European Community Directive on the Conservation of Natural Habitats and of Wild Fauna and Flora (92/43/EEC)

Supporting documentation for the Third Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2007 to December 2012
Conservation status assessment for

Species:

S1106 - Atlantic salmon. (*Salmo salar*)

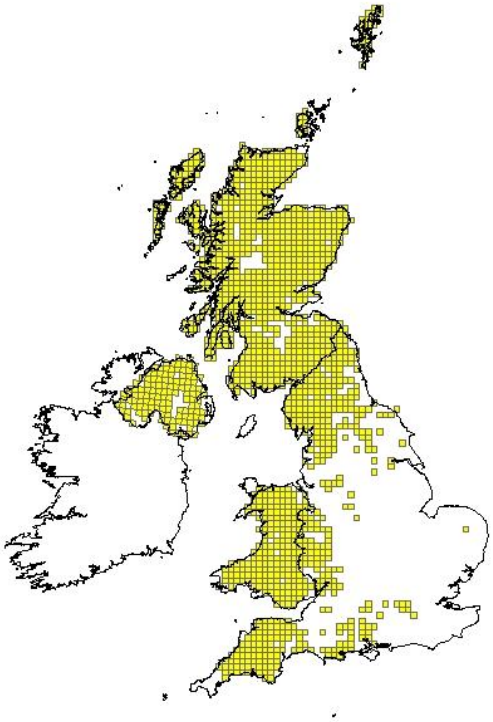
IMPORTANT NOTE – PLEASE READ

- The country-level reporting information contained in this document is a contribution to the Article 17 UK report for the habitat/species concerned.
- It has been provided by **Scottish Natural Heritage** and refers only to the state of the habitat/species in **Scotland** - it does not constitute an assessment for the whole of the UK.
- The Article 17 UK Approach document provides details on how this information has been used and, combined with information supplied by other Statutory Nature Conservation Bodies
- The format of the document is closely aligned to that set out by the European Commission for Member State reporting – as a result, some of the fields are not applicable at a country-level and have deliberately been left blank – in addition, the content of most fields is constrained by the EC reporting categories.

Reporting format on the 'main results of the surveillance under Article 11' for Annex II, IV & V species

Field name	*Brief explanations*	
0.2 Species	**0.2.1 Species code**	**S1106**
	0.2.2 Species scientific name	***Salmo salar***
	0.2.3 Alternative species scientific name Optional	
	0.2.4 Common name Optional	**Atlantic salmon**

1.1 Maps			
1.1.1 Distribution map		**Sensitive**	**False**
	Atlantic salmon are present in approximately 350 river systems in Scotland. The Marine Scotland Science salmon distribution dataset contains the best available information on the current distribution of salmon, and natural and man made passable and impassable barriers. Data were initially collated from a variety of historical and contemporary data sources including MSS staff, District Salmon Fishery Boards, Fisheries Trusts and local angling clubs in the 1980s (Gardiner & Egglishaw 1986). The last major update to the dataset was carried out in 2006. At this stage, the distribution data were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial distribution of salmon. The distribution of Atlantic salmon in Scotland was recently reviewed as part of the NASCO Focus Area Report (IP(09)8).		



1.1.2 Method used - map	**Estimate based on partial data with some extrapolation and/or modelling**
	GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. **Updated data collated by Marine Scotland and added to NBN September 2012 NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf
1.1.3 Year or period	**1986-2012**
1.1.4 Additional distribution map	**False**
1.1.5 Range map	

2.1 Biogeographical region & marine regions	**ATL**
2.2 Published sources	**"GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. **Updated data collated by Marine Scotland and added to NBN September 2012"**

	GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. **Updated data collated by Marine Scotland and added to NBN September 2012

2.3 Range	
2.3.1 Surface area Range	**863.79**
	Present in ~389 river systems. The wetted area available to salmon in Scotland is estimated at 863.79 km2, consisting of 177.29 km2 of river habitat and 686.50 km2 of loch habitat.
2.3.2 Method used Surface area of Range	**Estimate based on partial data with some extrapolation and/or modelling**
	Data collected in 1986 and updated in 2007 were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial distribution of salmon. These line data were subsequently allocated to Ordnance Survey MasterMap polygons in order to provide wetted areas. GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. **Updated data collated by Marine Scotland and added to NBN September 2012 NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf Atlantic salmon are present in approximately 350 river systems in Scotland. The Marine Scotland Science salmon distribution dataset contains the best available information on the current distribution of salmon, and natural and man made passable and impassable barriers. Data were initially collated from a variety of historical and contemporary data sources including MSS staff, District Salmon Fishery Boards, Fisheries Trusts and local angling clubs in the 1980s (Gardiner & Egglishaw 1986). The last major update to the dataset was carried out in 2006. At this stage, the distribution data were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial distribution of salmon. The distribution of Atlantic salmon in Scotland was recently reviewed as part of the NASCO Focus Area Report (IP(09)8).
2.3.3 Short-term trend Period	**1986-2007**
2.3.4 Short term trend Trend direction	**increase**
2.3.5 Short-term trend	

