



Managing salmon fisheries in England and on the Border Esk

Technical Case in support of proposed new
regulations

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Foreword

Salmon are one of the most iconic species inhabiting our rivers. Unfortunately, in recent years we have seen significant declines in once flourishing populations of this magnificent fish up and down the country. Working together with partners, the Environment Agency initiated the Salmon Five Point Approach to address this decline. As part of this programme, we set out our intention to explore whether further controls on the exploitation of salmon from our rivers would be required. This document sets out how, following an initial consultation, we now propose to reduce the take of salmon from our net and rod fisheries in England and on the Border Esk.

Our rationale supports proposals for large reductions in our salmon net fisheries and to also further restrict the activities undertaken within our salmon rod fisheries. These decisions, advertised in the proposed new byelaws, have certainly not been taken lightly. We recognise that these proposals will have an impact on livelihoods, which often have been passed down through many generations of the same families, and will place restrictions on traditional and cherished pastimes. In reaching this difficult decision we have sought advice and views from salmon rod and net interests, affiliated groups, businesses and organisations. We have also closely considered the best available scientific evidence available to us.

Unfortunately, that scientific evidence does not present a rosy picture. Our calculations of salmon stocks from catch returns and fish counters across the country indicates downward trends on a large number of our principle salmon rivers. The monitoring data shows that the numbers of young salmon fry and parr have also declined alarmingly, with some rivers found to be almost devoid of juvenile stages. This crash in juvenile numbers is one of the reasons we have already introduced an emergency byelaw for the River Camel in Cornwall. We also know that far fewer salmon are returning to spawn, making those that do all the more precious to supporting future generations of salmon.

These measures will negatively affect the people who arguably value salmon the most. What makes this decision even more difficult is that we know that the exploitation of salmon by rods and nets has by no means been the primary driver behind the population declines that we have seen. However, with stocks at such critical levels in many rivers it is essential that all available steps are taken to prevent and reverse these trends, and support the aspiration to restore populations so that future generations can benefit from their continued presence in our rivers.

We're working with our partners to take and facilitate action elsewhere too. In April, new rules to improve farming practice next to water will be introduced. We have sought significant investment from water companies as part of the latest price review, to improve their impact on water quality and to investigate and improve flows. Together with partners and utilising a range of funding streams, millions of pounds have been invested in improving fish passage, and we will continue to support these efforts, wherever possible targeting the most important barriers first. We are also working in close co-operation with neighbouring countries to better understand where salmon go to once they leave our rivers, and what this could tell us about managing these stocks better and increasing their survival rates.

I am heartened that we have made progress in all of these areas, and that the Salmon Five Point Approach has helped focus attention on the importance of this work. However we need to make further progress, as it will only be by fast, concerted and co-ordinated efforts, that we can arrest the decline in salmon populations before it is too late.



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Summary

Many of the salmon stocks in England have declined over the last 10 years, with catches and counts of adult salmon being amongst the lowest in the 3 most recent annual stock assessments, 2014 to 2016. These declines are not simply a direct feature of reduced fishing effort resulting in reduced catches being recorded. These reflect genuine declines in adult salmon stocks as evidenced by fish counters and traps, and in fixed effort fisheries, as well as being evidenced in other European countries.

In 2016, we classified the 42 English principal salmon rivers in the following categories:

- 14 At Risk (AR) of failing to meet their Management Objective (of exceeding their respective Conservation Limit, or minimum safe level, in 4 years out of 5);
- 24 Probably at Risk (PaR) of meeting their Management Objective;
- And 4 rivers Probably Not at Risk (PNaR) of meeting their Management Objective.

None of the rivers were classified in the Not at Risk (NaR) category in 2016. Projecting those stock trends forwards gives slightly better classifications of: 10 AR, 27 PaR and 5 PNaR in 2021, but still with no rivers in the NaR category. Note that proposed regulations are based on 2021 stock status.

Our guidance for the management of stocks in each of these categories, directs us to reduce rod and net exploitation to zero for At Risk stocks as quickly as possible. Through the Salmon Five Point Approach we have considered more ambitious conservation regulations, to include greater protection for PaR stocks, and from August to October 2017 we consulted on a range of regulatory options to help achieve this. The results of this initial consultation are provided in Appendix 1.

We received a range of support for the differing options. Considering the range of responses to the initial consultation, and balancing these with the need for protection of stocks and the need to balance restrictions between net and rod fisheries, we have selected the following regulatory options for England and the Border Esk which we are now formally advertising:

