	Council ***Annual Progress Report on Actions taken under the Implementation Plan for the Calendar Year 2021 UK – England and Wales***	**CNL(22)32**

Annual Progress Report on Actions taken under the Implementation Plan for the Calendar Year 2021

The Annual Progress Reports allow NASCO to evaluate progress on actions taken by Parties / jurisdictions to implement its internationally agreed Resolutions, Agreements and Guidelines and, consequently, the achievement of their objectives and actions taken in accordance with the Convention. The following information should be provided through the Annual Progress Reports:

- any changes to the management regime for salmon and consequent changes to the Implementation Plan;
- actions that have been taken under the Implementation Plan in the previous year;
- significant changes to the status of stocks, and a report on catches; and
- actions taken in accordance with the provisions of the Convention.

In completing this Annual Progress Report please refer to the ***Guidelines for the Preparation and Evaluation of NASCO Implementation Plans and for Reporting on Progress****, CNL(18)49.*

These reports will be reviewed by the Council. Please complete this form and return it to the Secretariat **no later than 1 April 2022**.

Party:	**United Kingdom**
Jurisdiction / Region:	**England and Wales**

1: Changes to the Implementation Plan

1.1 Describe any proposed revisions to the Implementation Plan ***(Where changes are proposed, the revised Implementation Plans should be submitted to the Secretariat by 1 November).***

The England and Wales (E&W) Implementation Plan 2019-24 is now deemed satisfactory following a review in November 2021.

1.2 Describe any major new initiatives or achievements for salmon conservation and management that you wish to highlight.

In 2021, new salmon protection byelaws were implemented on the River Severn, which have closed all the remaining salmon net fisheries. New byelaws were also introduced for salmon rod fisheries, which require 100% mandatory catch-and-release and method restrictions to promote the survival of released fish on the Severn, Wye and Usk. These came into force on 1st March 2022.

A rod fishery byelaw was implemented on the River Lune, in 2021, that has made the rod fishery mandatory catch-and-release to conserve salmon stocks.

To build climate change resilience, the Keeping Rivers Cool (KRC) initiative, published an England-wide Vegetation Object Model in 2021 and has nearly completed the KRC 2nd generation shade 'rainbow' map, which will be used to influence the Forestry Commission's woodland grant programme

with enhanced payments for riparian tree planting alongside salmonid waters. KRC was show-cased by the Environment Agency at the Glasgow COP26 conference.

The UK Government in England has announced a comprehensive reform of agricultural policy following the BREXIT withdrawal with the Environmental Land Management Scheme (ELMS), which has replaced the EU Common Agriculture Policy. The ELMS places a much greater emphasis on protecting the environment focusing on improving water quality and preventing soil loss with a new subsidy payment system to support more environmentally friendly land management practices.

The UK Government in England have recently consulted on the introduction of European Beaver to river catchments. Management plans are being developed to ensure that future beaver introductions can be adequately managed to limit their impact upon migratory fish populations taking account of best practice from other European countries and pilot projects in Scotland.

2: Stock status and catches.

2.1 Provide a description of any new factors that may affect the abundance of salmon stocks significantly and, if there has been any significant change in stock status since the development of the Implementation Plan, provide a brief (200 word max) summary of these changes.

In 2021, the provisional salmon rod catch in E&W was the lowest on record. There were periods of prolonged dry weather across much of E&W, which produced difficult conditions for angling. Salmon stocks are in an increasingly critical state when assessed against Conservation Limits (CLs) (see Action F1) with 91% of principal salmon rivers in E&W projected to be assessed as At Risk or Probably At Risk by 2026 if recent trends continue. The state of E&W salmon populations reflects the increasingly stressful environmental conditions in fresh, transitional and marine waters impacting on salmon most notably from climate change, diffuse pollution, habitat quality and barriers to migration. Though pink salmon were expected in numbers in 2021, as they are odd year spawners, very few were observed with 26 reported captured.

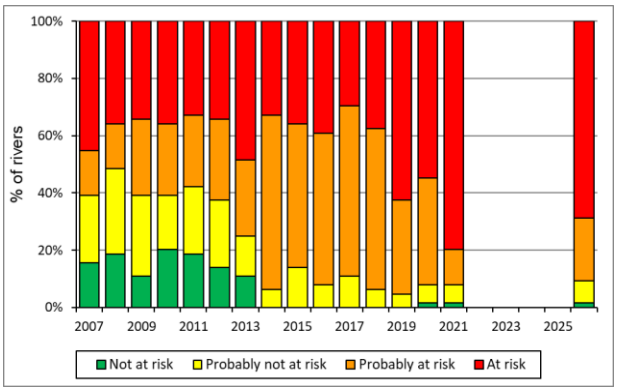
2.2 Provide the following information on catches: ***(nominal catch equals reported quantity of salmon caught and retained in tonnes 'round fresh weight' (i.e. weight of whole, ungutted, unfrozen fish) or 'round fresh weight equivalent').***

	In-river	Estuarine	Coastal	Total
(a) provisional nominal catch (which may be subject to revision) for 2021 (tonnes)	1.1	0	0	1.1
(b) confirmed nominal catch of salmon for 2020 (tonnes)	3.0	0	0	3.0
(c) estimated unreported catch for 2021 (tonnes)	0.11	0	0	0.11
(d) number and percentage of salmon caught and released in recreational fisheries in 2021	In E&W, 5,442 salmon were released from 5,736 salmon caught, which equates to 95% overall catch and release (Based on provisional 2021 rod catch data). This reflects a combination of voluntary and mandatory catch and release (C&R) requirements and is the highest percentage on record.			

3: Implementation Plan Actions.

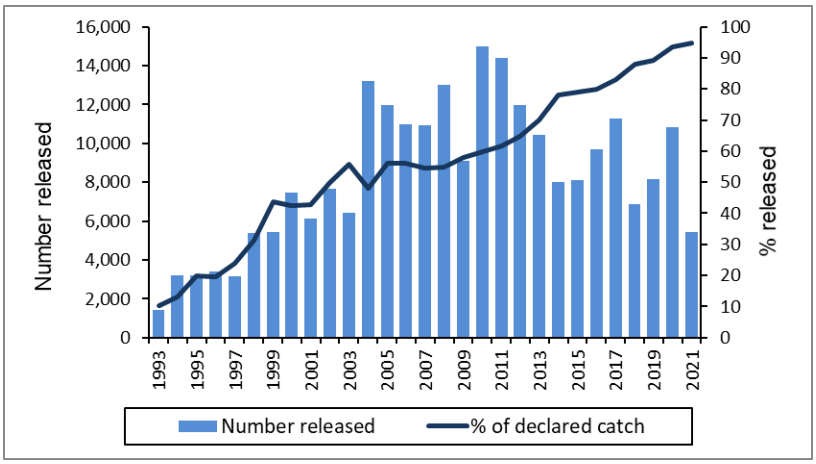
3.1 Provide an update on progress on actions relating to the Management of Salmon Fisheries *(section 2.9 of the Implementation Plan).*

Note: *the reports under 'Progress on action to date' should provide a* ***brief overview*** *of each action. For all actions, provide* ***clear and concise*** *quantitative information to demonstrate progress. In circumstances where quantitative information cannot be provided for a particular action because of its nature, a clear rationale must be given for not providing quantitative information and other information should be provided to enable progress with that action to be evaluated. While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group.*