Magnitude	**a) Minimum**	
	Identification of a clear range trend over this period is difficult. Subsequent to historic declines, there have been recolonisations of various, formerly occupied industrialised rivers, such as the River Clyde and several Firth of Forth rivers in central Scotland. Identification of a clear range trend over this period is difficult. However, the gradual recolonisation of the Clyde catchment and other rivers and the removal of man-made barriers to migration in many catchments have undoubtedly led to an increase in habitat availability in the shorter term. The scale of this over the shorter term appears to be larger than any losses in available habitat over this term. The short-term range should therefore be (+). This is, however, has not yet been quantified. The 2009 NASCO FAR Report (IP(09)8) gave tentative estimates that historical habitat areas which are no longer available to Atlantic salmon are 81.45 km2 for standing waters and 13.33 km2 for running waters- representing approximately 10% and 7% of the total historical area for standing and running waters respectively. One important caveat to consider is the fact that some of the running water habitat is has been impounded for water supply purposes and can no longer be classified as running water habitat.	
	b) Maximum	
2.3.6 Long-term trend Period	**1960-2012**	
	Post-industrial era 1960 – 2012	
2.3.7 Long-term trend Trend direction	**increase**	
	(+) - It is probable that the UK range of Atlantic salmon has remained mostly stable since the Habitats Directive came into force. Over the longer timescales, and subsequent to historic declines in the quality and quantity of Atlantic salmon habitat during the late 19th and early/mid 20th centuries, there have been recolonisations of various, formerly occupied industrialised rivers, such as the River Clyde in central Scotland.	
2.3.8 Long-term trend Magnitude Optional	**a) Minimum**	
	GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. **Updated data collated by Marine Scotland and added to NBN September 2012 NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf Identification of a clear range trend over this period is difficult. However, the gradual recolonisation of the Clyde catchment and other rivers and the removal of man-made barriers to migration in many	

	catchments have undoubtedly led to an increase in habitat availability in the shorter term. The scale of this over the shorter term appears to be larger than any losses in available habitat over this term. The short-term range should therefore be (+). This is, however, has not yet been quantified. The 2009 NASCO FAR Report (IP(09)8) gave tentative estimates that historical habitat areas which are no longer available to Atlantic salmon are 81.45 km2 for standing waters and 13.33 km2 for running waters- representing approximately 10% and 7% of the total historical area for standing and running waters respectively. One important caveat to consider is the fact that some of the running water habitat is has been impounded for water supply purposes and can no longer be classified as running water habitat.	
	b) Maximum	
2.3.9 Favourable reference range	**a) Value in km²**	
	958.57 km2	
	b) Operator for FRR	
	c) FRR is unknown (indicated by "true")	**False**
	d) Method used to set FRR	**The current area occupied by Atlantic salmon in Scotland (863.79 km2) plus the area formerly occupied by this species (94.78 km2) suggests that the total area of suitable habitat may be 958.57 km2. It is important to note that access to some of this habitat may be restricted by the presence of dams or other impassable obstacles. The character of some habitat (particularly riverine habitat) may have changed due to associated issues (such as impoundment).**
2.3.10 Reason for change Is the difference between the reported value in 2.3.1 and the previous reporting round mainly due to…	**a) Genuine change?**	**True**
	Identification of a clear range trend over this period is difficult. However, the gradual recolonisation of the Clyde catchment and other rivers and the removal of man-made barriers to migration in many catchments have undoubtedly led to an increase in habitat availability in the shorter term. The scale of this over the shorter term appears to be larger than any losses in available habitat over this term. The short-term range should therefore be (+). This is, however, has not yet been	

	quantified. The 2009 NASCO FAR Report (IP(09)8) gave tentative estimates that historical habitat areas which are no longer available to Atlantic salmon are 81.45 km2 for standing waters and 13.33 km2 for running waters- representing approximately 10% and 7% of the total historical area for standing and running waters respectively. One important caveat to consider is the fact that some of the running water habitat is has been impounded for water supply purposes and can no longer be classified as running water habitat.	
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**

2.4 Population		
2.4.1 Population size estimation (using individuals or agreed exceptions where possible)	**a) Unit**	
	b) Minimum	
	c) Maximum	
2.4.2 Population size estimation (using population unit other than individuals) Optional *(if 2.4.1 filled in)*	**a) Unit**	**number of adults**
	Spawning adults	
	b) Minimum	**470329**
	10 year mean (2001-2011) - 470,329	
	c) Maximum	
	10 year mean (2001-2011) - 470,329	
2.4.3 Additional information on population estimates / conversion Optional	**a) Definition of "locality"**	**Spawning adults**
	b) Method to convert data	
	c) Problems encountered to provide population size estimation	