- Maintain the existing measures aimed at protecting spring salmon for a further 10 years.
- Close all drift net fisheries from 2018.
- Require the release of all salmon caught in the River Lune Haaf Net Fishery and the Anglian Coastal and Southern Coastal Fisheries from 2018.
- Close the seine and draft net fisheries on the Rivers Exe, Tamar, Tavy, Lynher, Camel, Taw and Torridge from 2019.
- Shorten the fishing season and require the release of all salmon caught in the seine and draft net fisheries on the Rivers Teign, Dart, Fowey and Poole Harbour from 2019.
- Shorten the fishing season, amend fishing areas and require the release of all salmon caught in the North East Coast T and J Net Fishery from 2019.
- Require the release of all salmon caught from the lave net fisheries of the Rivers Kent and Leven from 2019.
- Require any salmon caught by rod and line from the Rivers Lune, Ribble, Tees, Crake, Dorset Stour, Yealm, Cumbrian Derwent, Plym, Wyre and Cumbrian Calder to be returned for the full salmon fishing season from 2018.
- Require the return of all salmon caught by rod and line for the full salmon fishing season from 2018 from rivers that have salmon populations that do not have minimum safe spawning levels set for them.
- Prohibition of some fishing hooks and trebles when fishing for salmon and sea trout in England and the Border Esk from 2019.

It is the intention to introduce these byelaws for a typical 10 year period, with a review after 5 years. Earlier reviews may be triggered by changes in stock status.

In addition, high catch and release targets will be sought from the rod fisheries through voluntary means in 2018 for the 27 Probably At Risk rivers.

1. About this document

1.1 This document sets out the supporting technical case for the proposed salmon byelaws

1.1.1 We have set out the reasons why we are proposing the salmon byelaws that are being advertised.

This document sets out to:

- Support the rationale behind these proposals.
- Give details on how we have developed these measures.
- Account for the evidence and information we have used to form them.
- Rationalise and justify their implementation.

1.1.2 During 2017, the Environment Agency sought views on a range of regulatory options to reduce exploitation of salmon stocks by rod, net and fixed engine fisheries in England and on the Border Esk. We have now proposed new regulations to help achieve this. These regulations have drawn on the responses to our initial consultation (Appendix 1) and balanced these with our domestic and international duties to protect salmon stocks. These regulations form part of the commitment to restore salmon stocks in England that is integral to the Salmon Five Point Approach, and seek to maximise the opportunity for salmon stock recovery and longer term sustainability.

1.1.3 These proposed measures are in addition to any local Net Limitation Order¹ and fishery byelaw consultations that the Environment Agency has recently conducted or is currently conducting, and which you may have recently been engaged with. Natural Resources Wales has also recently consulted on its own regulations to protect salmon and sea trout stocks in Wales.

¹ A net limitation order (NLO) is the mechanism within the Salmon and Freshwater Fisheries Act 1975 whereby the Environment Agency defines the number of net or trap fishing licences that will be available in a particular area.

2. Introduction

2.1 Environment Agency's fisheries duties and responsibilities

- 2.1.1 The Environment Agency has a statutory duty, cited in the Environment Act (1995), to “maintain, improve and develop fisheries”. In addition, we have a statutory duty to operate a licensing system for fishing under the Salmon and Freshwater Fisheries Act (1975).
- 2.1.2 The powers to meet these duties are contained primarily in the Salmon and Freshwater Fisheries Act 1975 (including licensing of angling and net fishing), the Water Resources Act 1991 (including the powers to make byelaws to regulate fishing), the Eels (England and Wales) Regulations 2009 (including powers to facilitate eel passage) and the Keeping and Introduction of Fish Regulations 2015 (including regulating the movement and introduction of fish).
- 2.1.3 The EU Habitats Directive or specifically Council Directive 92/43/EEC (on the conservation of natural habitats and of wild flora and fauna) states that: *"If a species is included under this directive, it requires measures to be taken by individual member states to maintain or restore them to favourable conservation status in their natural range"*.

The Atlantic salmon (*Salmo salar* L.) is a species listed in Annex 2 of the Directive. From an English perspective, there are currently 12 rivers (or tributaries of rivers) designated as Special Areas of Conservation (SAC) where salmon are a named qualifying interest. This places an additional requirement on fisheries managers and government to maintain the habitats and population status of salmon in these rivers in a favourable condition. Any proposed amendment to salmon fishery regulations, for net or rod fisheries that have potential to impact upon salmon populations within these rivers, will require further consideration of these statutory designations. We have carried out assessments for the impacts of these regulations on SACs and Site of Special Scientific Interest (SSSI) features and these are presented in Appendices 2 and 3.

- 2.1.4 Salmon stocks in England are managed in line with the guiding principles that are set out by the North Atlantic Salmon Conservation Organisation² (NASCO). Further information on the NASCO guidelines relating to salmon fisheries management are available at: http://www.nasco.int/pdf/far_fisheries/Fisheries%20Guidelines%20Brochure.pdf

In brief, these guidelines indicate that conserving the productive capacity of individual river salmon stocks should be given priority over exploitation. The guidelines further state that fishing should not be permitted on stocks which are below their Conservation Limits³. However, if a decision is made to allow fishing on a stock which is below its Conservation Limit, on the basis of overriding socio-economic factors, fishing should clearly be limited to a level that will still permit stock recovery within a stated timeframe.

