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

Fourth Report by the United Kingdom under Article 17

on the implementation of the Directive
from January 2013 to December 2018

Supporting documentation for the
conservation status assessment for the species:

S1106 - Atlantic salmon (*Salmo salar*)

WALES

IMPORTANT NOTE - PLEASE READ

- The information in this document is a country-level contribution to the UK Report on the conservation status of this species, submitted to the European Commission as part of the 2019 UK Reporting under Article 17 of the EU Habitats Directive.
- The 2019 Article 17 UK Approach document provides details on how this supporting information was used to produce the UK Report.
- The UK Report on the conservation status of this species is provided in a separate document.
- The reporting fields and options used are aligned to those set out in the European Commission guidance.
- Explanatory notes (where provided) by the country are included at the end. These provide an audit trail of relevant supporting information.
- Some of the reporting fields have been left blank because either: (i) there was insufficient information to complete the field; (ii) completion of the field was not obligatory; (iii) the field was not relevant to this species (section 12 Natura 2000 coverage for Annex II species) and/or (iv) the field was only relevant at UK-level (sections 9 Future prospects and 10 Conclusions).
- For technical reasons, the country-level future trends for Range, Population and Habitat for the species are only available in a separate spreadsheet that contains all the country-level supporting information.
- The country-level reporting information for all habitats and species is also available in spreadsheet format.

Visit the JNCC website, https://jncc.gov.uk/article17, for further information on UK Article 17 reporting.

Report on the main results of the surveillance under Article 11 for Annex II, IV and V species (Annex B)

NATIONAL LEVEL

1. General information

1.1 Member State	**UK (Wales information only)**
1.2 Species code	**1106**
1.3 Species scientific name	**Salmo salar**
1.4 Alternative species scientific name	
1.5 Common name (in national language)	Atlantic salmon

2. Maps

2.1 Sensitive species	No
2.2 Year or period	2013-2018
2.3 Distribution map	Yes
2.4 Distribution map Method used	Complete survey or a statistically robust estimate
2.5 Additional maps	No

3. Information related to Annex V Species (Art. 14)

3.1 Is the species taken in the wild/exploited?	Yes	
3.2 Which of the measures in Art. 14 have been taken?	a) regulations regarding access to property	No
	b) temporary or local prohibition of the taking of specimens in the wild and exploitation	Yes
	c) regulation of the periods and/or methods of taking specimens	Yes
	d) application of hunting and fishing rules which take account of the conservation of such populations	Yes
	e) establishment of a system of licences for taking specimens or of quotas	Yes
	f) regulation of the purchase, sale, offering for sale, keeping for sale or transport for sale of specimens	Yes
	g) breeding in captivity of animal species as well as artificial propagation of plant species	No
	h) other measures	No

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3.3 Hunting bag or quantity taken in the wild for Mammals and Acipenseridae (Fish)

a) Unit

b) Statistics/ quantity taken	Provide statistics/quantity per hunting season or per year (where season is not used) over the reporting period					
	Season/ year 1	Season/ year 2	Season/ year 3	Season/ year 4	Season/ year 5	Season/ year 6
Min. (raw, ie. not rounded)						
Max. (raw, ie. not rounded)						
Unknown	No	No	No	No	No	No

3.4. Hunting bag or quantity taken in the wild Method used

3.5. Additional information

BIOGEOGRAPHICAL LEVEL

4. Biogeographical and marine regions

4.1 Biogeographical or marine region where the species occurs

Atlantic (ATL)

4.2 Sources of information

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5. Range

5.1 Surface area (km²)		
5.2 Short-term trend Period		
5.3 Short-term trend Direction	Stable (0)	
5.4 Short-term trend Magnitude	a) Minimum	b) Maximum
5.5 Short-term trend Method used		
5.6 Long-term trend Period		
5.7 Long-term trend Direction		
5.8 Long-term trend Magnitude	a) Minimum	b) Maximum
5.9 Long-term trend Method used		
5.10 Favourable reference range	a) Area (km²) b) Operator c) Unknown d) Method	
5.11 Change and reason for change in surface area of range	No change The change is mainly due to:	
5.12 Additional information		