Action F1:	Description of action (*as submitted in the IP*):	In order to ensure that management decisions are based on up-to-date assessments of stock status and composition (F1), in E&W we will (i) undertake annual assessments of the status of salmon stocks in line with the NASCO Fishery Management Guidance (paragraph 2.5), and (ii) annually review management measures and any need for changes / possible new measures (including voluntary and emergency regulatory controls) in salmon fishing These actions will also ensure that regulated fishing in estuary and river fisheries does not exceed levels that are sustainable and threaten conservation of stocks (F3), and that mixed stock fisheries do not pose unacceptable risks to stocks (F4).
	Expected outcome (*as submitted in the IP*):	An annual update on stock status for all principal salmon rivers, meeting annual reporting requirements for ICES and NASCO, and, where the annual review of management measures indicates the need for change, these changes will be implemented.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	(i) The status of salmon stocks was assessed for all 64 of E&W' principal salmon rivers to meet annual reporting requirements for ICES and NASCO and will be published in the report: *Salmon Stocks and Fisheries in England and Wales 2021*. The assessment places each rivers' salmon stock into one of four categories with the strongest classed as 'Not at Risk' and the weakest as 'At Risk', see Figure 1. below. In 2021, 92% of principal salmon rivers in E&W were At Risk or Probably At Risk, which is a significant concern. (ii) Details of revised management measures are described in F3 and F4.  *Figure 1. Percentage of principal salmon rivers in England and Wales in each risk category, assessed against their management*

		objective, for 2007-2021 and as projected for 2026, if recent trends continue.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action F2:	Description of action (*as submitted in the IP*):	In order to ensure that assessments of stock status, compliance procedures and associated Decision Structure make best use of available data and remain fit for purpose (F2), E&W will continue to assess ways in which assessment procedures and the related Decision Structure can be improved and changes implemented. These developments will be subject to discussion and review with stakeholders through the England Fisheries Group (EFG) and Welsh Fisheries Forum (WFF).
	Expected outcome (*as submitted in the IP*):	Introduction of a more robust stock assessment methodology with clearer and more timely links to management decision-making and regulatory responses.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	The national salmon stock assessment review group met regularly throughout 2021. In 2021, work progressed on a number of areas in reviewing the application of Conservation Limits (CLs) to salmon assessment and management in E&W. These have included (i) comparison of the equivalent procedures applied by neighbouring jurisdictions in the UK, Ireland and elsewhere and (ii) exploration of alternative approaches to assessing and categorising statistical compliance with CLs and associated Management Targets in E&W. Work is ongoing to scrutinise and improve the quality of data underpinning various aspects of the assessment process. This includes (i) re-examination of wetted area estimates integral to the derivation of CLs and (ii) further improvements to the online portal for reporting rod catch returns. To improve adult monitoring, in England, £250k was invested in further strengthening the resilience of the national salmon counter network with a particular focus on enabling remote digital access and upgrading digital components, including computers and cameras. In Wales, trials of an acoustic (Aris) counter began on the Rver Usk with the aim of adding this river to the existing network of rivers (Dee, Teifi and Taff) providing annual Returning Stock Estimates for salmon (or their equivalent). Working with Exeter University, genetic techniques have been used to investigate the sex ratios of smolts and adult cohorts over two complete lifecycles (five-year period) on the River Tamar, with a paper being prepared for peer review prior to publication. We are seeking to extend this work to other monitored river catchments in England to see if similar findings are present. To keep stakeholders informed a briefing was given to the England Salmon Advisory Group and the Wales Fisheries Forum.
	Current status of action:	Ongoing

	If 'Completed', has the action achieved its objective?	
Action F3:	Description of action (*as submitted in the IP*):	In order to ensure that regulated fishing by estuary and river fisheries does not exceed levels that are sustainable and threaten conservation of stocks (F3) (in line with the NASCO Fishery Management Guidance - paragraph 2.7), E&W will introduce new restrictions on net and rod fisheries in England from the 2019 season, and in Wales from 2020. The measures are based on the projected status of stocks for 2022, as assessed in 2017, and will be in place for 10 years. In England there will be a review of rod and line C&R in 2020. Stock status will continue to be assessed annually. These actions will also ensure that mixed stock fisheries do not pose unacceptable risks to stocks (F4). **For England (measures implemented from 2019):** • Closure of all net fisheries for 'at risk' and 'probably at risk' rivers in 2019, based on the projected status of stocks for 2022, as assessed in 2017; this includes all remaining drift net fisheries. • Mandatory C&R by anglers on the rivers that are classed as 'at risk', based on the projected status of stocks for 2022, as assessed in 2017, and on rivers that are listed as 'recovering rivers' (Annex 2). • Voluntary C&R targets in excess of 90% on rivers classed as 'probably at risk'. Compliance with the C&R target will be reviewed in 2020 with a view to either continuing the voluntary measures or implementing mandatory C&R byelaws if stocks cannot be adequately protected by voluntary means. • Renewal of the 1998 Spring Salmon Byelaws. These protect the larger, early running salmon, and do not introduce any new restrictions. N.B. River Severn emergency byelaws were introduced in 2019 requiring compulsory C&R. N.B. A package of rod fishing byelaws will also be developed for the cross-border rivers Wye and Dee ("Border Rivers (England) byelaws") to complement measures in Wales. **For Wales (measures implemented from 2020):** • Mandatory C&R fishing of all salmon at all times for rod fisheries in all rivers in Wales. • Introduce partial method prohibitions on bait (worm, prawn and shrimp), use of treble hooks and use of barbed hooks. • Introduce mandatory C&R fishing and method controls on 2 of the 3 cross-border rivers – Dee and Wye in Wales. (N.B. River Severn emergency byelaws requiring mandatory C&R of salmon were introduced in 2019 in England and 2021 in Wales). • Introduce mandatory C&R at all times in all net fisheries, with arrangements for the last very small fishery under negotiation.

		• Introduce revised start and finish dates for net fishing seasons with compulsory C&R. (Introduced 2019).
	Expected outcome (*as submitted in the IP*):	Reduction in the exploitation of stocks to facilitate conservation of wild salmon stocks and to aid stock recovery.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	To reduce salmon exploitation in E&W, the new restrictions on net and rod fisheries described above for England (National Salmon and Sea Trout Byelaws 2018) and Wales ('All Wales' and 'Cross-Border' (Wye and Dee) Fishing Byelaws 2020) have been introduced. As of 2021 all salmon net fisheries in England that harvest salmon have now been closed through byelaws. All remaining NLOs in England remain either to limit the numbers of net licences available to harvest sea trout or to retain the low impact heritage Lave net catch and release fishery in the Severn. Six of 15 Net Limitation Orders (NLOs) due for review within the IP have been reviewed to date and the remainder are on plan. In 2021, the following NLOs were reviewed: **River Teign:** the NLO was renewed for sea trout with the national salmon byelaws having closed the salmon net fishery (Sea trout net fishery only). **River Exe:** the net fishery was closed in 2018. **River Dart:** the NLO mid-term review is in progress though the net fishery has been bought out until 2025 and the national salmon byelaws have closed the salmon net fishery (No net fishery in operation). **River Severn:** the NLO and rod and net byelaws have been confirmed (Salmon C&R for lave net fishery only). **Christchurch Harbour:** the NLO is under consultation and proposes to close the net fishery for ten years. The current NLO, which was introduced in 2012, was for zero nets and associated with a net buyout that expires in 2022. For E&W in 2021, based on the provisional rod catch data, the C&R rate was 95%.  *Figure 2. The number and percentage of the declared salmon catch released by rod and line anglers, 1993-2021.*