2.2 Salmon stock management

- 2.2.1 Encompassing this variety of duties and obligations (as summarised in section 2.1 above) in our fisheries strategy “Better sea trout and salmon fisheries – Our Strategy for 2008 – 2021”, we state that, **as a general principle, we want to reduce the exploitation of At-**

² North Atlantic Salmon Conservation Organisation is an international organisation, established by an inter-governmental Convention in 1984. Their objective is to conserve, restore, enhance and rationally manage Atlantic salmon through international cooperation taking account of the best available scientific information.

³ The Conservation Limit (CL) is the minimum spawning stock level below which stocks should not be allowed to fall. The CL for each river is set at a stock size (defined in terms of eggs deposited) below which further reductions in spawner numbers are likely to result in significant reductions in the number of juvenile fish produced in the next generation.

Risk stocks and will seek to agree voluntary constraints or use mandatory controls on fishing to ensure stocks are sustained whilst fishing opportunity is optimised.

2.2.2 The status of stocks in the principal salmon rivers in England is assessed annually against the Conservation Limits and Management Targets⁴ for these rivers, with the results used as a basis for assessing the need for management and conservation measures. The methods which are used are described in detail in Annex 7 to the Assessment of Salmon Stocks and Fisheries in England and Wales, and are reproduced in Appendix 4 of this document.

In summary, this method involves estimating the numbers of salmon returning to spawn in a river each year, and hence the number of eggs deposited, against the Conservation Limit. The Conservation Limit is considered to be the **minimum safe level of spawning salmon** (described as the number of salmon eggs deposited) for each river. **By regularly failing to reach this limit, the risk of that river’s salmon stock suffering serious decline greatly increases.**

2.2.3 Because salmon stocks naturally vary from year to year, the Environment Agency aims to ensure that **stocks meet the Conservation Limit in four out of five years on average; this is the Management Objective.** To meet this, the average level of a stock typically needs to be around 40% above the Conservation Limit (this higher level is termed the Management Target).

2.2.4 **It is also important to look at the trend for a particular stock, whether it is stable, improving or deteriorating. Stocks are therefore classified according to whether, on the basis of the trend over the past 10 years, they are likely to meet the Management Objective in five years’ time.** This system is used because it gives an early warning of where a river’s salmon stock will be, if current trends are maintained. On the basis of this annual compliance assessment, stocks are allocated to one of four categories based on the likelihood of meeting the Management Objective. These are set out in Table 1.

Table 1: Likelihood of meeting the Management Objective and the associated risk category

Likelihood of meeting the Management Objective	Less than 5%	Between 5% and less than 50%	Between 50% and less than 95%	95% and greater
Category name	At Risk (AR)	Probably at Risk (PaR)	Probably Not at Risk (PNaR)	Not at Risk (NaR)

2.2.5 To assist in determining the appropriate level of exploitation for a river’s salmon stock, a salmon fishery management Decision Structure (Appendix 4) was established and has been in use since 2007. The Decision Structure helps to guide a consistent approach to the implementation of management measures and seeks to manage exploitation at a sustainable level that promotes stock recovery, whilst minimising the social and economic impacts of measures to control exploitation.

2.2.6 **This approach has resulted in local based controls which typically seek to maintain an equitable balance between rod and net exploitation.** Examples of this approach may include reductions in the number of licences for netsmen, changes in the netting season to reduce the salmon catch, or the introduction of 100% catch and release for the rod fishery to maximise the numbers of salmon available to spawn escapement.

⁴ The Management target (MT) is a spawning stock level for managers to aim at in order to meet the management objective. The ‘management objective’ used for each river in England is that the stock should be meeting or exceeding its CL in at least four years out of five (i.e. >80% of the time), on average.

2.3 The current state of salmon stocks - England

- 2.3.1 Evidence on the current state of salmon stocks is presented in Appendix 5 (App 5). **There has been a marked deterioration in the status of many salmon stocks in the last few years.** This has occurred despite actions to tackle issues which impact salmon, including: national measures to reduce the exploitation of specific components of the salmon stock, and the introduction of fishery based management measures (implemented in line with the Decision Structure) to reduce, limit and, where necessary, cease exploitation.
- 2.3.2 Long-term trends in rod catch show a progressive decline in catch numbers from the peak in the mid-1960s to a low in the early 2000s. Although catch numbers improved between 2004 and 2011, they have subsequently fallen and are currently amongst the lowest recorded. The 2016 catch numbers saw some improvement over those in 2015 and 2014, but remain 25% below the 5 year average. (Figs. 17 and 18; App-2 App 5 - corrected 26.03.18)
- 2.3.3 There has been a marked decline in net catches in England and Wales over the last 15 to 20 years. This will in part be a consequence of increased regulatory controls, such as reducing net limitation orders and licence buy outs, but does also reflect the genuine reduction in salmon stocks (Fig. 16; App-2 App 5 - corrected 26.03.18). For example, the 5-year average net catch of salmon for the drift and haaf nets on the River Lune for the period 2000 to 2004 was 1,095 salmon per year, and for the most recent 5-year period (2012 to 2016) was 239 salmon per year. There were no changes in the number of licences issued over this period, nor in the available net fishing time, therefore directly reflecting a substantial decrease in the abundance of adult salmon.
- 2.3.4 **Importantly stock data that is independent of rod or net catches also indicates genuine declines in numbers of returning adults.** Electronic fish counters and adult trap data from English and Welsh rivers show variable performance between the stocks on these monitored rivers. Some runs have varied considerably year on year without any discernible trend, while most indicate a declining trend, particularly over recent years (Fig. 5; App-2 App 5 - corrected 26.03.18). Counter and trap data from the River Tamar and River Dee also show a reducing trend in grilse length and weight, and therefore by inference, a reduction in the number of eggs they carry (Figs. 6 and 7; App-2 App 5 - corrected 26.03.18).
- 2.3.5 The national salmon stock assessment shows that, although some of the worst performing rivers are improving and are predicted to continue to do so, most salmon populations have declined, in some cases severely, and are generally not predicted to improve in the next 5 years. Only 4 of the principal salmon rivers (projected to be 5 in 2021) currently fall within the 'Probably Not at Risk' category and none fall in the 'Not at Risk' category, therefore there are no salmon stocks that we are very certain will meet their Management Objective. **The majority of salmon stocks in England fall into the 'At Risk' and 'Probably at Risk' categories and thus remain in a depleted state, and are considered to have no harvestable surplus of salmon.**