6. Population

6.1 Year or period	2007-2018	
6.2 Population size (in reporting unit)	a) Unit	number of map 1x1 km grid cells (grids1x1)
	b) Minimum	
	c) Maximum	
	d) Best single value	3114
6.3 Type of estimate	Best estimate	
6.4 Additional population size (using population unit other than reporting unit)	a) Unit	number of adults (adults)
	b) Minimum	
	c) Maximum	
	d) Best single value	128912
6.5 Type of estimate	Multi-year mean	
6.6 Population size Method used	Complete survey or a statistically robust estimate	
6.7 Short-term trend Period	2007-2018	
6.8 Short-term trend Direction	Decreasing (-)	
6.9 Short-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval	
6.10 Short-term trend Method used	Complete survey or a statistically robust estimate	

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6.11 Long-term trend Period	
6.12 Long-term trend Direction	
6.13 Long-term trend Magnitude	a) Minimum b) Maximum c) Confidence interval
6.14 Long-term trend Method used	
6.15 Favourable reference population (using the unit in 6.2 or 6.4)	a) Population size b) Operator c) Unknown d) Method
6.16 Change and reason for change in population size	Genuine change Use of different method The change is mainly due to: Genuine change
6.17 Additional information	

7. Habitat for the species

7.1 Sufficiency of area and quality of occupied habitat	a) Are area and quality of occupied habitat sufficient (to maintain the species at FCS)?	No
	b) Is there a sufficiently large area of occupied AND unoccupied habitat of suitable quality (to maintain the species at FCS)?	Yes
7.2 Sufficiency of area and quality of occupied habitat Method used	Based mainly on extrapolation from a limited amount of data	
7.3 Short-term trend Period	2007-2018	
7.4 Short-term trend Direction	Increasing (+)	
7.5 Short-term trend Method used		
7.6 Long-term trend Period		
7.7 Long-term trend Direction		
7.8 Long-term trend Method used		
7.9 Additional information		

8. Main pressures and threats

8.1 Characterisation of pressures/threats

Pressure	Ranking
Modification of hydrological flow or physical alteration of water bodies for agriculture (excluding development and operation of dams) (A33)	M
Hydropower (dams, weirs, run-off-the-river), including infrastructure (D02)	H
Change of habitat location, size, and / or quality due to climate change (N05)	H

Agricultural activities generating diffuse pollution to surface or ground waters (A26)	H
Extraction activities generating diffuse pollution to ground or surface waters (C11)	M
Agricultural activities generating point source pollution to surface or ground waters (A25)	H
Use of plant protection chemicals in agriculture (A21)	M
Use of other pest control methods in agriculture (excluding tillage) (A23)	M
Use of other pest control methods in forestry (B22)	M

Threat	Ranking
Change of habitat location, size, and / or quality due to climate change (N05)	M
Desynchronisation of biological / ecological processes due to climate change (N06)	H
Agricultural activities generating diffuse pollution to surface or ground waters (A26)	H
Agricultural activities generating point source pollution to surface or ground waters (A25)	H
Wind, wave and tidal power, including infrastructure (D01)	M
Use of plant protection chemicals in agriculture (A21)	H
Use of other pest control methods in forestry (B22)	H
Modification of hydrological flow or physical alteration of water bodies for agriculture (excluding development and operation of dams) (A33)	M
Hydropower (dams, weirs, run-off-the-river), including infrastructure (D02)	M

8.2 Sources of information

8.3 Additional information

9. Conservation measures

9.1 Status of measures

a) Are measures needed? Yes

b) Indicate the status of measures Measures identified and taken

9.2 Main purpose of the measures taken

Increase the population size and/or improve population dynamics (improve reproduction success, reduce mortality, improve age/sex structure) (related to 'Population')

9.3 Location of the measures taken

Both inside and outside Natura 2000

9.4 Response to the measures

Medium-term results (within the next two reporting periods, 2019-2030)

9.5 List of main conservation measures

Reduce impact of hydropower operation and infrastructure (CC04)

Other measures related to extraction and energy exploitation activities (CC14)

Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (CF02)

Reduce impact of multi-purpose hydrological changes (CJ02)

Implement climate change adaptation measures (CN02)

Management of hunting, recreational fishing and recreational or commercial harvesting or collection of plants (CG02)