		A review of voluntary C&R in England in 2017 and now in 2021 has identified a number of At Risk rivers that are not achieving the minimum required 90% C&R rates. This is currently under review with an intention of ensuring further protective measures.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action F4:	Description of action (*as submitted in the IP*):	In order to ensure that mixed stock fisheries do not pose unacceptable risks to stocks (F4), E&W will introduce measures to phase out / regulate any remaining MSFs to reduce fishing mortality to sustainable levels in order to conserve stocks (in line with the NASCO Fishery Management Guidance - paragraph 2.7). Any estuarine MSFs will continue to be managed in order to safeguard the weakest contributing stock. Measures include: a. The drift net fishery on the NE coast will close in 2019 and mandatory C&R of salmon will be required in the NE T&J (beach) net and Anglian coastal fisheries. b. The 5-year review of the NLO for net fisheries in the Severn Estuary and the regulatory measures for fixed engines will be conducted and amended as appropriate. c. The 7-year review of the NLO for the remaining nets in the Anglian Coastal Fishery will be conducted and the NLO (licence numbers) and Byelaws (fishing periods and gear) amended as appropriate. The 10-year review of the NLO for the remaining T&J (beach) nets in the NE coast fishery will be conducted and the NLO (licence numbers) and Byelaws (fishing periods and gear) amended as appropriate.
	Expected outcome (*as submitted in the IP*):	Cessation of netting or introduction of mandatory C&R provisions for salmon in all coastal mixed stock fisheries from 2019. Implementation of regulations to ensure estuarine mixed stock fisheries (N.B. River Severn only, all other estuary fisheries will be closed or subject to mandatory C&R) continue to be managed in line with national policy and international guidance and to ensure that all contributing stocks achieve their management objectives.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a. The drift net fishery on the NE was closed in 2019. Mandatory C&R of salmon is now required on the NE T&J (beach) net and Anglian coastal fisheries. On the NE T&J net fisheries, the netting season was also adjusted to ensure that the risk of salmon interaction was minimised. b. The Severn NLO and rod and net byelaws have been confirmed, which has closed the draft net fishery and putcher ranks, requires salmon C&R for the low risk, heritage lave net fishery and compulsory C&R for salmon caught by rod and line. Rod fishery method control measures have also been also implemented to conserve salmon.

		c. The Anglian coast NLO is due for review in 2024. This fishery only retains sea trout and has significantly reduced in scale in recent years. d. The NE coast T&J NLO is due for review in 2022.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action F5:	Description of action (*as submitted in the IP*):	In order to ensure that conservation of salmon stocks and fishing mortality at sustainable levels is not threatened by lack of support from stakeholders in voluntary conservation measure (F5), E&W will work with stakeholder organisations to promote C&R in rod fisheries through enhanced guidance and communications to increase acceptance of C&R among those anglers currently reluctant to adopt this practice and to achieve required C&R targets. In Wales this is mandatory C&R in all rivers from 2020; and in England from the 2019 season - mandatory C&R in all rivers classed as 'at risk', with voluntary high C&R rates (>90%) in all stocks classed as 'probably at risk' (based on the projected status of stocks for 2022, as assessed in 2017).
	Expected outcome (*as submitted in the IP*):	Higher uptake of C&R in rod fisheries resulting in increased numbers of salmon surviving to spawn to facilitate stock recovery.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	Based on provisional rod catch data for 2021, the overall C&R rate across E&W was 95%, which includes a combination of mandatory and voluntary measures that require C&R. In England, the overall C&R rate was 94%. A review of voluntary C&R rates has identified that in both 2020 and 2021 a number of principal salmon rivers, which are At Risk or Probably At Risk, are still not meeting the minimum 90% C&R rate and further measures will therefore need to be implemented in the near future. In Wales, where mandatory C&R applied to all 22 principal salmon rivers, the overall C&R rate was 98%. Action to improve levels of C&R have included: the Angling Trust, Salmon and Trout Conservation and the Atlantic Salmon Trust promoting best practice C&R guidance and producing 'The Gift', Parts 1-3, which are video clips on (i) the best tackle to use to safely C&R Atlantic salmon; (ii) planning how to safely land a hooked salmon; and (iii) how to safely land, unhook, revive and release a salmon. In 2021, C&R reminders were sent by the Environment Agency to approximately 8,000 salmon rod fishing licence holders in E&W who have signed up to receive the e-newsletter. In Wales, guidance has been issued to all netsmen on C&R. For rod and line anglers, a new web-based guide to C&R was introduced in 2019: *Look after your salmon - an angler's guide to catch and release*, in partnership with the Wye and Usk Foundation, Angling Trust and Environment Agency.

<table>
<tr><td></td><td>Current status of action:</td><td>Ongoing</td></tr>
<tr><td></td><td>If ‘Completed’, has the action achieved its objective?</td><td></td></tr>
<tr><td>Action F6:</td><td>Description of action (as submitted in the IP):</td><td>In order to ensure that unregulated (illegal) fishing and by-catch in other fisheries do not threaten conservation of stocks (F6), E&W will ensure the effective enforcement of fishery regulations (in line with the NASCO Fishery Management Guidance - paragraph 2.3), and specifically will:
a) Continue with prevention, disruption and intervention of illegal fishing, including intelligence-led enforcement and ongoing implementation of a ban on the sale of rod-caught fish and a carcass tagging scheme for net-caught fish.
b) Undertake a review of fishery enforcement priorities in England and Wales.
work with England’s ten Inshore Fisheries and Conservation Authorities (IFCAs) and Welsh Government to secure better protection for migratory salmonids from netting activities</td></tr>
<tr><td></td><td>Expected outcome (as submitted in the IP):</td><td>Reduced illegal fishing and by-catch of migratory salmonids in estuaries and nearshore areas, helping to ensure that as many returning salmon as possible survive to contribute to spawning, particularly for stocks in vulnerable rivers.</td></tr>
<tr><td></td><td>Progress on action to date (Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):</td><td>In NE England, 5 illegal gill nets were seized across the Area during 2021. This is significantly lower than 2020 (17) and 2019 (10) and it is believed that the initial impact of Covid-19 in 2020 that caused a rise in activity due to a perceived lack of enforcement presence, has subsided and successful and publicised operations, joint operations and court successes during 2021 have reduced activity through deterrence.

<table>
<tr><th>NE England salmonid fisheries enforcement 2021</th><th>No.</th></tr>
<tr><td>Section 1 & 2 offences (Gaff/Snatch/stripping eggs))</td><td>1</td></tr>
<tr><td>Illegal nets seized - salmon</td><td>5</td></tr>
<tr><td>Obstructions to migrating fish (Section 12 offences)</td><td>2</td></tr>
<tr><td>Section 2 (gravel removal/disturbing spawn of fish)</td><td>1</td></tr>
<tr><td>Local Enforcement Positions (LEPS)</td><td>1</td></tr>
<tr><td>Exemptions (under Salmon and Sea Trout Protection Byelaws 2018)</td><td>1</td></tr>
<tr><td>Memex Intel reports</td><td>24</td></tr>
<tr><td>National Incident Reporting System (NIRS) reports</td><td>71</td></tr>
<tr><td>Estuary and coastal boat patrols
(8 commercial T netsmen checked and several other fishing boats checked)</td><td>14</td></tr>
<tr><td>Dealer inspections</td><td>15</td></tr>
<tr><td>Joint Boat patrols (IFCAs)</td><td>3</td></tr>
<tr><td>Joint Operations (Police/ external agencies)</td><td>4</td></tr>
<tr><td>Joint Operations (Yorkshire Area)</td><td>2</td></tr>
</table>

b) In England, the Environment Agency's fisheries enforcement review remains ongoing. In 2021, key issues that were considered</td></tr>
</table>

		included: the technical development framework for enforcement officers, structures, terms and conditions and resourcing. c) In 2021, the Environment Agency has worked with all 10 Inshore Fisheries Conservation Authorities (IFCAs) to ensure the protection of salmon and sea trout in inshore waters. Notably this has included seeking to ensure IFCA byelaws protect salmon and sea trout from sea fisheries bycatch in Cornwall, Devon & Severn, Southern and Sussex IFCAs. Environment Agency officers have also attended IFCA meetings and undertaken joint patrols, with officers of both agencies operating with cross-warrants in some districts. In Wales, Natural Resources Wales are continuing to seek ways of working with Welsh Government marine fisheries to better protect salmon in inshore waters
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	