Table 2: The number of English principal salmon rivers in respective stock assessment categories 2016 and 2021.

England	At Risk	Probably At Risk	Probably Not At Risk	Not At Risk
2016 status	14	24	4	0
2021 status	10	27	5	0

- 2.3.6 The available estimates of marine survival for stocks in the UK and Ireland show a marked decline in marine survival around 1990, and persistent low levels of marine survival since. Similar patterns of reduced levels of marine survival in the last 20 to 30 years are evident for stocks throughout the north-east Atlantic. The reduction in the survival rate of salmon in

the north-east Atlantic means that the same number of smolts leaving English rivers now, will produce far fewer returning salmon than would have been the case in the 1980s (Figs. 3 and 4; App 2 App 5 - corrected 26.03.18).

2.3.7 **The latest juvenile salmon assessments (2011 to 2016) indicate low levels of juvenile abundance across the country.** There are concerns around the very low numbers of juveniles, in particular fry, recorded in many river catchments during 2016. The reduction in fry abundance is likely to result in reduced smolt numbers in 2018. There is already evidence of reduced smolt output for the River Frome in 2017, where the majority of smolts migrate after 1 year in freshwater.

The very low numbers of salmon fry recorded from monitoring sites in English rivers in 2016 are not taken into account by the predicted 2021 classification. This is because it is based on the trends and variability of returning adult numbers for the 10 years up to, and including, the current year (in this case 2016). Therefore, unless there is an improvement in salmon survival during a later life stage, it is likely that this reduced juvenile stock will lead to lower management target compliance than the data is currently predicting in 2021 (Figs. 10, 11 and 12; App 2 App 5 - corrected 26.03.18).

2.4 The current state of salmon stocks – Wales, Scotland and Ireland

2.4.1 The concerns regarding the apparent recent declines in salmon stocks in England are very much mirrored in the recent fisheries management actions taken by respective regulators to protect Welsh, Scottish and Irish salmon stocks.

2.4.2 Natural Resources Wales have recently consulted on new salmon fishing regulations, in light of widespread declining adult salmon stocks, as categorised in Table 3 below, and widespread reductions in juvenile abundance. These proposed regulations would require the mandatory 100% catch and release of all salmon caught by rod and net from all 20 principal salmon rivers. The cross border rivers Wye and Dee are also, separately, proposed to be regulated by mandatory 100% catch and release fishing.

Table 3: The number of Welsh principal salmon rivers in respective stock assessment categories 2016 and 2021.

Wales	At Risk	Probably At Risk	Probably Not At Risk	Not At Risk
2016 status	10	9	1	0
2021 status	7	12	1	0

2.4.3 Scottish salmon stocks have been classified according to the grades identified in Table 4 for the 2018 fishing season. In 2018 the number of rivers under no restrictions (Grade 1) and voluntary restrictions (Grade 2) have roughly halved from the previous 2017 classification. The number of rivers facing mandatory 100% catch and release regulations has increased from 73 to 123 (representing 72% of all Scottish rivers).

Table 4: The number and percentage of Scottish salmon rivers classified within Scottish stock assessment grades 2017 and 2018.

Scotland	Grade 1 (no restrictions)	Grade 2 (voluntary action to reduce exploitation)	Grade 3 (mandatory 100% catch and release)
2017 no. of rivers (% in brackets)	47 (28%)	48 (28.5%)	73 (43.5%)
2018 no. of rivers (% in brackets)	21 (12%)	27 (16%)	123 (72%)

2.4.4 Irish salmon stocks have been classified according to the grades presented in Table 5 for the 2018 fishing season. The number of rivers deemed to have a harvestable surplus of adult salmon is 42, while 36 rivers will be regulated as mandatory 100% catch and release and 68 rivers will be closed to all fishing.