Other measures to reduce impacts from marine aquaculture infrastructures and operation (CG09)

Reduce diffuse pollution to surface or ground waters from agricultural activities (CA11)

Reduce/eliminate diffuse pollution to surface or ground waters from industrial, commercial, residential and recreational areas and activities (CF05)

9.6 Additional information

10. Future prospects

10.1 Future prospects of parameters

a) Range
b) Population
c) Habitat of the species

10.2 Additional information

11. Conclusions

11.1. Range

11.2. Population

11.3. Habitat for the species

11.4. Future prospects

11.5 Overall assessment of Conservation Status

11.6 Overall trend in Conservation Status

11.7 Change and reasons for change in conservation status and conservation status trend

a) Overall assessment of conservation status

No change

The change is mainly due to:

b) Overall trend in conservation status

No change

The change is mainly due to:

11.8 Additional information

12. Natura 2000 (pSCIs, SCIs and SACs) coverage for Annex II species

12.1 Population size inside the pSCIs, SCIs and SACs network (on the biogeographical/marine level including all sites where the species is present)

a) Unit	number of adults (adults)
b) Minimum	11346
c) Maximum	35906
d) Best single value	

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12.2 Type of estimate	Best estimate
12.3 Population size inside the network Method used	Complete survey or a statistically robust estimate
12.4 Short-term trend of population size within the network Direction	Stable (0)
12.5 Short-term trend of population size within the network Method used	Complete survey or a statistically robust estimate
12.6 Additional information	