2.4.4 Year or period	**2001-2011**	
2.4.5 Method used Population size	**Estimate based on partial data with some extrapolation and/or modelling**	
	Data returns for catches plus Monte Carlo modelling for the last calendar year INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA 2012. Report of the Working Group on North Atlantic Salmon, 26 March–4 April 2012, Copenhagen, Denmark. (ICES CM 2012/ACOM:09) www.ices.dk/reports/ACOM/2012/WGNAS/wgnas_2012.pdf Marine Scotland 2012. Salmon Fishery Statistics - 2011 Season www.scotland.gov.uk/Publications/2012/09/5826/1 470,329 spawning adults based on an average value over the period 2002-2011. These are standard reporting units used by ICES for estimating population size and trends. These figures are calculated as Pre-Fishery Abundance minus the fishery catch. They are therefore the best measure the numbers of fish which will contribute to future recruitment. Data quality is considered to be good, though some predictive modelling is usually required for the final year of data.	
2.4.6 Short-term trend Period	**1952-2011**	
	The total rod catch (retained and released) in 2011 was very similar to the previous five-year average. Taken over the time series since 1952, annual rod catch has increased and is currently towards the high end of the observed range. This may be taken as evidence of an increase in the numbers of fish entering fresh water and, given the high levels of reported catch and release, escaping to spawn. However, the status of stocks on smaller geographical scales (e.g. among or within catchments) may differ both from each other and also from the overall assessments presented above. The long term decline in the total rod catch of spring salmon suggests that the populations associated with this stock component may be particularly weak although there is some indication that spring salmon catch has stabilised in recent years. Source: Marine Scotland 2012. Salmon Fishery Statistics - 2011 Season www.scotland.gov.uk/Publications/2012/09/5826/1	
2.4.7 Short-term trend Trend direction	**increase**	
	Nationally (Scotland) 1SW fish (grilse) (+) 2 SW fish (0) Locally – more variable	
2.4.8 Short-term trend Magnitude	**a) Minimum**	
	b) Maximum	

	c) Confidence interval	
2.4.9 Short-term trend Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
	INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA 2012. Report of the Working Group on North Atlantic Salmon, 26 March–4 April 2012, Copenhagen, Denmark. (ICES CM 2012/ACOM:09) www.ices.dk/reports/ACOM/2012/WGNAS/wgnas_2012.pdf Marine Scotland 2012. Salmon Fishery Statistics - 2011 Season www.scotland.gov.uk/Publications/2012/09/5826/1 Nationally (Scotland) 1SW fish (grilse) (+) 2 SW fish (0) Locally – more variable	
2.4.10 Long-term trend – Period	**1952-2011**	
	Taken over the time series since 1952, annual rod catch has increased and is currently towards the high end of the observed range. This may be taken as evidence of an increase in the numbers of fish entering fresh water and, given the high levels of reported catch and release, escaping to spawn. The long term decline in the total rod catch of spring salmon suggests that the populations associated with this stock component may be particularly weak although there is some indication that spring salmon catch has stabilised in recent years.	
2.4.11 Long-term trend Trend direction	**increase**	
	Taken over the time series since 1952, annual rod catch has increased and is currently towards the high end of the observed range. This may be taken as evidence of an increase in the numbers of fish entering fresh water and, given the high levels of reported catch and release, escaping to spawn. The long term decline in the total rod catch of spring salmon suggests that the populations associated with this stock component may be particularly weak although there is some indication that spring salmon catch has stabilised in recent years.	
2.4.12 Long-term trend Magnitude Optional	**a) Minimum**	
	b) Maximum	

	c) Confidence interval	
2.4.13 Long term trend Method used	**2**	
	INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA 2012. Report of the Working Group on North Atlantic Salmon, 26 March–4 April 2012, Copenhagen, Denmark. (ICES CM 2012/ACOM:09) www.ices.dk/reports/ACOM/2012/WGNAS/wgnas_2012.pdf Marine Scotland 2012. Salmon Fishery Statistics - 2011 Season www.scotland.gov.uk/Publications/2012/09/5826/1 Taken over the time series since 1952, annual rod catch has increased and is currently towards the high end of the observed range. This may be taken as evidence of an increase in the numbers of fish entering fresh water and, given the high levels of reported catch and release, escaping to spawn. The long term decline in the total rod catch of spring salmon suggests that the populations associated with this stock component may be particularly weak although there is some indication that spring salmon catch has stabilised in recent years. Data used are Atlantic salmon catches from 1952-2011. Data quality is reasonable but contains no measure of effort. No catch-independent data is included in the assessment (i.e. through the use of fish counters). In general, the quality of the freshwater environment is no longer deteriorating and small improvements are evident in some parts of the country. Moreover, exploitation has been greatly reduced, with net fisheries and fixed engines removed and rod fisheries increasingly switching to catch and release. Recent declines are primarily related to changes to the marine habitat of Atlantic salmon, which has direct and indirect impacts on both Atlantic salmon and its prey. These are primarily driven by climate change and are outside the direct control of the UK government.	
2.4.14 Favourable reference population	**a) Number of individuals/agreed exceptions/other units**	**502570**
	This is the number of spawning adults within the Atlantic salmon population. Atlantic salmon populations, like any other fish taxa fluctuate from year to year. Therefore, since ICES 2012 provides count data as far back as 1971, expert opinion is that the long-term average from 1971 – 1994 (502,570) provides the most appropriate baseline for comparison. Although there have been declines in Atlantic salmon since 1994, these have been driven predominately by external pressures, such as changes in marine habitat, and this reporting process only covers the freshwater	