Table 5: The number and percentage of Irish salmon rivers classified within Irish stock assessment grades 2018.

Ireland	Grade 1 (no restrictions)	Grade 2 (mandatory 100% catch and release)	Grade 3 (total closure)
2018 No. of rivers (% in brackets)	42 (29%)	36 (25%)	68 (46%)

2.5 The Salmon Five Point Approach

2.5.1 More recently the Environment Agency and our partners have developed the Salmon Five Point Approach (2016), with the aim of stabilising and recovering salmon stocks to ensure their future sustainability. Since the start of the Salmon Five Point Approach the key areas being worked on for salmon by a range of organisations include:

- Improving marine survival.
- Removing barriers to migration and enhancing habitat.
- Safeguarding sufficient flows.
- Maximising spawning success by improving water quality.

Further detail on the Approach and all its actions is available at:

<http://bit.ly/Salmon5PointApproach>

2.5.2 We recognise that there is still a lot to do on these four strands of our approach, and these will remain the focus of our, and partner organisations,' work over the coming years. A great deal of this work is long term and, although much has begun, benefits will not be realised immediately. Some areas will need more legislation, or will be delivered through non fisheries specific work, such as managing water abstraction and future farming reforms.

2.5.3 The most significant single factor impacting upon the status of salmon populations is believed to be the decline in marine survival rates i.e. the percentage of smolts migrating from freshwater which survive at sea to return and spawn in their river of origin, which have reduced markedly over the last 20 to 30 years. Reduced marine survival affects stocks across the North Atlantic, and reflects changes in oceanographic conditions operating over

a broad scale. Climate driven changes affecting ocean ecosystems are believed to be responsible, with probable impacts on the food available to salmon and possibly increased levels of competition and predation. Given the obvious difficulties of influencing ocean and underlying climatic conditions, there is widespread recognition that, in the short term at least, managers need to focus on reducing the pressures on salmon in freshwater and coastal environments in order to maximise the numbers and quality of smolts leaving our rivers. These are key aims of the Salmon Five Point Approach (S5PA).

- 2.5.4 The specific element of the S5PA addressing exploitation, seeks to further reduce exploitation beyond the extent that our current guidance requires. In developing the preferred measures to further reduce exploitation of salmon for net and fixed engine fisheries and rod fisheries, we have taken the view that stocks falling in the lowest 2 stock status categories (i.e. those with less than a 50% likelihood of reaching the management objective – those At Risk and Probably at Risk) should be subject to increased protection. We believe it is important to act now to try to arrest further declines. Stocks that continue to have a better than 50% likelihood of meeting the management objective (i.e. those classified as Not at Risk or Probably Not at Risk) are considered to have some capacity for continued exploitation and might be regarded as having a certain level of harvestable surplus.

2.6 Consideration of sea trout within the Salmon Five Point Approach

- 2.6.1 In developing regulations for further reducing the exploitation of salmon, the intention has been not to increase the level of sea trout exploitation in a fishery beyond the current typical level of exploitation. Sea trout stocks will continue to be monitored and the need for any additional exploitation controls will be reviewed annually.

2.7 Recovering salmon rivers

- 2.7.1 Rivers that are recovering from historical degradation which do not have minimum safe spawning levels set for them e.g. the Trent, Yorkshire Ouse and Mersey, are currently considered not to be able to support any exploitation of salmon. This position is formalised in the regulations proposed here. Therefore, fisheries that exist, or may develop, on these rivers will continue to be required to operate mandatory 100% catch and release for salmon. The list of recovering rivers is presented in Schedule 2 of the proposed byelaw and are included below.

Please note that we are also intending to ask the Minister to amend to Schedule 2 to the byelaws to include the Yorkshire Ouse, River Trent, River Medway and River Stour (Kent) when we seek their confirmation.

Schedule 2 Recovering Rivers - as they appear in the proposed byelaws

Name of River	County
Allen	Cornwall
Aln	Northumberland
Alt	Merseyside
Annas	Cumbria
Avill	Somerset
Bela	Cumbria
Belford Burn	Northumberland
Blackeney Brook or Blackpool Brook	Gloucestershire
Blyth	Northumberland
Bristol Avon	
Brit	Dorset
Derwent	Northumberland
Don	Tyne & Wear

Doniford	Somerset
Ellen	Cumbria
Ems	West Sussex
Fal	Cornwall
Gilpin	Cumbria
Harbourne	Devon
Heddon	Devon
Keer	Lancashire
Lerryn	Cornwall
Looe	Cornwall
Meon	Hampshire
Mersey	
Mite	Cumbria
Otter	Devon
Par	Cornwall
Parrett	Dorset and Somerset
Porth	Cornwall
Seaton	Cornwall
Sid	Devon
Skelton Beck	North Yorkshire
Skinningrove Beck	North Yorkshire
Team	Durham and Tyne and Wear
Thames	
Valency	Cornwall
Wampool	Cumbria
Wansbeck	Northumberland
Warren Burn	Northumberland
Washford	Somerset
Waver	Cumbria
Weaver	Cheshire
Winster	Cumbria