13. Complementary information

13.1 Justification of % thresholds for trends	
13.2 Trans-boundary assessment	
13.3 Other relevant Information	

Distribution Map

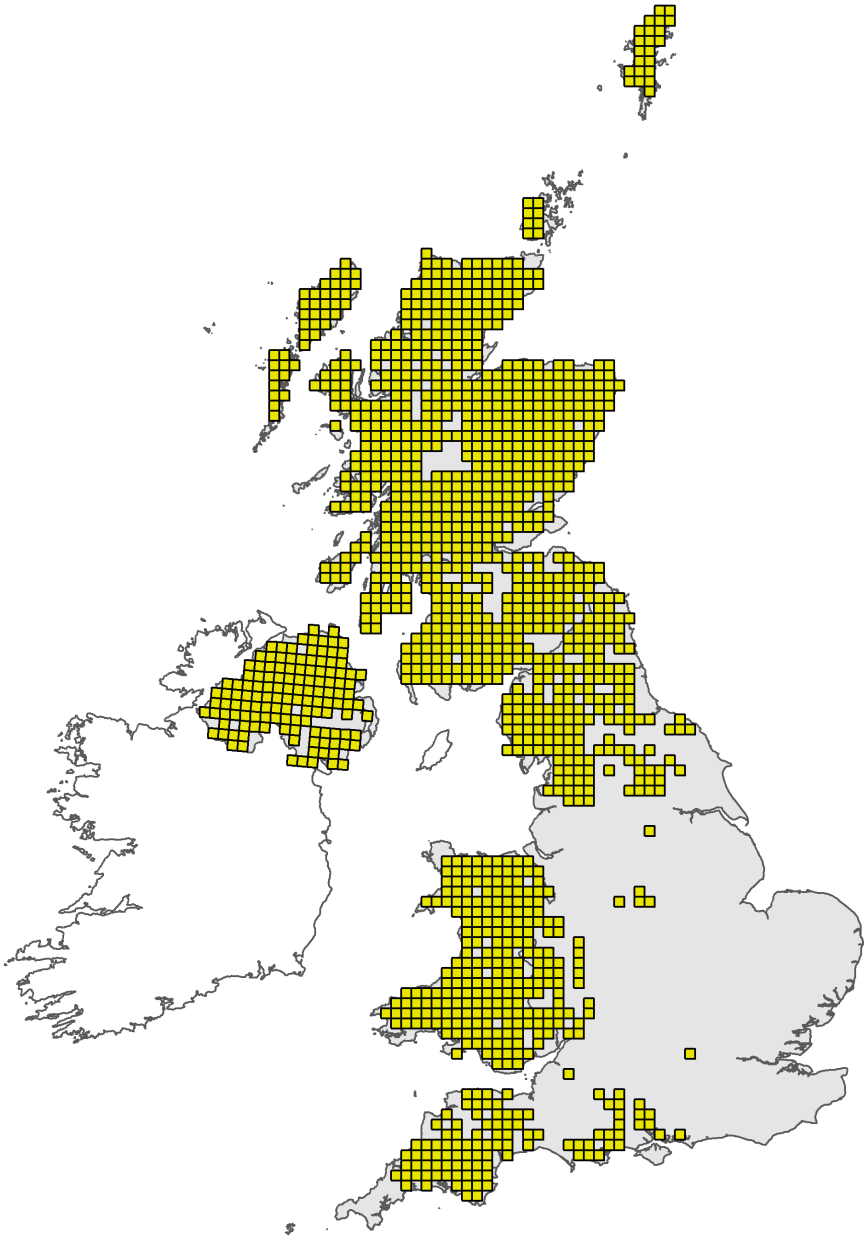

Figure 1: UK distribution map for S1106 - Atlantic salmon (*Salmo salar*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The 10km grid square distribution map is based on available species records within the current reporting period. For further details see the 2019 Article 17 UK Approach document.

