamoquoddy tribes both have tribal rights to fish for salmon in the Penobscot River for ceremonial and subsistence purposes. However, the tribes in Maine have chosen not to exercise that righ in recent years due to concerns over the conservation status of the population in the Penobscot River.
People carrying out historic fishing activities	Citizens of the State of Maine have strong cultural connection to Atlantic salmon; Viable fisheries will help maintain this connection, which is critical to recovering the species. However, to date there is no data to show the relationship between providing a fishery opportunity in Maine and increased desire to support recovery efforts.

Environmental aspects with particular reference to biodiversity value	
Indicator/icon of sound environment, indicator for environmental changes such as the climate	Species listed under the Endangered Species Act are identified as national priorities for conservation and recovery. The goal of the ESA is to recover the ecosystems upon which listed species depend – so recovery of Atlantic salmon will benefit a wide range of species through the restoration of ecosystem function.
Genetic reserve for aquaculture	No information.
Genetic reserve for the survival of the species under changing (climate) conditions	There are a number of federal hatcheries used for artificial propagation of Atlantic salmon for recovery and restoration purposes. These hatcheries represent a genetic reserve in the event of a catastrophic event.
Value and impacts of listing salmon, e.g. under EU Habitats Directive, US Endangered Species Act, Canadian Species at Risk Act, etc.	Federal agencies are prohibited from undertaking, permitting, or funding any activity that will jeopardize the continued existence of a listed species. Funds are expended annually by federal agencies and industries, individuals and entities to modify projects and implement conditions to avoid, minimize or mitigate impacts to listed Atlantic salmon and their habitat. In addition, approximately $10 million is spent directly annually to protect and recover Atlantic salmon.

Canada

Number of Salmon Anglers

	2000 Resident	2005 Resident	2000 Canadian Non-Resident	2005 Canadian Non-Resident	2000 Other Non-Resident	2005 Other Non-Resident	2000 Total	2005 Total
Newfoundland	14,287	12,293	1,003	1,034	601	519	15,890	13,846
PEI	241	366	18	55	17	18	276	439
Nova Scotia	1,257	1,790	200	287	509	465	1,966	2,542
New Brunswick	12,777	11,183	1,410	1,977	3,512	2,699	17,698	15,859
Quebec	10,415	7,654	417	0	929	0	11,761	7,654
Total	38,976	33,286	3,048	3,353	5,567	3,701	47,592	40,340

Number of Salmon Days Fished

	2000 Resident	2005 Resident	2000 Canadian Non-Resident	2005 Canadian Non-Resident	2000 Other Non-Resident	2005 Other Non-Resident	2000 Total	2005 Total
Newfoundland	170,210	153,284	5,720	5,490	3,501	3,983	179,431	162,757
PEI	2,395	3,693	83	150	90	50	2,567	3,894
Nova Scotia	17,059	15,912	814	1,464	3,225	3,747	21,099	21,123
New Brunswick	103,965	100,849	5,603	7,624	17,717	16,913	127,285	125,386
Quebec	88,092	51,730	2,584	0	7,950	0	98,626	51,730
Total	381,720	325,469	14,805	14,728	32,482	24,693	429,008	364,890

Summary of Economic Contributions Attributable to Atlantic salmon
(angler must have fished at least one day for Atlantic salmon)