3. Renewal of existing National Salmon Byelaws

3.1 Introduction

- 3.1.1 The current National Salmon Byelaws expire on the 31 December 2018 and have been reviewed here within the options to further reduce exploitation of salmon by net and rod fisheries. This ensures that any byelaws which are brought in, to either protect spring salmon stocks or achieve the commitments of the Salmon Five Point Approach, are covered in a single set of new National Salmon Byelaws.
- 3.1.2 Currently the measures to protect spring salmon stocks cover both England and Wales. Natural Resources Wales have consulted on their own measures to protect the whole salmon stock in Wales. We are therefore proposing that a new set of National Salmon Byelaws would cover England and the Border Esk only. The Environment Agency is working with Natural Resources Wales to establish how measures would be managed on the border rivers (Wye, Severn and Dee).
- 3.1.3 Appendix 5 describes the current state of multi sea winter salmon stocks, which make up a large proportion of salmon returning to our salmon rivers prior to the 1 June each year.
- 3.1.4 We have used the same criteria for this review of the existing National Salmon Byelaws, as were used in the 2008 review of these regulations. The full analysis is set out in Appendix 5, Section 9. **In summary, no rivers in England currently meet the criteria for relaxing the National Salmon Byelaws.** This is due to:
- **No rivers currently meeting their management objective with a high degree of certainty.**
 - **The percentage of salmon caught before the 1 June⁵ increased every year between 2011 (5.5%) and 2015 (13.2%) before dropping slightly to 10% in 2016. However, the data shows that numbers caught before the 1 June remained relatively stable between 2011 and 2016.** This indicates that the pre-1 June increase in percentage has not been due to an improvement in the spring catch, but rather a drop in the numbers caught later in the year. This is consistent with the decrease in the numbers of grilse caught by anglers.
 - **National figures point to a drop in the 5 year average pre-June catch, from 1,609 between 1994 and 1998 to 1,173 between 2012 and 2016.**
- 3.1.5 It is therefore proposed that the existing measures to protect spring salmon stocks are renewed without amendment for England⁶ and the Border Esk, so that:
- The start of the netting season for salmon and sea trout continues to be the 1 June⁷.
 - There is no angling for salmon, other than with artificial fly or lure, before 16 June.
 - All salmon caught by anglers before 16 June are returned, with minimum injury.
- 3.1.6 A number of respondents to the initial consultation questioned why different dates apply to the end of the National Salmon byelaws for rod (15 June) and net (31 May) fisheries, or argued that similar end dates should apply to both fisheries. Spring salmon are defined as

⁵ The 1 June is used here so that comparisons can be made between net/fixed engine and rod catch data.

⁶ How the continuation of these measures will apply to the English parts of the Rivers Wye, Dee and Severn is currently being discussed with Natural Resources Wales.

⁷ A few specified net fisheries are still allowed to net for sea trout before 1 June although any salmon caught must be returned immediately to the water with the least possible injury.

those salmon that enter freshwater before 1 June. Following their entry into freshwater, spring salmon are considered to be most vulnerable to capture by rod and line angling for a period of around 2 weeks. Delaying the lifting of National Salmon byelaw restrictions to 16 June for rod fisheries therefore provides protection for any spring salmon that passed through the estuaries and entered freshwater immediately prior to 1 June.

- 3.1.7 Some respondents to the initial consultation questioned the benefit of the existing National Salmon Byelaws, citing no apparent increase in spring salmon numbers as a result of these byelaws being in place for almost 20 years. While spring salmon numbers have certainly not increased to pre-1990s levels, there has nonetheless been an apparent increase in spring salmon numbers in the last 6 years (Appendix 5 Figure 1). It is not readily possible to attribute this increase solely to the National Salmon Byelaws, given that salmon stocks are affected by so many factors, but the prevention of killing spring salmon by nets and the mandatory release of thousands of spring salmon over the last 18 years will have at least contributed to some extent to the evident improvement in spring salmon stocks.

3.2 National Salmon Byelaws Options appraisal

- 3.2.1 The pros and cons of the renewal or the relaxation of the National Salmon Byelaws are presented in Table 6 below.

Table 6: Pros and cons of regulatory options for renewal of National Salmon Byelaws

	Pros	Cons
Do Nothing		<p>Current National Salmon Byelaws will expire later in 2018, and current level of protection for spring salmon will be removed thereafter.</p> <p>Does not comply with S5PA commitment to reduce exploitation.</p> <p>Contrary to national guidance.</p> <p>Contrary to international guidance.</p> <p>Contrary to Habitats Directive.</p>
Renew current National Salmon Byelaws without change	<p>Maintains same level of protection for spring salmon stock component.</p> <p>Consistent with national and international (NASCO/ICES) guidance.</p> <p>Consistent with Habitats Directive.</p> <p>Allows rod fishery participation to continue on C&R basis.</p>	<p>Likely to prove unpopular with some licensed rod anglers and netsmen.</p>

Table 6 continued.