Range Map

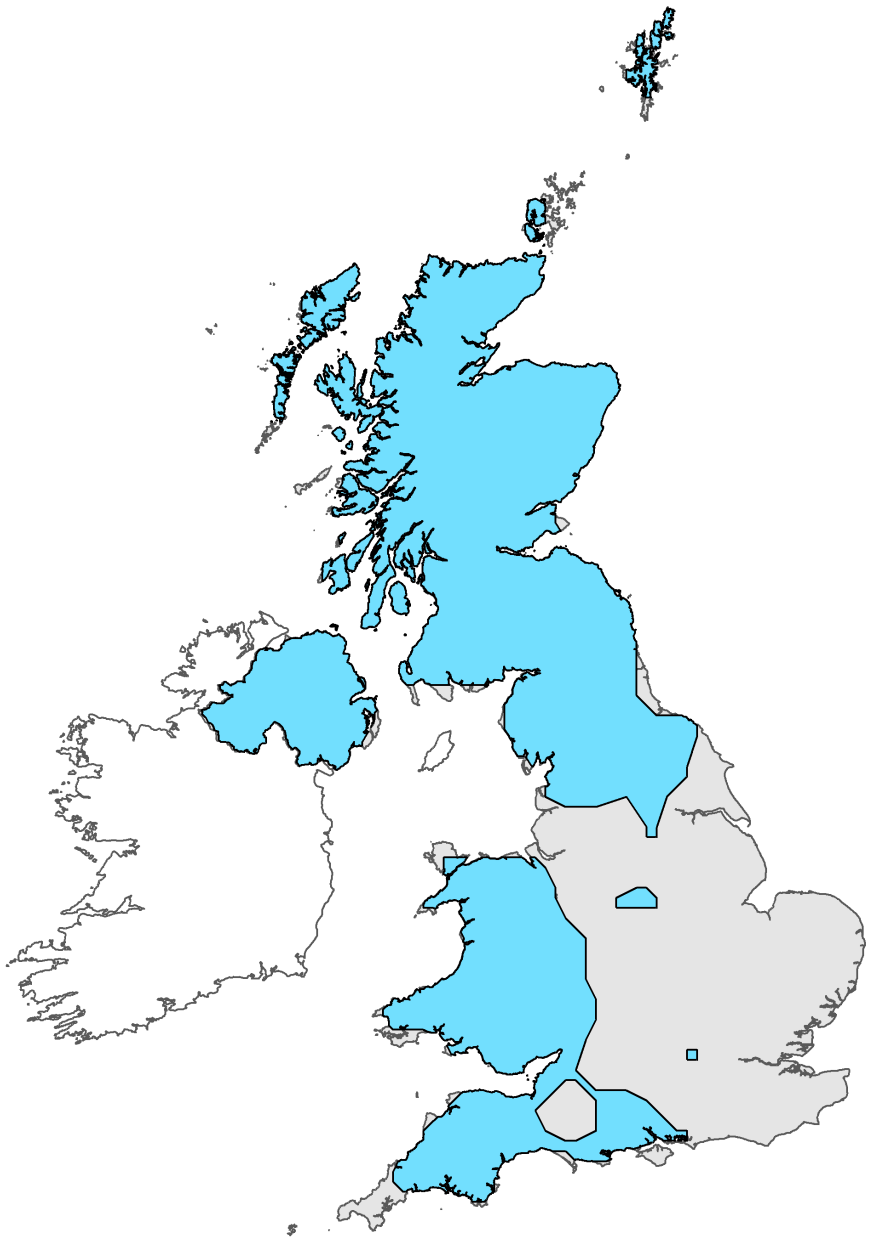

Figure 2: UK range map for S1106 - Atlantic salmon (*Salmo salar*). Coastline boundary derived from the Oil and Gas Authority's OGA and Lloyd's Register SNS Regional Geological Maps (Open Source). Open Government Licence v3 (OGL). Contains data © 2017 Oil and Gas Authority.

The range map has been produced by applying a bespoke range mapping tool for Article 17 reporting (produced by JNCC) to the 10km grid square distribution map presented in Figure 1. The alpha value for this species was 25km. For further details see the 2019 Article 17 UK Approach document.

Explanatory Notes

Species name: Salmo salar (1106)

Field label	Note
2.4 Distribution map; Method used	The 10 km square mapped range is based on records from annual & six yearly NRW juvenile salmonid surveys conducted using a standardised electric fishing technique. This widespread species is expected to be present in the majority of water courses (NRW, 2017b). The species range in Wales has not significantly changed since the previous report in 2013 (JNCC, 2013) (Figure 1), although this coarse scale would not detect localised variation.
3.2 Which of the measures in Art. 14 have been taken?	Rod fishing licences are available for the open fishing season which usually extends from March to October (November on some rivers). There are currently catch & release (C&R) restraints and, on some rivers, daily and weekly limits on the numbers of fish that can be taken. The current byelaws also describe restrictions on the use of bait, lures, lead weights, keepnets, gaffs & tailers. There is also a ban on the sale, barter or exchange of rod caught salmon (NRW, 2018a). Following a public consultation on additional regulations to protect failing stocks, it is possible that, subject to a ministerial decision, mandatory C&R and other restrictions will be extended to all salmon net and rod fisheries for the next 10 years to help allow the fish stocks to recover to sustainable levels. (NRW, 2018a). Salmon can also be taken using nets and traps in public fisheries located in many of the estuaries in west and north west Wales and NRW regulates these fisheries using a combination of fishing licences, Net Limitation Orders and fisheries byelaws (NRW 2018b).

Species name: Salmo salar (1106) Region code: ATL

Field label	Note
5.3 Short term trend; Direction	See 5.11
5.11 Change and reason for change in surface area of range	NRW juvenile salmonid data from 2007 was mapped as 10 km grid squares. The 10 km scale is probably too coarse to detect changes and although there appears to be slight variation in the distribution of occupied 10 km grid squares it has probably remained quite stable since 2013 (comparisons show some variation on the Wales /England country border with one or two additional squares on the Lleyn peninsula & Pembrokeshire coast). (JNCC, 2013; NRW, 2017b).
6.2 Population size	The population wholly in Wales = 3114 Additional transboundary population of = 69
6.4 Additional population size	57,334 (1SW) & 71,578 (MSW) = 128,912 total returning adult salmon. This is the average 10-year population size reported to ICES using estimates of returning 1SW & MSW salmon for England & Wales (ICES, 2017). The UK is a member of the inter-governmental North Atlantic salmon Conservation Organisation (NASCO) which works with the International Council for the Exploration of the Sea (ICES) to collate data and identify emerging threats to salmon populations. Each year adult salmon data is collated at a UK level - reported separately (in this context) for England and Wales - & submitted to NASCO (See Additional information document - appendix 1: Statement on treatment of Atlantic salmon data).