	habitat of the species. Furthermore, it is difficult to argue that a population of approximately 502,570 spawning adults would not be large enough to maintain and perpetuate itself in the absence of these external pressures. For this reason, the 1971-1994 average has been set as the minimum favourable reference population. (This does not, take into account the numbers needed to support local populations of Atlantic salmon at a smaller geographical (catchment and sub-catchment) level) The figure used in the previous reporting round (mean number of spawners 1971-1994) has to be disaggregated to include only the data for Scotland - this is 502,570.	
	b) Operator	
	c) FRP is unknown indicated by "true"	**False**
	d) Method used to set FRP	**This is the number of spawning adults within the Atlantic salmon population.** **Atlantic salmon populations, like any other fish taxa fluctuate from year to year. Therefore, since ICES 2012 provides count data as far back as 1971, expert opinion is that the long-term average from** **1971 – 1994 (502,570) provides the most appropriate baseline for comparison.** **Although there have been declines in Atlantic salmon since 1994, these have been driven predominately by external pressures, such as changes in marine habitat, and this reporting process only covers the freshwater habitat of the species. Furthermore, it is difficult to argue that a population of approximately 502,570 spawning adults would not be large enough to maintain and perpetuate itself in the absence of these external pressures.** **For this reason, the 1971-1994 average has been set as the minimum favourable reference population.** **(This does not, take into account the numbers needed to support local populations of Atlantic salmon at a smaller geographical (catchment and sub-catchment) level)**
	INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA 2012. Report of the Working Group on North Atlantic Salmon, 26 March–4	

	April 2012, Copenhagen, Denmark. (ICES CM 2012/ACOM:09) www.ices.dk/reports/ACOM/2012/WGNAS/wgnas_2012.pd	
2.4.15 Reason for change Is the difference between the value reported at 2.4.1 or 2.4.2 and the previous reporting round mainly due to:	**a) Genuine change?**	**True**
	The previous value (in the 2007 reporting round) was given for the UK and not Scotland. Atlantic salmon populations, like any other fish taxa fluctuate from year to year. The number of adults returning to spawn is determined by marine survival rates.	
	b) Improved knowledge/more accurate data?	**False**
	c) Use of different method (e.g. "Range tool")?	**False**
	Note that the previous value (in the 2007 reporting round) was given for the UK and not Scotland	

2.5 Habitat for the species	
2.5.1 Area estimation	**958.57**
	The current area occupied by Atlantic salmon in Scotland (863.79 km2) plus the area formerly occupied by this species (94.78 km2) suggests that the total area of suitable habitat may be 958.57 km2. It is important to note that access to some of this habitat may be restricted by the presence of dams or other impassable obstacles. The character of some habitat (particularly riverine habitat) may have changed due to associated issues (such as impoundment). There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species. Freshwater: Clean well-oxygenated river gravels for spawning. Rivers with good water quality, coarse boulder / cobble / pebble substrates for fry and parr (juvenile fish. Abundant supply of insect prey both from the river and from surrounding terrestrial habitats. Unimpeded access to and from the sea. Marine: Nutrient-rich, cold water habitat supporting abundant plankton, especially krill, squid and small fish (e.g. sandeels, sprats, anchovies). Most multi-sea-winter UK fish feed off Greenland. There is thought to be a sufficient amount of habitat in the UK to support a viable population of the species.
2.5.2 Year or period	**2009-2009**

2.5.3 Method used Habitat for the species	**Estimate based on partial data with some extrapolation and/or modelling**	
2.5.4 Quality of the habitat	**a) Habitat quality**	**Good**
	b) Assessment method	**Atlantic salmon distribution data was collected from a range of historical and current (MSS staff, District Salmon Fishery Boards, Fisheries Trusts and local angling clubs) sources. First distribution map published in 1986 and updated in 2007. These data were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial distribution of salmon. Line data were subsequently allocated to Ordnance Survey MasterMap polygons in order to provide wetted areas. This provided estimates of both the current and historical distribution of Atlantic salmon in Scotland.** **These data were collated by Marine Scotland Science and there is no doubt that the quality of the analysis is good.**
	Atlantic salmon distribution data was collected from a range of historical and current (MSS staff, District Salmon Fishery Boards, Fisheries Trusts and local angling clubs) sources. First distribution map published in 1986 and updated in 2007. These data were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial distribution of salmon. Line data were subsequently allocated to Ordnance Survey MasterMap polygons in order to provide wetted areas. This provided estimates of both the current and historical distribution of Atlantic salmon in Scotland. These data were collated by Marine Scotland Science and there is no doubt that the quality of the analysis is good. DAVIES, CE, SHELLEY, J, HARDING, PT, MCLEAN, IFG, GARDINER, R & PEIRSON, G (eds.) 2004. Freshwater fishes in Britain. The species and their distribution. Colchester: Harley Books GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. MAITLAND, P.S. 1994. Fish. In: The Fresh Waters of Scotland: A National resource of International Significance. (eds. P.S. Maitland, P.J. Boon & D.S. McLusky),. pp.191-208. Wiley & Sons Publ. Ltd. 639pp.	