3.2 Provide an update on progress on actions relating to Habitat Protection and Restoration *(section 3.5 of the Implementation Plan).* ***Note:*** *the reports under 'Progress on action to date' should provide a* ***brief overview*** *of each action. For all actions, provide* ***clear and concise*** *quantitative information to demonstrate progress. In circumstances where quantitative information cannot be provided for a particular action because of its nature, a clear rationale must be given for not providing quantitative information and other information should be provided to enable progress with that action to be evaluated. While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group.*		
Action H1:	Description of action (*as submitted in the IP*):	To increase salmon's climate change resilience (H1) we will: a) seek to safeguard and create thermal refugia through tree planting/fencing to increase riparian shade in England and Wales (target 50,000 trees and 50km fencing in England by 2024); b) work with anglers to minimise the risk to salmon when temperatures are high through supporting voluntary cessation of fishing (e.g. on all principal salmon rivers where water temperatures reach 19ºC at 09:00); c) ensure that salmonid thermal standards are applied and adhered to through regulation on all principal salmon rivers; d) aim to establish temperature monitoring networks on principal salmon rivers, representative of regions (target 5 rivers in England by 2024) to research and support management initiatives; and e) investigate potential impacts of future climate change scenarios on salmon and explore and seek to implement possible mitigating measures.
	Expected outcome (*as submitted in the IP*):	Improved salmon survival as a result of actions to moderate the impact of climate change.
	Progress on action to date	a) In 2021, across England's principal and recovering salmon rivers, tree planting contributed to the enhancement of 21.9km of river delivering

	(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):	climate change resilience, together with measures to address diffuse pollution and natural flood management (Environment Agency's 'kilometres of river enhanced' database). To build climate change resilience, the Keeping Rivers Cool (KRC) initiative published an England-wide Vegetation Object Model in 2021 and has nearly completed the KRC 2nd generation shade 'rainbow' map, which will be used to influence the Forestry Commission's woodland grant programme with enhanced payments for riparian tree planting on salmonid waters. KRC was show cased at the Glasgow COP26 conference. The Welsh Government aims to see the planting 100,000 hectares of new woodland by 2030 to help Wales meet its carbon emission reduction targets. Woodland development is expected to deliver multiple benefits for the environment, the economy and for wellbeing, and to this end a number of linked initiatives are underway including the Wales' National Forest Programme - launched in March 2020 with £5 million of funding coupled to a further £10 million for the Glastir Woodland creation and restoration scheme. Natural Resources Wales' own Woodland Creation Programme is supporting this and related work across Wales. b) Three voluntary schemes continued in 2021, on the rivers Test, Itchen and Hampshire Avon. In 2021, 17 days fishing were lost on the Hampshire Avon due to high temperatures. c) Further work is required to determine the application of thermal standards in the permitting of discharges. d) A temperature monitoring network continued on the River Tamar in 2021. The Environment Agency has identified the varied sources of river temperature data currently collected. In Wales, networks of temperature loggers are in place on a number of principal salmon rivers, including the Wye, Usk, Tywi, Conwy, Clwyd and Dee (via Natural Resources Wales and partner organisations including Welsh Water, Afonydd Cymru and Wye Salmon Association). Options for developing a telemetered network of river temperature sensors are also being considered. e) In 2021, the Environment Agency published a method for river water temperature projections and is piloting this on chalk streams. This is due to complete in April 2022. Natural Resources Wales, with Cardiff University and Welsh Government (Kess II programme), is supporting PhD research into climate effects on salmonids in freshwaters. This aims to utilise long-term data sets - including on temperature, discharge, water quality and juvenile fish abundance - to map and model thermal conditions and salmonid habitat availability across Welsh catchments under future climate scenarios. A key aim is to identify important refuge habitats and guide both protection and potential enhancement actions. Work to date has focussed on the Usk and Wye catchments (i) examining spatial and temporal changes in water quality in the last ~20 years; (ii) exploring factors influencing past changes in water temperature and modelling possible future temperature regimes based on climate change scenarios; (iii) investigating the influence of broadleaf woodland on river

		temperatures; (iv) mapping thermal extremes to identify locations most at risk from climate warming (v) developing climate and water quality models to explore factors affecting juvenile salmon abundance.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action H2:	Description of action (*as submitted in the IP*):	To improve the survival of salmon in estuaries and inshore waters (H2), we will: a) review and report on the factors affecting salmon at sea and the associated evaluation and prioritisation of potential stressors acting in estuaries and inshore waters; b) raise the profile of salmon by supporting the International Year of the Salmon (IYS) throughout 2019 (and possibly beyond); c) support research initiatives aimed at improving understanding of salmon survival at sea (including: SAMARCH (SAlmonid MAnagament Round the CHannel) 2017-2022 and the Likely Suspects initiative) and use recommendations to realise better protection for salmon in estuaries and at sea; d) work with England's ten Inshore Fisheries and Conservation Authorities (IFCAs) and Welsh Government to secure better protection for migratory salmonids from netting activities; e) secure improvements in water quality through the delivery of the Water Company National Environment Programmes PR14 (2015-2020) & PR19 (2020-2025) and River Basin Management Plans (2015-2021) & (2021-2027); and f) seek to ensure tidal-lagoons and power stations do not adversely impact on salmon populations.
	Expected outcome (*as submitted in the IP*):	Improved understanding of the fate of salmon in estuaries and marine waters to inform policy and strengthen management practice in these areas. Tangible measures implemented to protect salmon in the marine environment, e.g. byelaws introduced to protect salmon from inshore netting activities.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) The paper: *A review of marine stressors impacting Atlantic salmon Salmo salar, with an assessment of major threats to English stocks*, Gilson et al. (2021), was submitted for publication to the journal: Reviews in Fish Biology and Fisheries. It has been accepted for publication subject to minor amendments. These have been addressed and the paper returned to the journal. b) IYS has now effectively concluded in the North Atlantic, but a concluding symposium for Atlantic and Pacific will take place in Vancouver, Canada in October 2022. c) In 2021, the SAlmonid MAnagement Round the CHannel project (SAMARCH) was extended to 2023 (2017-2023). Further gillnetting (under licence) of sea trout was undertaken off the Dorset and Cornish

coasts and 10,140 salmon parr were tagged by the Game and Wildlife Conservation Trust (GWCT) and Cefas on the River Frome. Scientific outputs so far, include two PhDs and fourteen papers, which include the migration phenology of salmon smolts, the impact of salmon smolt size on marine return rates and the salmon maturation schedule at sea. A Marine Policy Group has been established involving the GWCT, Salmon and Trout Conservation and the Environment Agency to use the scientific outputs of SAMARCH to strengthen the protection of salmon and sea trout in transitional and marine waters.

Natural Resources Wales published two evidence reports in 2021, one assessing methods to collect data on the spatial and temporal distribution of diadromous fish in Welsh waters and the second proposing the design of a telemetry array covering Marine Energy resource areas in Wales. The reports will be used to inform and prioritise future funding and evidence work in this area.

d) In 2021, in England, the Environment Agency has continued to emphasise the need to strengthen protective measures to reduce the risk of by-catch through the review of Southern IFCA, Sussex IFCA and Cornwall IFCA byelaws with the emerging information from SAMARCH being particularly helpful to highlight the vulnerability of salmonids to nearshore gillnetting. New net (and rod) fishery byelaws were introduced on all principal salmon (and sea trout) rivers in Wales in 2020. These byelaws will be in place for 10 years with a 5-year mid-term review. All Net Limitation Orders (NLOs) in Wales were renewed in 2017 and should be in place for another 10 years. New rod byelaws for 100% mandatory catch-and-release and method restrictions to promote survival of released fish were promoted by Natural Resources Wales for the Severn, Wye and Usk in 2021. These byelaws were came in to force on 1st March 2022.

e) In England, the most recent published WFD status information for transitional and coastal (TraC) waters is for 2019. The results for overall WFD class status were:

	High	Good	Moderate	Poor	Bad
Transitional	0%	0%	91.3%	3.8%	4.8%
Coastal	0%	0%	98.4%	1.6%	0%

WFD cycle 3 classifications were undertaken in Wales in 2021. Overall, the classification for transitional waters in 2021 was the same as the previous (interim) classification in 2018, with only one of 32 water bodies classified as Poor, the remainder being Good (4) or Moderate (27). The overall classification for the 23 coastal water bodies in Wales in 2021 was also similar to 2018 with the same number of water bodies classified as Moderate (14) and High (1) but one fewer classified as Good (7). One coastal water body was classified as Poor in 2021 but none in 2018. These assessments will be used to help deliver environmental improvements though the River Basin Management Planning cycle.