	Pros	Cons
Relax current National Salmon Byelaws	Likely to prove popular with licensed rod anglers and netsmen.	Does not meet S5PA commitment to reduce exploitation. Contrary to national guidance. Contrary to international guidance. Contrary to Habitats Directive.

3.2.2 Our preferred option here, to satisfy stock protection, is to renew the existing National Salmon byelaws unchanged for a further 10 years.

3.3 Why this is our preferred option

3.3.1 The status of the multi sea-winter, or spring salmon, and 1 sea winter stock components in terms of Pre-Fishery Abundance for England and Wales is presented in Appendix 5 (Figure 1). There has been an evident increase in the abundance of spring salmon in the last 6 years. However, over a slightly longer period there has been a decline in the abundance of the 1 sea-winter, grilse component, that had previously supported a substantial proportion of the spawning stock. An increase in multi sea-winter spawner numbers, as shown in Figure 1 App 2, will be expected to have a disproportionate benefit for total egg deposition, given the substantially higher number of eggs carried by these larger fish. However, the concurrent marked reduction of the grilse component poses a risk to the sustainability of salmon stocks in the future, as even relatively modest reductions in multi sea-winter salmon in future years would result in proportionally greater reductions in egg deposition, from the relatively low levels currently seen in many rivers. So, while the spring salmon stocks appear to have improved, they have generally not reached a level that would allow a surplus to be killed, and the majority of river stocks are either in the At Risk or Probably at Risk categories. This implies that there is no harvestable surplus in these stocks yet.

4. Proposed regulations for salmon net and fixed engine fisheries

4.1 Net and Fixed Engine Regulations Options appraisal

4.1.1 The pros and cons of the options for the regulation of the net and fixed engine fishery (excluding the North East Coast fishery) are presented in Table 7 below.

Table 7: Pros and cons of regulatory options for reduced exploitation of salmon by net and fixed engine fisheries (not including North East Coast net fishery)

	Pros	Cons
<p>Option 1</p> <p>National byelaw prohibiting the take of salmon from all Principal Salmon Rivers.</p>	<p>Provides highest level of protection for all stocks from exploitation.</p> <p>Unambiguous regulation across all net fisheries.</p> <p>Meets S5PA commitment to reduce exploitation in short term.</p>	<p>Prevents the take of a harvestable surplus from stocks above CL.</p> <p>Does not optimise fishing opportunities.</p> <p>Likely to prove unpopular with licensed netmen on PNaR stocks.</p>
<p>Option 2</p> <p>National byelaw prohibiting the take of salmon from Principal Salmon Rivers that are Probably at Risk (PaR) and At Risk (AR).</p>	<p>Provides highest level of protection from exploitation for stocks below CL.</p> <p>Meets S5PA commitment to reduce exploitation in short term.</p>	
<p>Option 3</p> <p>National byelaw prohibiting the take of salmon from Principal Salmon Rivers that are At Risk (AR).</p>	<p>Provides protection for the most vulnerable stocks (AR).</p> <p>Consistent with current guidance (Decision Structure).</p>	<p>Does not meet S5PA commitment to reduce exploitation.</p>
<p>Option 4</p> <p>Revised fishery based Net Limitation Orders and catch/effort controls to move to zero exploitation of Probably at Risk (PaR) and At Risk (AR) salmon stocks.</p>	<p>Slower reduction of exploitation to zero likely to be more popular amongst licensees.</p>	<p>Does not meet S5PA commitment to reduce exploitation in short term.</p>

4.1.2 **Our preferred regulatory option is to close all drift net fisheries in 2018. The preferred regulatory option for other net fisheries that exploit stocks that are At Risk or Probably at Risk will be bought in by 2019. Sea trout only fisheries may operate where the bycatch of salmon is low, and salmon can be released with a high likelihood of survival. It is the intention to introduce these byelaws for a typical 10 year period, with a review after 5 years. Earlier reviews may be triggered by changes in stock status.**

4.1.3 The result of these preferred regulations for each net fishery in England is presented in Table 8 below.

Table 8 – The outcome of preferred regulations for each net and fixed engine fishery