	MAITLAND, P.S. 2004 Keys to the Freshwater Fish of Britain and Ireland with notes on their distribution and ecology . Freshwater Biological Association , Scientific Publication No. 62, 245pp. MAITLAND, P.S. 2007 Scotland's Freshwater Fish: Ecology, Conservation & Folklore. Trafford Publishing, Oxford. NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf The habitat area is given as the sum of the area known to host Atlantic salmon , plus the area where Atlantic salmon have been recorded in the past. This estimate is reasonable. These data were collated as part of a Scottish Government response to NASCO (the Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8). Atlantic salmon distribution data was collected from a range of historical and current (MSS staff, District Salmon Fishery Boards, Fisheries Trusts and local angling clubs) sources. First distribution map published in 1986 and updated in 2007. These data were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial distribution of salmon. Line data were subsequently allocated to Ordnance Survey MasterMap polygons in order to provide wetted areas. This provided estimates of both the current and historical distribution of Atlantic salmon in Scotland. Data quality is good.
2.5.5 Short-term trend Period	**2001-2012**
2.5.6 Short-term trend Trend direction	**stable** (0) tending to (+) because of easement of man-made obstacles and improvements in water quality in areas previously affected by industrialisation. NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf (0) tending to (+) because of easement of man-made obstacles and improvements in water quality in areas previously affected by industrialisation. This is driven by domestic and European (i.e. WFD) driven improvements in water quality legislation and standards. Magnitude of change not calculated. Atlantic salmon distribution data was collected from a range of historical and current (MSS staff, District Salmon Fishery Boards, Fisheries Trusts and local angling clubs) sources. First distribution map published in 1986 and updated in 2007. These data were digitised onto the Centre for Ecology and Hydrology (CEH) digital rivers network to identify the spatial

	distribution of salmon. Line data were subsequently allocated to Ordnance Survey MasterMap polygons in order to provide wetted areas. This provided estimates of both the current and historical distribution of Atlantic salmon in Scotland. Data quality is good.
2.5.7 Long-term trend Period	**1983-2012**
	1983-2012: 1983 selected as the start date because this was the year from which Atlantic salmon began to be sighted annually in the River Clyde. This is a clear indication of an improvement in water quality and re-colonisation by this species within industrialised catchments in Scotland.
2.5.8 Long-term trend Trend direction	**increase**
	(0) tending to (+) because of easement of man-made obstacles and improvements in water quality in areas previously affected by industrialisation. This is driven by domestic and European (i.e. WFD) driven improvements in water quality legislation and standards. Magnitude of change not calculated. DOUGHTY, R. AND GARDINER, R. 2003. The Return of Salmon to Cleaner Rivers – A Scottish Perspective. Chapter 15 in: Salmon at the Edge (Ed. MILLS, D.). Oxford: Blackwell Scientific. GARDINER, R. & MCLAREN, I. 1991. Decline and recovery of salmon in the Central Belt of Scotland. In: Strategies for the Rehabilitation of Salmon Rivers. (ed. Mills, D.) Proceedings of a joint AST-IFM conference held at the Linnean Society 29-30 November 1990. pp. 187-193. NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf
2.5.9 Area of suitable habitat for the species	**a) Value in km²** **958.57**
	The current area occupied by Atlantic salmon in Scotland (863.79 km2) plus the area formerly occupied by this species (94.78 km2) suggests that the total area of suitable habitat may be 958.57 km2. It is important to note that access to some of this habitat may be restricted by the presence of dams or other impassable obstacles. The character of some habitat (particularly riverine habitat) may have changed due to associated issues (such as impoundment). DAVIES, CE, SHELLEY, J, HARDING, PT, MCLEAN, IFG, GARDINER, R & PEIRSON, G (eds.) 2004. Freshwater fishes in Britain. The species and their distribution. Colchester: Harley Books DOUGHTY, R. AND GARDINER, R. 2003. The Return of Salmon to Cleaner Rivers – A Scottish Perspective. Chapter 15 in: Salmon at the Edge (Ed. MILLS, D.). Oxford: Blackwell Scientific. GARDINER, R. & EGGLISHAW, H. 1986. A Map of the Distribution in Scottish Rivers of the Atlantic Salmon, Salmo salar L. Department of Agriculture and Fisheries for Scotland, Freshwater Fisheries Laboratory, Pitlochry. 5pp + folded map. Scottish Fisheries Publication. **Updated data collated by Marine Scotland and added to NBN September 2012 GARDINER, R. & MCLAREN, I. 1991. Decline and recovery of salmon in the Central Belt of Scotland. In: Strategies for the Rehabilitation of Salmon Rivers. (ed. Mills, D.) Proceedings of a joint AST-IFM conference

held at the Linnean Society 29-30 November 1990. pp. 187-193.

MAITLAND, P.S. 1994. Fish. In: The Fresh Waters of Scotland: A National resource of International Significance. (eds. P.S. Maitland, P.J. Boon & D.S. McLusky),. pp.191-208. Wiley & Sons Publ. Ltd. 639pp.

MAITLAND, P.S. 2004 Keys to the Freshwater Fish of Britain and Ireland with notes on their distribution and ecology . Freshwater Biological Association , Scientific Publication No. 62, 245pp.

MAITLAND, P.S. 2007 Scotland's Freshwater Fish: Ecology, Conservation & Folklore. Trafford Publishing, Oxford.
NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf

b) Absence of data indicated as '0'	

2.5.10 Reason for change

Is the difference between the value reported at 2.5.1 and the previous reporting round mainly due to

a) Genuine change?	**True**

Figure given for the previous reporting round was for the UK. However it is clear that habitat improvements (in terms of water quality and accessibility) will have resulted in an increase in range and habitat suitability at a local level.