f) In 2021, to secure protection measures for migratory salmonids the Environment Agency provided evidence to the Hinkley Point C nuclear power station inquiry. Natural Resources Wales are engaged in

		discussions with a several developers re. environmental impact assessments - including impacts to diadromous fish. These relate to a number of planned projects in Wales, including: the Morlais Tidal Demonstration Zone off Anglesey; a tidal lagoon proposal in the Dee Estuary; and the Mersey Tidal Power development.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action H3:	Description of action (*as submitted in the IP*):	To improve fish passage and salmon habitat (H3) through implementing River Basin Management Plans, working with key partner organisations such as the Rivers Trust across England and Wales, we will aim to: a) identify and prioritise barriers to migration and implement measures to improve fish passage (e.g. passage schemes completed on at least 25 sites in England by 2024 and 35 in Wales in 2020/21); b) identify and restore degraded salmon habitat (e.g. minimum 50 kilometres in England and a target of 100 kilometres in Wales by 2024); c) deliver new fish passage regulations; and d) seek to ensure in-river hydropower and tidal power schemes meet defined standards and do not cause deterioration in salmon populations.
	Expected outcome (*as submitted in the IP*):	Improved fish passage allowing greater access to spawning areas and improved smolt survival combined with enhanced habitat improving spawning success and juvenile survival.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) In 2021, fish passage was improved on 19 weirs/barriers across England's principal and recovering salmon rivers, improving access for salmon on rivers including the Severn, Ribble, Camel, Tyne and Test (data from the Environment Agency's 'kilometres of river enhanced' database and fish passage panel). Natural Resources Wales (NRW) secured capital funding from Welsh Government for a package of fisheries habitat works across Wales in 2020/21. This has been allocated to an internal NRW project 'Salmon4Tommorrow2' (£1.3 million) as well externally delivered habitat restoration and river habitat works undertaken by Rivers Trusts across Wales and co-ordinated by Afonydd Cymru (£1.0 million). Fish passage outcomes from the former include 9 fish passage schemes developed to feasibility/design/approval or construction stages – together providing migration access to over 130 km of river. From the latter, 29 fish migration projects have delivered improved access to 336 km of river. In addition to the above, the LIFE Dee River project has completed barrier removal/easement schemes at 4 sites on the River Dee in 2021 improving accesss for up and downstream migrants to ~50km of river. New fisheries capital funding of ~£2.5million has recently been confirmed for Wales for 2021/22 – 2024/25

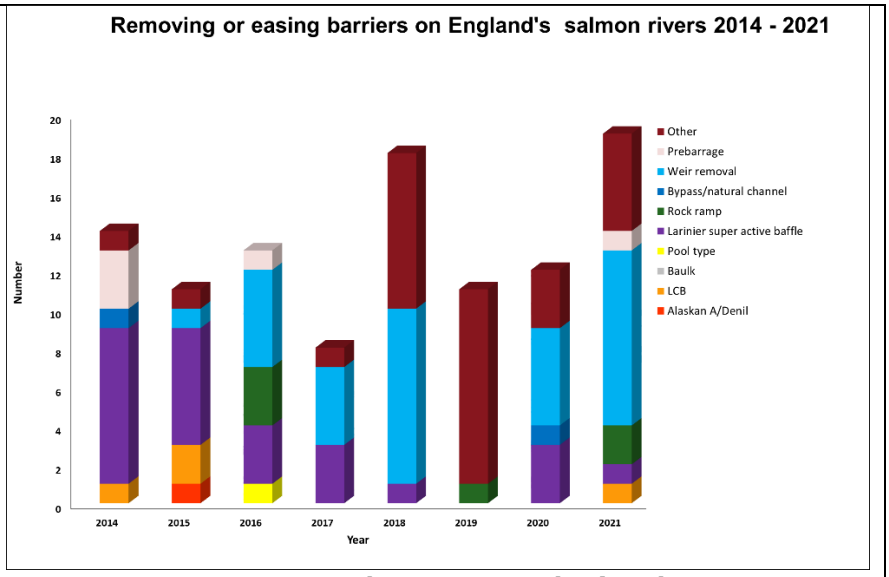


Figure 4. Removing or easing barriers on England's salmon rivers 2014-2021.

Diglis Weir fish pass on the River Severn

b) In 2021, 203km of habitat was enhanced across England's 42 principal salmon rivers (data from the Environment Agency's 'kilometres of river enhanced' database and fish passage group).

In Wales habitat restoration and river habitat works undertaken by Rivers Trusts across Wales and co-ordinated by Afonydd Cymru (see H3 a) have delivered 72 habitat restoration projects targeting 100km of river. In addition, 17 fish habitat restoration plans have been produced to inform future schemes. The LIFE Dee River project also delivered ~11km of riverside fencing in 2021, as well as carrying out gravel and boulder introductions to improve in-stream habitats, and undertaking other remedial bankside works.

2021 also saw the launch of the 'Four Rivers for LIFE' project. This ~£14 million project supported by the EU LIFE programme and match-

		funded by Welsh Government aims to bring 500 km of the rivers Teifi, Cleddau, Tywi and Usk into good condition, delivering improvements to river habitats and the wider catchment environment and benefitting a range of ecological features including salmon and other migratory fish species. c) The government remains committed to delivering fish passage legislation, subject to parliamentary capacity in the House. d) On England's 42 principal salmon rivers, up until the end of 2021, 123 hydropower permits have been issued. On the River Wear at Freemans Reach hydropower scheme in Durham, working with the local authority, to reduce the attractiveness of the outflow to salmon and encourage use of the adjacent fish pass, flows through the turbine are seasonally reduced and rubber matting screens have been installed. Video surveillance is used to monitor the situation. In Wales, NRW applies its hydropower guidance when licensing HEP schemes - ensuring residual flows are protective of salmon habitat and flow requirements, and new impoundments are sited and designed to protect upstream and downstream passage. There has been limited further development of new hydro schemes in Wales following changes in financial support for renewable energy schemes.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action H4:	Description of action (*as submitted in the IP*):	To ensure sufficient flow for salmon through delivering measures to realise sustainable abstraction (H4), we will: a) continue the Restoring Sustainable Abstraction (RSA) Programme; to vary abstraction licences to meet requirements of environmental legislation (e.g. (WFD & HD), which includes 13 licences on salmon rivers in England investigated by March 2020); b) review time-limited licences due for renewal on salmon rivers, adjusting them as necessary to make sure they do not allow environmental damage now or in the future; c) ensure all permanent abstraction licences shown to be seriously damaging to salmon are reduced and meet environmental standards; d) revoke 116 unused licences that are no longer needed, and work with abstractors to reduce 12 under-used licences on salmon rivers in England by 2019. This will prevent increased abstraction from these licences creating new environmental pressures; e) regulate all significant abstractions that have been exempt historically to protect the water environment; f) secure sufficient flows for salmon through delivering >100 Water Industry National Environmental Programme water resource investigations during PR14 & PR19; g) work with abstractors and catchment groups to develop local solutions to existing abstraction problems, as set out in the Water Abstraction