6.8 Short term trend; Direction	NB: Short term population trend is based on egg deposition calculations, trends in juvenile salmonid densities from the previous five years, the return rates of 1SW & MSW adults and returning stock estimates from three rivers with validated counts. Across Wales, there has been poor compliance with conservation limits & management targets relating to egg deposition rates. Calculations show that there has been a large egg shortfall between 2011 - 2016 (NRW, 2017a) (Figure 3). There was an extensive reduction in the densities of juvenile salmonids in 2015 & 2016 and numbers were at a critically low level in some principal catchments. These are rivers which had previously produced consistent fry numbers. (NRW, 2017a). While there has been a modest decline in juvenile salmon densities since 2009, the scale of the down-turn in 2016 was particularly notable and affected rivers throughout the country.The widespread nature of these observations suggested that factors operating at a broad scale were responsible for the declines in juvenile densities (ICES, 2017; NRW, 2017a) (See Figures 4 & 5). Compared to the 1980s, both 1SW & MSW returning adults have declined due at least in part to high mortality rates at sea. The factors affecting their survival is constraining the abundance of the salmon population (ICES, 2017; NRW, 2017a). Validated counts and run estimates for three rivers Dee, Teifi & Taff show that there has been a marked decline in in the number of returning salmon over the last decade. It is assumed that this is representative of the population across Wales (NRW, 2017a).These assessments show that the short-term population trend for Welsh salmon is exhibiting deterioration at each stage in its lifecycle.
6.17 Additional information	See additional information document.
6.17 Additional information	Index river monitoring across England and Wales indicates there have been marked changes in the contribution of 1SW and MSW salmon to returning stocks in the the last few years - with grilse numbers falling sharply post ~2010, Others have observed similar, and there are patterns in national (catch) derived data sets that support these observations.
7.1 Sufficiency of area and quality of occupied habitat	- area = Welsh river connectivity could be improved by removing full barriers to fish passage and allowing salmon access to additional suitable habitat. Much progress has been made but more remains to be done. In the marine environment, the habitat is affected by the impacts of ocean current oscillations and variations in temperature, salinity and pH regimes. -quality = The ecological status of water bodies in Wales was classified as follows; 3 Bad (49km length), 55 Poor (523 km length), 374 Moderate (3837 km length), 286 Good (2736 km length), 0 High. In Wales most of the river habitat quality can be classed as close to the Good-Moderate boundary (NRW, 2015). GES would support healthy salmon populations but water quality recovery across Wales is variable with improvements in urban rivers but rural rivers remain of concern. Ongoing agricultural pollution arising from both point and diffuse sources is having a serious detrimental effect on the Welsh environment. Agricultural pollution is the third most frequent reason for a river water body failing to meet Good Ecological Status. It affects some 180 individual waterbodies (NRW, 2016c).
7.4 Short term trend; Direction	The Water Framework Directive requires that water bodies are classified and reasons for failure are listed for those failing to meet Good Ecological Status. In Wales, 36 per cent of all water bodies achieved Good Ecological Status in 2012. In 2014, 42% of water bodies achieved good ecological status (National Assembly Wales, 2015).