Easement of man-made obstacles and improvements in water quality in areas previously affected by industrialisation. This is driven by domestic and European (i.e. WFD) driven improvements in water quality legislation and standards

b) Improved knowledge/more accurate data?	**True**

The WFD River Basin Management plans provide a comprehensive list of issues which affect the aquatic environment at a waterbody level. This is a significant addition to our knowledge base. See: SEPA WFD water quality data assessment sheets for each Scottish waterbody at: www.sepa.org.uk/water/river_basin_planning/waterbody_data_sheets.aspx

NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf

NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2012 Annual Report on Actions Taken Under Implementation Plans EU – UK (Scotland). Report CNL(12)32 www.nasco.int/pdf/2012%20papers/CNL_12_32.pdf

www.sepa.org.uk/water/river_basin_planning/waterbody_data_sheets.a

	spx	
	c) Use of different method (e.g. "Range tool")?	**False**

2.6 Main pressures		
a) Pressure	**b) Ranking**	**c) Pollution qualifier**
	H = high importance M = medium importance L = low importance	
F01: Marine and Freshwater Aquaculture	H	
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	H	NPX
J02: human induced changes in hydraulic conditions	H	
M01: Changes in abiotic conditions	H	
M02: Changes in biotic conditions	H	
C01: Mining and quarrying	M	
F02: Fishing and harvesting aquatic resources	M	
H04: Air pollution, air-borne pollutants	M	A
I03: introduced genetic material, GMO	M	
J03: Other ecosystem modifications	M	
K01: abiotic (slow) natural processes	M	
K03: Interspecific faunal relations	M	

A wide range of pressures can affect Atlantic salmon, both in freshwater and in marine environments. Intensive aquaculture, exploitation (as adults and as a pre-adult by-catch), climate change and predation (at a local scale) can all impact this species at sea and in coastal areas.

Atlantic salmon support a large recreational fishery in Scotland, and a culture of 'catch and release' has grown in recent years. Stocking, carried out in support of these fisheries, continues to be a management issue in many catchments. This has, in part, been addressed by amendments made to the Salmon and Freshwater Fisheries (Consolidation)(Scotland) Act 2003 by the Aquaculture & Fisheries (Scotland) Act 2007. Controls on exploitation (though the use of weekly and seasonal close times), restrictions placed on angling gear and bait, and provision for the control of the monogenean parasite Gyrodactylus salaris were also included. A further Aquaculture & Fisheries Bill is currently under development which may strengthen controls further.

The forthcoming Bill may also introduce greater powers to regulate the aquaculture industry, and in particular the impact this industry may have on wild salmonids. Also of relevance are the two strategic

documents: A Fresh Start: The Renewed Strategic Framework for Scottish Aquaculture' and 'A Strategic Framework for Scottish Freshwater Fisheries', which outline a number of priorities for action to improve the way in which aquaculture and wild fisheries (including Atlantic salmon) are managed in Scotland.

The network of Fisheries Trusts which cover most of Scotland has also produced both Fishery Management Plans and Biosecurity Plans for each of their respective areas. These outline priorities for action at a local level.

The Water Framework Directive established a new regulatory structure aimed at the protection, improvement and sustainable use of surface waters, transitional waters, coastal waters and ground-waters across Europe. Activities which impact aquatic habitats are tightly controlled through domestic legislation - Water Environment and Water Services (Scotland) Act 2003. Discharges, disposal to land, abstractions, impoundments and engineering works (such as those related to mineral extraction, hydro and in-river engineering) are all regulated by SEPA through the Water Environment (Controlled Activities) (Scotland) Regulations 2011.

Climate change will impact both freshwater and marine habitats. In freshwater changes to established hydrological regimes and the more frequent occurrence of extreme events can have significant impacts on Atlantic salmon and their habitats. At sea, changes to prey productivity as a result of changing temperatures, pH and, possibly currents, may already be impacting migrating Atlantic salmon. These are outwith the direct control of the Scottish (or UK) government.
All of the pressures listed can also be considered 'threats' if they do not already occur in any given catchment. A review of progress against these threats has been produced in Section 2.6.

Added to this list of 'threats' however are marine renewable developments. These are potential threats because their impact on migrating Atlantic salmon is not known.

Following work commissioned by SNH [see: Gill, A.B. & Bartlett, M. (2010). Literature review on the potential effects of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel. Scottish Natural Heritage Commissioned Report No.401], further empirical research is currently ongoing within Marine Scotland to assess the impact of electromagnetic fields on Atlantic salmon.

A review of marine migration pathways has also been produced [see: I.A. Malcolm, J. Godfrey & A.F. Youngson 2010. Review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment: implications for the development of marine renewables. Scottish Marine and Freshwater Science 1 No 14.]

Policy towards these developments will develop as the body of scientific evidence progresses.

2.6.1 Method used – Pressures	**mainly based on expert judgement and other data**
	DAVIES, CE, SHELLEY, J, HARDING, PT, MCLEAN, IFG, GARDINER, R & PEIRSON, G (eds.) 2004. Freshwater fishes in Britain. The species and their distribution. Colchester: Harley Books DOUGHTY, R. AND GARDINER, R. 2003. The Return of Salmon to Cleaner Rivers – A Scottish Perspective. Chapter 15 in: Salmon at the Edge (Ed. MILLS, D.). Oxford: Blackwell Scientific. HENDRY, K. & CRAGG-HINE, D. 2003. Ecology of the Atlantic salmon. Conserving Natura 2000 Rivers - Ecology Series No. 7. English Nature, Peterborough. 32pp. MAITLAND, P.S. 1994. Fish. In: The Fresh Waters of Scotland: A National resource of International Significance. (eds. P.S. Maitland, P.J. Boon & D.S. McLusky),. pp.191-208. Wiley & Sons Publ. Ltd. 639pp.