		Plan 2017 (England). To support this, we will also work with stakeholders to improve available tools through the Future Local Management of Flows initiative 2019-2024; and h) ensure hydro and tidal power schemes do not cause deterioration in flows or an increase in migration barriers to the detriment of salmon populations. Where possible ensure flows and artificial spates controlled from impounding reservoirs are managed to optimise salmon production/migration.
	Expected outcome (*as submitted in the IP*):	Improved flows to sustain the various life stages of salmon in freshwater (and the wider ecology of rivers) resulting in improved survival of salmon. More sustainable abstraction with more water bodies meeting environmental objectives. Under Defra's 25-year Environment Plan and set out in the Water Abstraction Plan (*https://www.gov.uk/government/publications/water-abstraction-plan-2017/water-abstraction-plan*), it is proposed to reduce the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies. In order to meet these goals, the Environment Agency will implement the actions described above.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) In England, no abstraction licences on principal salmon rivers were reviewed under the RSA programme in 2021. In Wales, NRW are progressing discussions with holders of abstraction and impoundment licences within the RSA programme. For example, work on abstraction control (alongside other measures) is continuing in partnership with major industrial water users in the lower reaches of the Afan in order to facilitate salmon passage at significant barriers and improve river and estuarine flow conditions for migration. b) No time-limited licences on England's principal salmon rivers were reviewed in 2021. In Wales, NRW continues to review all time-limited licences in accordance with the review schedule. c) In England, no licence, that has been shown to be seriously damaging to salmon, was modified in 2021. There are no licences in this category in Wales. d) In England, two unused licences that are no longer needed have been revoked under phase three of this programme in 2021. This action is not applicable to Wales. e) In England, 1,632 applications for significant abstractions to be brought into regulation have been received, which will be determined between 2020 and 2022. The programme is approximately 50% complete and is due to be completed by 31st December 2022. In Wales, the application window for previously exempt abstractors to apply closed on the 31st December 2019. NRW is progressing the117 transitional applications received to meet the statutory 31st December 2022 determination deadline. A number of applications fall within rivers designated as Special Areas of Conservation for salmon, amongst other species. This is a key part of wider work to manage water resources more effectively and to create a cleaner, healthier water environment.

		f) In 2021, Water Companies, as part of the Water Industry National Environment Programme (WINEP), completed 53 schemes that will bring benefits to salmon. Thirty-seven of these were on our Principal Salmon Rivers and 16 on recovering salmon rivers. The schemes include improvements to salmon passage and screening, habitat quality, and investigating and resolving impacts of water quality and flow. In 2022, there are 151 investigation and improvement schemes scheduled on Principal Salmon Rivers (85) and recovering salmon rivers (66). Drivers for salmon are included in PR24 (2024-2029) including fish passage, screening and environmental improvements. In Wales, NRW is progressing discussions with water companies on water resources schemes within the National Environment Programme. Nine sites have been identified for either improvement to flow or sediment management to meet Water Framework Directive requirements for Heavily Modified Water Bodies by 2025. g**)** In England, in 2021, the Environment Agency has continued to develop its hydroecology toolkit to address several gaps in the first version. This will help the toolkit to be applied to fish monitoring datasets. In a separate project, datasets of surface flow and groundwater models will be used to understand the impacts of groundwater abstraction on fish and other ecological elements. This action is not applicable to Wales. h) In England, the Environment Agency has a model in place that triggers Kielder releases. It is based on freshwater flow and water temperature in the River Tyne and predicts whether there will be an oxygen deficit in the Tyne estuary. This is used to prompt the request for a release - via the Environment Agency's Hydrology team. Due to fairly regular natural spates in the summer of 2021, in the Tyne catchment, there was no need to request extra releases. In Devon, in 2021, one spring 'fish bank' reservoir release was made for smolt migration and a further release in December was made to aid upstream migration of adult salmon from the Wimbleball dam, which supplies the Haddeo, a tributary of the Exe, and one 'fish bank' spring reservoir release was made from the Avon dam on the (Devon) Avon. Both were due to extended periods of low flows. In Wales, Natural Resources Wales applies its hydropower guidance when licensing HEP schemes (see H3 d). Work to improve understanding of the effects of reservoir operation and flow regulation on salmon migration in the rivers Dee, Wye, Usk and Severn is ongoing. For example, on the River Dee, a multi-year investigation involving tracking and other techniques is being undertaken to examine any adverse impacts of the Bala sluices on the migratory behaviour of salmon smolts and adults at this site. These investigations will inform potential future modifications to this structure and/or its operation.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	

Action H5:	Description of action (*as submitted in the IP*):	To maximise the production of healthy smolts by improving water quality (H5), we will: a) influence River Basin Management Plans to deliver the necessary water quality improvements to protect and enhance salmon populations (England baseline principal salmon water body status (2016): 25% Good/High, 54% Moderate, 19% Poor, 2% Bad; Wales overall minimum target 42% water bodies Good or better status by 2021); b) deliver >100 Water Industry National Environment Programme water quality investigations on salmon rivers during PR14 (2015-2020) and PR19 (2020-2025); c) improve conditions for salmon through targeted agri-environment schemes e.g. Catchment Sensitive Farming, Environmental Stewardship, Countryside Stewardship and regulatory approaches such as Farming Rules for Water (or the equivalent initiatives in Wales e.g. Glastir schemes, Farm Business and Sustainable Production grants and New Water regulations ~2020); and d) seek to reduce 'serious environmental incidents' (e.g. from 419 in 2017 in (England). Includes delivery through Wales Land Management Forum sub-group on agricultural pollution and provision of advice by Farming Connect Agricultural Pollution Prevention Campaign).
	Expected outcome (*as submitted in the IP*):	Improved water quality to sustain the various life stages of salmon in freshwater (and the wider ecology of rivers) resulting in improved survival of salmon.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) In 2021, in England, the latest water classification results under the WFD are for 2019. They show that water quality is a long way from government ambitions with 14% of all rivers achieving 'good ecological status'. The results in part reflect a change in the methods to classify English water bodies to more accurately report on the presence of certain chemicals that do not break down easily in the environment. In Wales, WFD cycle 3 classifications were undertaken in 2021. In total, 933 surface and ground waterbodies were classified to set the baseline for cycle 3. Across all these waterbodies, 40% were classified as having Good or better overall status in 2021 (i.e. combining ecological and chemical metrics). This represented a 3% improvement from that reported in 2015 at the start of the second cycle and an 8% improvement since 2009. These assessments will be used to help deliver environmental improvements though the River Basin Management Planning cycle. However, they do not include SAC Rivers which are considered under separate legislation and where water quality status is currently the subject of ongoing investigations. b) In 2021, Water Companies, as part of the Water Industry National Environment Programme (WINEP), completed 53 schemes that will bring benefits to salmon. Thirty-seven of these were on our Principal Salmon Rivers and 16 on recovering salmon rivers. The schemes include improvements to salmon passage and screening, habitat quality, and investigating and resolving impacts of water quality and flow. In 2022, there are 151 investigation and improvement schemes scheduled on Principal Salmon Rivers (85) and recovering salmon rivers (66).

		The National Environment Programme (NEP) PR19 for Wales identifies a number of actions by the lead water company – Dwr Cymru/Welsh Water (DCWW) – to improve environmental quality over the lifetime of the plan (2020-2025). This includes targeting improvements to 418km of rivers over the course of the AMP7 period (to 2025) and a further 128km during AMP8 – to 2030. These figures have been agreed with NRW and the Environment Agency as part of the NEP process, and as such have the status of formal legal obligations. NRW's latest annual performance report for DCWW in 2020 awarded a '4 star' rating overall – the highest possible rating and the first time this has been awarded. This included 100% delivery of the AMP programme. c) To improve conditions for salmon through targeted agri-environment schemes, uptake by farms within England's 42 principal salmon catchments to the end of 2021 was: Catchment Sensitive Farming: 9,149 farms covering 1,524,767 hectares. The UK Government in England has announced a comprehensive reform of agricultural policy following the BREXIT withdrawal with the Environmental Land Management Scheme (ELMS), which has replaced the EU Common Agriculture Policy. The ELMS places a much greater emphasis on protecting the environment focusing on improving water quality and preventing soil loss with a new subsidy payment system to support more environmentally friendly land management practices. The Wales Land Management Forum (WLMF) allows NRW to engage at a strategic level with organisations that have a direct land management role; e.g. Farmers' Union of Wales (FUW), Country Land and Business Association (CLA), DCWW, Welsh Government, etc. WLMF and a sub-group on agricultural pollution met regularly during 2021. The broad aim of WLFM is to develop mutual understanding of the root causes of pollution and to identify a spectrum of approaches for driving improvements. The focus has been on slurry and nutrient management alongside water quality issues relating to soil runoff and use of agri-chemicals. Initiatives such as the Farming Connect programme and the Dairy Project have continued to advise and support farmers in tackling agricultural pollution. The latter seeks to visit every dairy farm in Wales (~1,700); over 800 visits had been conducted to the end of 2021. d) In England, the most recent published information on serious pollution incidents is for 2020. In 2020, there were 563 serious pollution incidents, 21% more than 2019. Of these 17% attributed to illegal waste activities, 16% waste management activities, 8% water and sewerage companies and 10% farming activities. In 2021, Southern Water was handed a record £90 million fine after pleading guilty to thousands of illegal discharges of sewage which polluted rivers and coastal waters in Kent, Hampshire and Sussex. The judge said: "Each of the 51 offences seen in isolation shows a shocking and wholesale disregard for the environment, for the precious and delicate ecosystems along the North Kent and Solent coastlines, for human health, and for the fisheries and other legitimate businesses that depend on the vitality of the coastal waters."