8.1 Characterisation of pressures/ threats	Pressures: Salmon are exposed to a wide variety of pressures, reflecting the wide range of habitats that they use for spawning, feeding & migration. Barriers to fish migration (river connectivity) (A33, D02): modification or removal of artificial barriers that cause a permanent or temporary barrier to salmon migration will help enable access to additional habitat which may alleviate the impact of some of the additional pressures cited here. Other physical modifications to the water course can also affect instream carrying capacity by reducing wetted area, cover & food supply (JNCC, 2013). Climate change (N): Climate change is a pressure on both the freshwater & marine environment; increased precipitation leading to unseasonal flooding & warmer than average river water temperatures were implicated in the marked drop in Welsh juvenile salmonid numbers (NRW, 2017a). Marine ecosystems in the Northeast Atlantic have responded to ocean temperature changes by a shift towards a warmer regime leading to marked changes in the distribution & production of salmon food sources and a reduction in the carrying capacity of suitable marine habitat (Davidson & Hazlewood, 2007; ICES, 2012). In addition, the impact of climate change is also thought to have caused the timing of sea-bound migration to be poorly synchronised with conditions in the marine environment (Friedland et al, 2003; NASCO, 2010). Exploitation & harvesting aquatic resources (G01, G12, G17): parasitic sea lice and diseases are spread to wild salmon from farmed salmon populations (Miller et al, 2014; Jansen et al, 2016). Salmon by-catch in pelagic fisheries may be an issue but there is uncertainty in the estimates of numbers (NASCO, 2012). Pressures from commercial & recreational fisheries have decreased greatly but still play a part (JNCC, 2013). Diffuse pollution (A26, C11, J01): diffuse sources of pollution were one of the leading reasons for WFD river water bodies being non-compliant for fish & failing to reach Good Ecological status. Diffuse pollution mainly arises from agricultural management, accidental discharges and some abandoned mines, especially those that release sediment into water courses (NRW, 2015). Point source pollution (J01, A25) discharges from waste water treatment works are a significant contributor in some localised areas. Oestrogen mimics from industrial discharges are thought to weaken or kill salmon at the juvenile stage (JNCC, 2013) Certain agricultural practices are also implicated in point source pollution incidents although these have decreased in recent years (NRW, 2015). Air pollution (J01, J04): nitrogen oxides (NOx) and sulphur oxides (SOx) are emitted when fossil fuels are burnt. These air pollutants can impact water quality and although there have been clear and measurable improvements in water chemistry, the biological recovery has been more intermittent (NRW, 2015). Freshwater acidification remains a long term pressure in some parts of upland Wales (Kowalik et al, 2007). Threats: Threats are generally similar to pressures although horizon scanning suggests that the impact of some pressures may increase in the next decade. Invasive non-native species (INNS) (I01): INNS could spread more easily because of climate change and affect wild salmon health. Potentially damaging INNS include non-native crayfish (Pacifastacus leniusculus), pink salmon (Oncorhynchus gorbuscha) and salmon fluke (Gyrodactylus salaris.(CEFAS, 2017; JNCC, 2013). The latter is a parasite that has been identified as one of six primary challenges facing the conservation and management of wild Atlantic salmon in the North Atlantic (NASCO, 2016). Non-native signal crayfish (Pacifastacus leniusculus) predate salmonid eggs and research shows that the greater the density of signal crayfish in a river section, the lower the density of Atlantic salmon (Peay et al, 2009). Pink salmon have recently been recorded in England and Scotland and while there is no immediate threat to wild Atlantic salmon in terms of competition for spawning sites and juvenile recruitment, there is a risk of this species introducing novel parasites or diseases to native wild salmonids. To date, no pink salmon have been recorded in Wales (NRW, 2018d). Topmouth gudgeon (Pseudorasbora parva), is a non-native coarse fish which is the vector for the parasite Sphaerothecum destruens. This multi-fish species pathogen cases 90% mortality in Atlantic salmon. There are two known populations of topmouth gudgeon in the Llanelli area, but the potential impact on Welsh salmon population is not currently known. Energy production (D01): additional

renewable energy developments around the Welsh coastline (NAW, 2013), may lead to disruption / delay in fish migration. The impacts on salmon and potential adaptive management techniques require further investigation (Gill & Bartlett, 2010). The number of hydropower installations may also increase in the near future to help meet the demands of the Welsh Government's aspiration for Wales to generate 22.5 Gigawatts of installed capacity from different renewable energy technologies. (NAW, 2013; EU, 2009; EU, 2009). In rivers poor operational or infrastructure design could negatively impact salmon through entrainment, create adverse changes to flow regimes & habitat, lead to changes in river connectivity, increase disturbance etc. Climate change (N): oscillation in ocean currents and further increases in temperature and acifidication levels are a likely threat to salmon populations (Delworth et al, 2016). Pesticides (A21, A22, B22): studies suggest that low levels of cypermethrin (a pesticide) in the aquatic environment may have a significant effect on Atlantic salmon populations through disruption of reproductive functions (Moore & Waring, 2001). Increasing temperatures as a result of climate change, may enhance the toxicity of pesticide contaminants and also lead to increased run-off. The threat posed by the synergistic interactions between climate change and pesticide exposure requires more research (Noyes, et al. 2009). Microplastics (JO1): Currently there is very little research on the impact in rivers although researchers from the University of Manchester have called for tighter regulations on waste flowing into urban waterways, after the first study of its kind found that microplastics from urban river channels are a major contributor to the pollution problem in the oceans (Hurley et al, 2018). Studies into the impact of marine plastics show overwhelming evidence that this pollution is a threat to marine biodiversity which is already at risk from overfishing, climate change and other forms of anthropogenic disturbance (Derraik, 2002).