MAITLAND, P.S. 2004 Keys to the Freshwater Fish of Britain and Ireland with notes on their distribution and ecology . Freshwater Biological Association , Scientific Publication No. 62, 245pp.

MAITLAND, P.S. 2007 Scotland's Freshwater Fish: Ecology, Conservation & Folklore. Trafford Publishing, Oxford.

NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009 Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf

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www.sepa.org.uk/water/river_basin_planning/waterbody_data_sheets.aspx
DAVIES, CE, SHELLEY, J, HARDING, PT, MCLEAN, IFG, GARDINER, R & PEIRSON, G (eds.) 2004. Freshwater fishes in Britain. The species and their distribution. Colchester: Harley Books

DOUGHTY, R. AND GARDINER, R. 2003. The Return of Salmon to Cleaner Rivers – A Scottish Perspective. Chapter 15 in: Salmon at the Edge (Ed. MILLS, D.). Oxford: Blackwell Scientific.

Gill, A.B. & Bartlett, M. (2010). Literature review on the potential effects of electromagnetic fields and subsea noise from marine renewable energy developments on Atlantic salmon, sea trout and European eel. Scottish Natural Heritage Commissioned Report No.401 www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=1680

HENDRY, K. & CRAGG-HINE, D. 2003. Ecology of the Atlantic salmon. Conserving Natura 2000 Rivers - Ecology Series No. 7. English Nature, Peterborough. 32pp.

MAITLAND, P.S. 1994. Fish. In: The Fresh Waters of Scotland: A National resource of International Significance. (eds. P.S. Maitland, P.J. Boon & D.S. McLusky),. pp.191-208. Wiley & Sons Publ. Ltd. 639pp.

MAITLAND, P.S. 2004 Keys to the Freshwater Fish of Britain and Ireland with notes on their distribution and ecology . Freshwater Biological Association , Scientific Publication No. 62, 245pp.

MAITLAND, P.S. 2007 Scotland's Freshwater Fish: Ecology, Conservation & Folklore. Trafford Publishing, Oxford.

I.A. Malcolm, J. Godfrey & A.F. Youngson 2010. Review of migratory routes and behaviour of Atlantic salmon, sea trout and European eel in Scotland's coastal environment: implications for the development of marine renewables. Scottish Marine and Freshwater Science 1 No 14 www.scotland.gov.uk/Resource/Doc/295194/0111162.pdf

NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2009

	Protection, Restoration and Enhancement of Salmon Habitat Focus Area Report EU-UK (Scotland). Report IP(09)8 www.nasco.int/pdf/far_habitat/HabitatFAR_Scotland.pdf NORTH ATLANTIC SALMON CONSERVATION ORGANISATION 2012 Annual Report on Actions Taken Under Implementation Plans EU – UK (Scotland). Report CNL(12)32 www.nasco.int/pdf/2012%20papers/CNL_12_32.pdf www.sepa.org.uk/water/river_basin_planning/waterbody_data_sheets.aspx

2.7 Threats

a) Threat	b) Ranking H = high importance M = medium importance L = low importance	c) Pollution qualifier
C03: Renewable abiotic energy use	H	
F01: Marine and Freshwater Aquaculture	H	
F02: Fishing and harvesting aquatic resources	H	
H01: Pollution to surface waters (limnic & terrestrial, marine & brackish)	H	NPX
J02: human induced changes in hydraulic conditions	H	
J03: Other ecosystem modifications	H	
M01: Changes in abiotic conditions	H	
M02: Changes in biotic conditions	H	
C01: Mining and quarrying	M	
D02: Utility and service lines	M	
H04: Air pollution, air-borne pollutants	M	A
I03: introduced genetic material, GMO	M	
K03: Interspecific faunal relations	M	

2.7.1 Method used – Threats	**expert opinion**

2.8 Complementary information	
2.8.1 Justification of % thresholds for trends	
2.8.2 Other relevant information	**Accuracy of the assessment is limited by the fact that there is no measure of effort for the catch data used and that other measures of exploitation are used to translate catch statistics to population estimates.** **There is a lack of realisation that fish abundance can vary considerably on an inter-annual basis – this is common to all Article 17 fish assessments.** **As a measure of freshwater output, the best measure of recruitment would be an assessment of smolt numbers.** **Marine survival is a key issue with regard to Atlantic salmon in Scotland and elsewhere. Better monitoring of marine migration pathways and the factors that are responsible for marine mortality will be essential if issues relating to climate change and marine renewable energy are to be addressed.** **The genetic variability that exists within Atlantic salmon stocks is only now becoming fully realised. Single rivers may host many populations of Atlantic salmon and some of these may be maintained by relatively few fish. The broad approach taken by this assessment may underestimate the health of these populations.**
	Accuracy of the assessment is limited by the fact that there is no measure of effort for the catch data used and that other measures of exploitation are used to translate catch statistics to population estimates. There is a lack of realisation that fish abundance can vary considerably on an inter-annual basis – this is common to all Article 17 fish assessments. As a measure of freshwater output, the best measure of recruitment would be an assessment of smolt numbers. Marine survival is a key issue with regard to Atlantic salmon in Scotland and elsewhere. Better monitoring of marine migration pathways and the factors that are responsible for marine mortality will be essential if issues relating to climate change and marine renewable energy are to be addressed. The genetic variability that exists within Atlantic salmon stocks is only now becoming fully realised. Single rivers may host many populations of Atlantic salmon and some of these may be maintained by relatively few fish. The broad approach taken by this assessment may underestimate