		In Wales, the frequency of agricultural pollution incidents is a source of concern to NRW. The agricultural industry has been responsible for between 120 to 170 substantiated pollution incidents in recent years. Over 60% of these incidents took place within South West Wales, peaking in January to May. Some 50% of substantiated agricultural pollution incidents have been traced back to dairy farming (incidents involving less than 4% of dairy farms and ~1% of all farms). On 1 April 2021 new regulations for agricultural pollution came into force. These will address areas such as when to spread fertiliser and make or store silage. The new regulations will be introduced over the course of 3 years, providing time for farmers to plan for any changes.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action H6:	Description of action (*as submitted in the IP*):	To reduce the risk of salmon stock depletion as a result of predation (H6), we will: a) support the continued issue of licences to control cormorants and goosanders, including the use of area-based licences and the coordination of management actions; b) complete a preliminary review of the current management of fish-eating birds in Wales and undertake a subsequent full evidence-based review of policy if a decision is made to undertake this; c) explore options for better protecting salmon at sensitive life stages and potential predation 'pinch points' (e.g. around barriers to smolt migration) and introduce new measures where appropriate; and d) review changes in the abundance and distribution of potential predator species to facilitate management decisions (e.g. seals and fish-eating birds).
	Expected outcome (*as submitted in the IP*):	Ensuring that licensing policy for the control of fish-eating birds remains fit for purpose and strikes an appropriate balance between safeguarding fish stocks and the conservation status of the birds. Better protection of salmon during sensitive life stages through co-ordinated activities at potential 'pinch points'.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) In England, in 2021, for cormorants, 395 (In 2020, 375) individual licences and 21 (In 2020, 18) area licences were issued; and for goosanders, 22 (2020, 25) individual licences were issued. In Wales, 10 catchment-based licences were issued in 2020/21 for control of cormorants and goosanders. b) A 'Fish-Eating Birds external Advisory Group' (FEB AG) has been commissioned by Natural Resources Wales as part of a wider review of the evidence and policy basis for its regulatory decision-making re. shooting and trapping of all wild birds in Wales. The group has recently signed-off a series of reports on (i) census results for cormorant and goosander from counts undertaken across Wales in 2020/21; (ii) appraisal of the effectiveness of non-lethal and lethal control of FEBs in

		preventing damage to fisheries; (iii) a synopsis of UK and European cormorant and goosander dietary studies; (iv) appraisal of catchment or area-based licences to reduce the impact of FEBs on Welsh freshwater fisheries. Other work is ongoing including population viability modelling undertaken by the British Trust for Ornithology to determine population level impacts of different licence control scenarios. This broad range of evidence will be used to develop recommendations to Natural Resources Wales/FEB AG in 2022 and will inform future approaches to licensing for lethal control of FEBs in Wales. c) A review of obstructions across England and Wales is yet to be completed. The River Derwent smolt tracking project, in 2021, tagged 150 smolts to understand the loss rate as they migrate down river and at sea, in particular through Bassenthwaite Lake and in association with a number of weirs and to track marine migrations offshore through the Compass and Sea Monitor arrays. The project is being delivered through a PhD at Glasgow University. A three-year salmon smolt tracking study by Natural Resources Wales and partners on the River Usk (2020 onward), aims to examine the impact of barriers (and their alleviation) on predation losses. In 2021, 73 wild and 26 hatchery origin smolts were tagged in the upper Usk catchment, with a minimum 67% of wild fish and 50% hatchery origin fish successfully migrating to the estuary below Newport. Good flow conditions in early May – when the great majority of smolts appeared to migrate - were likely to have facilitated safe passage. Future work is planned for another 2 years to cover a range of environmental and river conditions. d) The most recent estimates of the abundance of grey and harbour seals are presented in the annual "Scientific Advice on Matters Related to the Management of Seal Populations: 2020", available at SCOS-2020.pdf (st-andrews.ac.uk). Grey seal populations at the start of the 2019 breeding season were estimated as 28,400 in England and 5,000 in Wales. Grey seal annual pup production in 2016-2018 was estimated at 10,350 in England and 2,250 in Wales, with increasing trend in pup production from 2014 to 2019 in both England (+10.9 % per annum) and Wales (+8.6 % per annum). Population estimates for harbour seals were 5,400 in England and <15 in Wales, with 2019 counts providing indications of a decline in England following a period of increase (27.6 % lower than the 2012 to 2018 mean counts). Numbers are too low in Wales to report a trend. An estimate of the abundance of otters for Britain gives a value of about 11,000 reported in 2018, with a 49% increase since the previous estimate in 1995 (Mathews et al., 2018: MAMMALS-Technical-Summary-FINALNE-Verision-FM2.pdf). The fifth national otter survey in England in 2009-2010 found evidence of continuing increase (Crawford, 2011). Survey work for the sixth survey is due to start in 2022. In Wales, the sixth national otter survey reported a 22% decline in number of sites with otter signs in 2015-2018 compared with the previous survey in 2009-2010, the first time that a decline has been observed since these surveys began in 1977 (Kean & Chadwick, 2021). Concerning fish-eating birds, the population estimate of wintering cormorants in Great Britain (in the winters 2012/2013 to 2016/2017) is 62,000 (Frost et al., 2019). The British Trust for Ornithology (BTO)

		Wetland Bird Survey report (Frost et al., 2021) states that the non-breeding trend for cormorants over the period 2008/09-2018/19 increased by 41% in England and 22% in Wales. Goosanders showed a 1% decrease in England and 44% increase in Wales over the same time period, and red-breasted mergansers showed 33% and 43% decreases respectively.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	

3.3 Provide an update on progress on actions relating to Aquaculture, Introductions and Transfers and Transgenics *(section 4.11 of the Implementation Plan).*

***Note**: the reports under 'Progress on action to date' should provide a **brief overview** of each action. For all actions, provide **clear and concise** quantitative information to demonstrate progress. In circumstances where quantitative information cannot be provided for a particular action because of its nature, a clear rationale must be given for not providing quantitative information and other information should be provided to enable progress with that action to be evaluated. While referring to additional material (e.g. via links to websites) may assist those seeking more detailed information, this will not be evaluated by the Review Group.*

Action A1:	Description of action (*as submitted in the IP*):	In response to pressure to increase salmon stocking as a means to support fisheries and/or stocks (A1), we will: a) regulate salmon stocking in English rivers by implementing the Environment Agency's stocking policy, which requires the production of a stocking plan; b) continue to highlight the evidence about the impacts of salmon stocking; and c) not allow salmon stocking in Wales. These actions will also address the threat from the introduction and spread of non-native fish, invertebrate species, parasites and diseases, excluding *G. salaris.*
	Expected outcome (*as submitted in the IP*):	All authorised stocking operations ensure the protection of genetic integrity and fitness of wild salmon populations.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) Five re-stocking hatcheries operate across England and are required to adhere to the Environment Agency's stocking policy. In 2021, stocking on the River Tyne was 17,089 0+ fry, which is considerably below the mitigation stocking for the impact of Kielder Reservoir of 160,000. This was due to Covid-19 restrictions impacting on the ability to collect wild native brood stock from the Tyne. There was no estuary mortality mitigation stocking in 2021. b) In 2021, the Environment Agency has continued to highlight the impacts of salmon stocking. c) In Line with NRW policy, no enhancement or restoration salmon stocking was undertaken in Wales. Forty-five hatchery reared salmon smolts were released into the River Usk in