	2000						2005				
Newfoundland	Resident-AS	Nonresident Canadian-AS	Nonresident Other-AS	Total AS	Total-All anglers (all species)	% AS to All	Resident-AS	Nonresident Canadian-AS	Nonresident Other-AS	Total AS	Total-All angl (all speci
Total investment	15,097,630	41,021	119,872	15,258,523	164,143,117	9.3%	19,061,122	192,829	24,771	19,278,722	207,729,6
Investment for recreational fishing	9,090,572	38,117	94,406	9,223,095	64,306,014	14.3%	9,232,258	82,737	23,545	9,338,540	95,089,2
Total direct expenditures incl packages	4,861,850	1,777,860	1,614,195	8,253,906	42,994,814	19.2%	6,082,040	1,632,434	1,406,994	9,121,468	18,242,9
Total expenditures	19,959,481	1,818,881	1,734,067	23,512,429	207,137,931	11.4%	25,143,162	1,825,263	1,431,765	28,400,190	225,972,5
Total attributable expenditures	13,952,423	1,815,977	1,708,601	17,477,001	107,300,828	16.3%	15,314,298	1,715,171	1,430,539	18,460,008	113,332,2
% attributable to recreational fishing	69.9%	99.8%	98.5%	74.3%	51.8%		60.9%	94.0%	99.9%	65.0%	50.3
New Brunswick											
Total investment	13,919,082	484,287	561,476	14,964,844	58,027,587	25.8%	9,767,333	148,823	271,651	10,187,807	44,988,2
Investment for recreational fishing	7,133,247	179,831	459,389	7,772,467	26,240,319	29.6%	6,481,878	146,098	270,688	6,898,664	24,689,4
Total direct expenditures incl packages	3,869,067	1,938,700	6,386,979	12,194,746	24,040,654	50.7%	4,603,629	2,335,025	4,430,143	11,368,797	22,737,5
Total expenditures	17,788,148	2,422,986	6,948,455	27,159,590	82,068,241	33.1%	14,370,963	2,483,848	4,701,794	21,556,605	67,725,8
Total attributable expenditures	11,002,314	2,118,530	6,846,368	19,967,212	50,280,973	39.7%	11,085,507	2,481,124	4,700,830	18,267,461	47,427,0
% attributable to recreational fishing	61.9%	87.4%	98.5%	73.5%	61.3%		77.1%	99.9%	100.0%	84.7%	70.0
Nova Scotia											
Total investment	734,289	7,426	22,514	764,229	71,749,196	1.1%	1,252,829	759,527	1,177,474	3,189,830	57,037,6
Investment for recreational fishing	491,587	6,412	19,097	517,095	35,278,054	1.5%	565,196	204,132	888,661	1,657,989	31,251,7
Total direct expenditures incl packages	865,056	147,842	636,268	1,649,167	21,411,676	7.7%	609,637	238,657	557,731	1,406,025	2,812,0
Total expenditures	1,599,345	155,268	658,782	2,413,396	93,160,872	2.6%	1,862,466	998,185	1,735,205	4,595,856	59,849,7
Total attributable expenditures	1,356,643	154,254	655,365	2,166,262	56,689,730	3.8%	1,174,833	442,789	1,446,391	3,064,014	34,063,7
% attributable to recreational fishing	84.8%	99.3%	99.5%	89.8%	60.9%		63.1%	44.4%	83.4%	66.7%	56.9
Prince Edward Island											
Total investment	43,659	289	1,659	45,606	2,638,371	1.7%	144,063	24,953	0	169,016	4,068,8
Investment for recreational fishing	24,327	289	1,026	25,642	1,633,054	1.6%	58,931	2,891	0	61,822	2,431,8
Total direct expenditures incl packages	18,463	6,237	10,338	35,038	2,018,181	1.7%	58,238	17,318	34,335	109,892	219,7
Total expenditures	62,122	6,525	11,997	80,645	4,656,552	1.7%	202,301	42,272	34,335	278,908	4,288,6
Total attributable expenditures	42,790	6,525	11,364	60,680	3,651,235	1.7%	117,170	20,209	34,335	171,714	2,651,6
% attributable to recreational fishing	68.9%	100.0%	94.7%	75.2%	78.4%		57.9%	47.8%	100.0%	61.6%	61.8
Quebec											
Total investment	33,361,072	88,552	916,527	34,366,152	1,102,688,572	3.1%	8,249,780	88,552	916,527	9,254,859	1,371,059,1
Investment for recreational fishing	19,528,279	88,043	914,170	20,530,492	642,009,072	3.2%	3,921,317	88,043	914,170	4,923,531	574,307,1
Total direct expenditures incl packages	23,508,261	926,280	4,961,628	29,396,168	469,099,376	6.3%	6,115,935	926,280	4,961,628	12,003,842	378,894,0
Total expenditures	56,869,333	1,014,832	5,878,155	63,762,320	1,571,787,948	4.1%	14,365,715	1,014,832	5,878,155	21,258,702	27,136,8
Total attributable expenditures	43,036,540	1,014,323	5,875,797	49,926,660	1,111,108,448	4.5%	10,037,253	1,014,323	5,875,797	16,927,373	22,803,1
% attributable to recreational fishing	75.7%	99.9%	100.0%	78.3%	70.7%		69.9%	99.9%	100.0%	79.6%	84.0
Atlantic - Atlantic salmon anglers											
Total investment	63,155,732	621,574	1,622,048	65,399,354	1,399,246,844	4.7%	38,475,126	1,214,684	2,390,424	42,080,235	1,684,883,4
Investment for recreational fishing	36,268,012	312,691	1,488,088	38,068,791	769,466,700	4.9%	20,259,581	523,902	2,097,063	22,880,545	727,769,4
Total direct expenditures incl packages	33,122,697	4,796,919	13,609,409	51,529,025	559,564,704	9.2%	17,469,480	5,149,714	11,390,830	34,010,025	422,906,3
Total expenditures	96,278,430	5,418,493	15,231,456	116,928,379	1,958,811,548	6.0%	55,944,607	6,364,398	13,781,254	76,090,260	2,107,789,8
Total attributable expenditures	69,390,709	5,109,610	15,097,497	89,597,816	1,329,031,404	6.7%	37,729,061	5,673,616	13,487,893	56,890,570	1,150,675,7
% attributable to recreational fishing	72.1%	94.3%	99.1%	76.6%	67.8%		67.4%	89.1%	97.9%	74.8%	54.0