9.5 List of main conservation measures	Maintaining the productive capacity of salmon freshwater habitat will require integrated catchment management planning to identify risks and prioritise the implementation of measures to address them. For example: The Welsh Government Glastir agri-environment scheme prescriptions for planting of bankside vegetation to create shade, changes to land use and upland land drainage schemes may mitigate some of the expected effects of climate change and reduce diffuse pollution (Welsh Government, 2018). Removal / re-modelling of existing artificial barriers to migration should be implemented when managing maintenance works or installation of new infrastructure projects in rivers (NRW, 2018c). The LIFE Natura 2000 project assessed priorities for SAC river habitat and species restoration / connectivity projects (NRW, 2014b), which if implemented would address many of the pressures and threats. The stocking of salmon bred and reared in captivity was phased out in 2015 (NRW, 2014a) & a further public consultation regarding salmon rod & line and net fishing catch controls closed in February 2018 and a ministerial decision on new regulatory constraints is expected soon (NRW, 2017c) Byelaws to further control net & rod angling - Welsh Government is currently considering whether to introduce a 10 year catch & release byelaw for all Welsh & cross border rivers (Mee D., pers comm; NRW, 2017a; 2017c). See section 3.2 for further details of control of hunting practises. NRW will continue to monitor water quality in water bodies & investigate reasons for not achieving WFD 'good' status (NRW, 2018c). NRW will enforce fishing regulations and take action against illegal fishing activities (NRW, 2018c). In the most recent NRW business plan (2018c), NRW has committed to improve salmon stocks and their freshwater habitats by commissioning river restoration plans that will address barriers and fish connectivity and restore impoverished habitat. The Convention for the Conservation of Salmon in the North Atlantic Ocean entered into force on 1 October 1983 and created an inter-governmental organization, the North Atlantic Salmon Conservation Organization (NASCO). The Convention created a large protected zone, free of targeted fisheries for Atlantic salmon in most areas beyond 12 nautical miles from the coast. Conservation measures in the marine environment should maintain both the productive capacity and diversity of salmon stocks (NASCO, 1998). Previous research has shown that salmon are caught as a by-catch in pelagic vessels fishing for species such as mackerel and herring, but the extent of such catches is not known. An innovative and pioneering technique to assess the presence or absence of salmon DNA on fishing nets or on-board water sample using environmental DNA (eDNA) is being developed. The eDNA collected may provide valuable information on the origins of salmon in the by-catch, which will greatly add to our knowledge of salmon migration and distribution patterns in the ocean (AST, 2018).
10.1 Future prospects of parameters	Range: The long-term range of the population is likely to be at risk from the declines in population recruitment and the availability of suitable habitat in the marine and freshwater environment. Population: Recent population recruitment problems and the balance of threats and conservation measures will continue to impact the population size in the next 12 years. Habitat for the species: The impact of multi-stressors on surface waters and their complex interactions on water quality are difficult to determine and in addition, may require site-specific, targeted mitigation action (MARS, 2018).
12.1 Population size inside the pSCIs, SCIs and SACs network	Counts for the whole river & not only units within the SAC boundary. The Dee & Wye are cross-border rivers and the RSE includes counts from the whole river system and not just from within the Welsh SAC boundary.

12.3 Population size inside the network; Method used	Dee (1 of 4 Index Rivers in the UK): These figures are based on trapping & mark-recapture for the whole of the time series. Trapping at Chester Weir is carried out throughout the year (January - December) but not continuously. Gwyrfai, Eden (Mawddach), & Usk: Annual assessment of adult salmon depends on rod catches as declared through NRW's fishing licence returns programme and assumed angling exploitation rates. Teifi: The Teifi figures for 2010-2016, inclusive, are from the acoustic counter at Glanteifi. For other years, run estimates are derived from rod catches and assumed angling exploitation rates. Wye: Assessment is based on rod return data supplied by fisheries owners.
12.4 Short term trend of the population size within the network; Direction	Populations on the River Wye are probably increasing but overall the SAC population is stable.