	the health of these populations.
2.8.3 Trans-boundary assessment	

2.9 Conclusions *(assessment of conservation status at end of reporting period)*
Please refer to the United Kingdom assessment for this species.

3 Natura 2000 coverage & conservation measures - Annex II species
(only applies to species listed under Annex II of the Directive)

3.1 Population

3.1.1 Population size Estimation of population size included in the SAC network	**a) Unit**	**number of adults**
	Spawning adults trend since date of designation	
	b) Minimum	**470329**
	c) Maximum	**470329**
3.1.2 Method used	**Estimate based on partial data with some extrapolation and/or modelling**	
3.1.3 Trend of population size within the network (short-term trend)	**stable**	

Trends within individual sites are variable. Data for SCM Cycle II has been collected but a report has not yet been received.

SAC	Date of designation	Spring	Summer	Autumn	All
Berriedale&Langwell	26-Jan-01	Y	Y	Y	Y
Grimersta	16-Mar-01	Y	N	Stable	N
Little Gruinard	16-Mar-01	Y	N	N	N
Bladnoch	20-Jul-01	Y	N	Y	Y
Dee	10-May-02	Y	Stable	Y	Y
Naver	16-Mar-01	N	N	N	N
South Esk	16-Mar-01	N	Stable	Y	Y
Spey	04-Jun-99	Y	Y	N	Y
Tay	10-May-02	Stable	Y	Y	Y
Thurso	16-Mar-01	Y	Y	N	N
Tweed	30-Nov-01	N	Y	Y	Y
Borgie	20-Dec-00	N	N	N	N
Endrick	20-Jan-01	N	N	N	N
Moriston	29-Jan-01	Y	N	Y	Stable

	North Harris 20-Dec-00 n/a Y Y Y Oykel 16-Mar-01 N N N N Teith 16-Mar-01 Y N N N Stable: the average rod catch in the years since the site was designated as a SAC is within +/- 5% of the catch in the year of designation. Y signifies an increase against the rod catch for that Fishery District in the year of designation figure and N denotes a decrease. Juvenile fish were surveyed by electrofishing in each SAC Adult fish trends were assessed by Marine Scotland using data obtained for Atlantic salmon catches. These data focused on trends rather than absolute numbers. Catch data is available for Fishery Districts rather than for individual SACs in many instances.

3.2 Conservation measures

Conservation measures taken (i.e. already being implemented) within the reporting period and provided information about their importance, location and evaluation.

3.2.1 Measure	3.2.2 Type					3.2.3 Ranking H = high importance M = medium importance L = low importance	3.2.4 Location where the measure is PRIMARILY applied			3.2.5 Broad evaluation of the measure					
	a) Legal/statutory	b) Administrative	c) Contractual	d) Recurrent	e) One-off		a) Inside	b) Outside	c) Both inside & outside	a) Maintain	b) Enhance	c) Long term	d) No effect	e) Unknown	f) Not evaluated
4.0: Other wetland-related measures	Y					M			Y	Y					
4.1: Restoring/improving water quality	Y					M			Y	Y					
4.2: Restoring/improving the hydrological regime	Y					M			Y	Y					
4.3: Managing water abstraction	Y					M			Y	Y					

5.0: Other marine-related measures	Y					M			Y	Y					
6.1: Establish protected areas/sites	Y					M			Y	Y					
7.2: Regulation/ Management of fishery in limnic systems	Y					M			Y	Y					
9.2: Regulating/ Managing exploitation of natural resources on sea	Y					M			Y	Y					

GODFREY, J.D. 2006. Site Condition Monitoring of Atlantic Salmon cSACs. SNH Contract F02AC608

RAFTS 2012. Site Condition Monitoring of Atlantic Salmon SACs. SNH Contract – NOT YET AVAILABLE
Measures to improve water quality and restore hydrological and fluvio-geomorphological processes are being carried out via domestic implementation of the WFD.

Controls on exploitation, for example through the operation of closed seasons or restrictions on the use of capture methods, is covered by fisheries legislation (e.g. Salmon & Freshwater Fisheries (Consolidation)(Scotland) Act 2003 and the Aquaculture & Fisheries (Scotland) Act 2007).

Marine planning is covered under the Marine (Scotland) Act 2010. This Act aims to achieve better protection for the marine environment and provide a more streamlined regulation for the use of the sea. It has initiated proposals for a coordinated marine planning system and new marine nature conservation provisions, including Marine Protected Areas. Marine Scotland has been established to coordinate delivery of these provisions as well as better marine and freshwater fisheries management and marine and freshwater science.