		Wales in 2021 to supplement the smolt tracking study (see H6 c).
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action A2:	Description of action (*as submitted in the IP*):	To prevent the introduction and spread of non-native fish, invertebrate species, parasites and diseases, excluding *G. salaris* (A2), we will: a) implement and enforce Keeping and Introduction of Fish Regulations (in 2015, the Environment Agency issued 5,207); b) implement European Council Regulation No. 708/2007 concerning the Use of Alien and Locally Absent Species in Aquaculture and the Alien and Locally Absent Species in Aquaculture (England and Wales) Regulations 2011; c) monitor disease threats (e.g., *Saprolegnia* and red vent syndrome) and the occurrence of non-native species (e.g. pink salmon) together with providing timely management advice; d) implement biosecurity protocols including the 'Check, Clean, Dry' campaign: and e) remove non-native fish at high-risk sites and/or applying Import of Live Fish Act (IFLA) or fish movement regulations to take appropriate enforcement action where site owners are not compliant.
	Expected outcome (*as submitted in the IP*):	Containment and/or eradication of undesirable non-native fish species and prevention of *G. salaris* and other parasites and diseases occurring in England and Wales.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) Since the implementation of the Keeping and Introduction of Fish Regulations in 2015, the total number of live/active permits issued by the Environment Agency is 6,009 Site Permits and 441 Supplier Permits (for introductions of non-native fish) up to 31 December 2021. b) There have been no applications to culture non-native or locally absent fish species in natural waters in E&W in 2021. Defra's policy remains to prohibit the culture of any non-native species in sites connected to natural waters. c) The Import of Live Fish Act (IFLA) Orders prohibit the keeping of any non-native freshwater fish in E&W without a licence. Illegally imported species are routinely seized at Border Inspection posts and the Fish Health Inspectorate (FHI) acts to prevent the introduction and marketing of unlicensed non-native fish from EU sources. Guilty parties face seizure and destruction of their stock and prosecution for serious or repeat offences. Recently, the FHI seized over 4000 live Prussian carp (*Carassius gibelio*) illegally imported into the UK during a successful enforcement operation at the Port of Dover. This operation was a result of a multi-agency intelligence led approach, which provided sufficient evidence on the source and trade routes of these live non-native species.

		d) The FHI carried out 84 investigations relating to suspicions of notifiable disease in 2021, the majority in fishery waters and two ornamental importers. In addition, 21 fish samples were screened for notifiable diseases on imports. The only listed disease detected was Koi Herpesvirus Disease (KHV): - Twenty fishery sites were subject to formal controls for this disease by the FHI. - Two ornamental importers were subject to formal controls for this disease but decided to cull and disinfect their stocks rather than undergo disease surveillance monitoring. These numbers are consistent with numbers experienced in previous years before the impact of Covid-19 as numbers of fish movements and fishing activities increased in 2021, which in turn increases disease outbreaks. All fish farms and ornamental fish import businesses operate in accordance with a biosecurity measures plan, which is aimed at minimising the risk of introduction of pathogens to the business and their spread to other businesses or the wider environment. These conditions of authorisation are audited at annual inspections by the FHI. The FHI audits biosecurity measures on aquaculture premises in E&W, to ensure that the risk of disease spread between farmed and natural waters is minimised. The FHI provides advice to industry on biosecurity and publicises the wider 'Check, Clean, Dry' campaign, which aims to educate all water users on the risks of moving non-native species or pathogens between water bodies. e) Due to Covid-19 restrictions no topmouth gudgeon (TMG) removals were undertaken in 2021. There are presently six known populations of topmouth gudgeon in England to be managed. Natural Resources Wales monitored 27 sites for the presence of TMG between January 2021 and February 2022. Six of those sites tested positive for TMG. A monitoring report, feasibility study and request for funding to carry out eradication at some of these sites has been submitted to Welsh Government. Improvements to Biosecurity have also been introduced, and an extended surveillance/investigatory programme planned for 2022.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action A3:	Description of action (*as submitted in the IP*):	To prevent the introduction and spread of the non-native parasite *G. salaris* (A3), we will: a) deliver the *G. salaris* surveillance programme, contingency

		planning and scenario testing/exercises; and implement biosecurity protocols, including ensuring in-river operations comply with best practice and encouraging anglers and other water users to remain vigilant to the risk of non-native species and pathogens, to report sightings and to take biosecurity measures (the 'Check, Clean, Dry' campaign)
	Expected outcome (*as submitted in the IP*):	Protection of salmon from impact of *G. salaris*.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g. website links) will not be evaluated):*	a) *G. salaris* contingency plans continue to be developed and tested. In 2021, Operation Russian Doll took place to test communications between Cefas, the Environment Agency, Natural Resources Wales and Welsh Government in the event of an outbreak of *G. salaris*. This contingency exercise was done in real time over the course of a couple of months. The exercise was well received and has highlighted the benefit of running such an exercise. Also, the exercise raised awareness of the importance of each agencies' roles in an outbreak event of *G. salaris*. b) Wild salmonid samples were taken from six river catchments in 2021 and all were negative for the presence of *G. salaris*. There was no suspicion of the presence of the parasite during routine inspections of salmonid farms, and no reports of unusually low levels of natural salmon parr populations that would have triggered specific investigation. c) In 2021, the Cefas Fish Health Inspectorate conducted investigations on the River Usk and Wye in response to a positive eDNA water sample for *G. salaris* carried out by Swansea University. The FHI collected samples using the well-established non-lethal method on salmon collected on the River Usk and Wye. All samples were negative for *G. salaris* with the qPCR assay for *G. salaris* used to demonstrate a presence/absence confirmed *G. dejarvinoides*.
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	
Action A4:	Description of action (*as submitted in the IP*):	To prevent an adverse impact of aquaculture on water quality (A4), fish farm discharge controls and restrictions on prohibited substances will be applied and any breaches in consents reported.
	Expected outcome (*as submitted in the IP*):	Avoidance of deleterious impacts on water quality to ensure waters achieve compliance with WFD GES/GEP status and requirements of protected sites.
	Progress on action to date *(Provide a brief overview with a quantitative measure, or other justified evaluation, of progress. Other material (e.g.*	In the application of fish farm discharge controls across England by the Environment Agency, in 2021, there were 44 completed breach records, in 2020, 33, 2019, 98 and 2018, 176 (CCS-NCAD Report). Breaches included: oxygen, ammonia and suspended solids with action required to ensure compliance. In 2020, Covid-19 significantly impacted on the sampling programme.

	website links) will not be evaluated):	
	Current status of action:	Ongoing
	If 'Completed', has the action achieved its objective?	

4: Additional information required under the Convention
4.1 Details of any laws, regulations and programmes that have been adopted or repealed since the last notification.
4.2 Details of any new commitments concerning the adoption or maintenance in force for specified periods of time of conservation, restoration, and other management measures.
4.3 Details of any new actions to prohibit fishing for salmon beyond 12 nautical miles.
4.4 Details of any new actions to invite the attention of States not party to the Convention to matters relating to the activities of its vessels which could adversely affect salmon stocks subject to the Convention.
4.5 Details of any actions taken to implement regulatory measures under Article 13 of the Convention including imposition of adequate penalties for violations.
North American Commission Members only:
4.6 Details of any new measures to minimise bycatches of salmon originating in the rivers of the other member.
4.7 Details of any alteration to fishing patterns that result in the initiation of fishing or increase in catches of salmon originating in the rivers of another Party except with the consent of the latter.