ANNEX 4

Working Group on Socio-Economics

WGSE(08)16

Overview of Existing Information on the Social and Economic Values of Wild Atlantic Salmon – updating by the Parties

Overview of existing knowledge/data/studies of the social and economic values of wild Atlantic Salmon*

Values / Country	USA	Canada	Greenland	Iceland	Faroe Isl.	Norway	Russia	UK (Scot)	UK (E & W)
Economic value									
Use	r	RC		R		Cr		RC	RC
Non-use	x	x		X		X			X
Economic impacts									
Direct		RC	C	R	c	RC	r	R	Rc
Indirect		r		R		r		R	R
Cost/benefit		rc		R		r			R
Social and cultural benefits									
Psychological	r					r			
Social	r			r		rc			
Cultural/indigenous peoples		s				s			C?

Values / Country	UK (NI)	Ireland	Finland	Sweden	Denmark	Germany	France	Spain
Economic value								
Use		RC	R	r	r			r
Non-use								
Economic impacts								
Direct		RC						
Indirect		RC						r
Cost/benefit		RC						
Social and cultural benefits								
Psychological		RC						
Social		RC						r
Cultural/indigenous peoples		RC						r

* This table focuses on studies of Atlantic salmon, but it is recognised that studies of other fish resources or other environmental issues provide useful information for enhancing knowledge of the social and economic values of Atlantic salmon. The table is incomplete and may be added to by each of the countries listed.

Legend: Relevance of study	Significant R/C/S	Minor r/c/s		
R C S indicate recreational, commercial or subsistence			X indicates non-use value	? indicates uncertainty

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Note: *This is not a comprehensive bibliography of studies concerning the social and economic value of Atlantic salmon. It is a selection of studies provided by the Parties as background information for the three NASCO meetings on social and economic values of wild salmon held in 2003, 2004 and 2008.*

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WSEV(03)7	The Value of the Atlantic Salmon and its Fisheries in England and Wales
WSEV(03)9	Social and Economic Values of Atlantic Salmon - Information provided by the Parties - European Union – Finland
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