	Net fishery	Predicted compliance 2021	Fishing Method	Decision Sea Trout:Salmon (ST:SA)
SW	Christchurch Harbour*	Probably at Risk	Seine or draft Net	Fisheries has been closed since 2012, so no recent data exists to assess the ST:SA ratio. Future measures will therefore be assessed at time of next Net Limitation Order review in 2022.
	Poole Harbour	Probably at Risk	Seine or draft Net	ST:SA ratio exceeds 4:1 in June only. From 2019, restrict season to June only and require release of all salmon.
	Exe	Probably at Risk	Draft Net	ST:SA ratio does not exceed 4:1 in any month. From 2019, fishery closes.
	Teign	Probably at Risk	Draft or seine Net	Retain exemption to fish pre 1 June. From 2019 the season will end on this date.
	Dart*	Probably at Risk	Draft or seine net	Retain exemption to fish pre 1 June. From 2019 the season will end on this date.
	Tavy, Tamar & Lynher*	Probably at Risk	Tavy* – draft or seine net	ST:SA ratio does not exceed 4:1 in any month. From 2019, fishery closes.
		Probably at Risk	Tamar – draft or seine net	ST:SA ratio does not exceed 4:1 in any month. From 2019, fishery closes.
		Probably at Risk	Lynher – draft or seine net	ST:SA ratio does not exceed 4:1 in any month. From 2019, fishery closes.
Fowey	Probably at Risk	Draft or seine	Retain exemption to fish pre 1 June. From 2019 the season will end on this date.	
SW	Camel*	Probably at Risk	Draft, seine, drift or hang net.	From 2018 fishery to close due to use of drift net.
	Rivers Taw and Torridge	Probably at Risk	Draft or seine net.	ST:SA ratio does not exceed 4:1 in any month. From 2019, fishery closes.
Anglian	Anglian Coastal Fishery	Fishery not associated with a classified salmon river	Drift net and other nets	From 2018 require release of all salmon caught.
Southern	Southern Coastal Fishery	Fishery not associated with a classified salmon river	Any	From 2018 require release of all salmon caught.

Table 8 continued

	Net fishery	Predicted compliance 2021	Fishing Method	Decision Sea Trout:Salmon (ST:SA)
Midlands / Wales	Severn (Wye & Usk)*	Probably Not at Risk	Putcher Rank	No new measures. Fishery continues to be managed under its existing NLO arrangements.
		Probably Not at Risk	Lave net	No new measures. Fishery continues to be managed under its existing NLO arrangements.
		Probably Not at Risk	Draft net	No new measures. Fishery continues to be managed under its existing NLO arrangements.
NW	Ribble	At Risk	Drift net	From 2018 fishery to close due to use of drift net.
	Lune	At Risk	Drift Net	From 2018 fishery to close due to use of drift net.
		At Risk	Haaf net	From 2018 require release of all salmon caught.
NW	Kent	Probably at Risk	Lave net	From 2019 require release of all salmon caught.
	Leven	Probably at Risk	Lave net	From 2019 require release of all salmon caught.
	Solway (England)*	Probably at Risk	Heave or Haaf net	As a result of the review of the Solway Net Limitation Order (NLO) measures have been advertised separately to achieve the release of all salmon caught by this fishery. S5PA measures will therefore be delivered by this NLO and local byelaw package, specific measures for this fishery won't therefore be included in new National Salmon Byelaws.

* Fisheries that take salmon form one or more SACs

4.2 Why this is our preferred option

4.2.1 Table 8 sets out how the preferred regulations have been applied to each net and fixed engine fishery in England. The following principles have underpinned the decision making process:

1. We are basing our decisions on the 2021 predicted status. The predicted status is the starting point for our existing decision structure and this approach aims to prevent the forecast scenario from happening, i.e. to prevent the stock falling below the Conservation Limit.
2. A fishery can continue if the method of capture is likely to have minimal impact on salmon survival post release. If the impact of survival is less certain we will consider allowing that fishery to continue to operate based on:
 - a. The number of salmon caught; and

- b. if the catch is dominated by sea trout (at a ratio of sea trout to salmon caught of greater than 4:1⁸).
 - c. Where the method of capture is likely to lead to a high level of mortality of any salmon caught we will close the fishery.
3. We will seek to minimise the impact of the measures on netsmen as far as is possible given the principles above. Therefore we will seek to reduce or cease the take of salmon from the worst performing river stocks first, and by not implementing new measures within fishing seasons that have already commenced.

4.2.2 The Southern / South West England net fisheries

The fisheries that operate in the south and south west of England, with the exception of the River Camel, all operate using beach draft or seine nets. Whilst salmon can be returned after being caught in draft or seine nets, they are likely to suffer some damage which could reduce their survival. In some locations multiple catches of the same fish may also occur during low river flows, leading to further reduced survival. As a result we have investigated which fisheries catch a minimal number of salmon and catch a high proportion of sea trout (greater than 4:1) on a monthly basis.

The fisheries on the rivers Exe, Tavy, Tamar, Lynher and Taw & Torridge do not exceed the ratio of 4:1 sea trout to salmon in any month of their current fishing seasons. Therefore these fisheries will close from 2019 if the byelaws are confirmed.

Fisheries in Poole Harbour, and the rivers Fowey, Dart and Teign exceed the 4:1 sea trout to salmon ratio for part of their current fishing seasons, and at these times catch very low numbers of salmon. The decision has been to modify their fishing seasons so that they can only fish in these months, and any salmon they do catch must be returned. These measures will come into force from 2019 if the byelaws are confirmed.

The Southern Coastal Fishery, situated in the River Beaulieu and fished using a seine net, very rarely catches salmon. From 2018 this fishery will be able to continue to operate under its current licence terms, but will be required to return any salmon that are caught if the byelaws are confirmed.

Drift nets, as used on the River Camel, cause significant damage to fish, with some fish dying whilst still caught in the net. We therefore do not consider that these nets can operate, and the proposed byelaws will close this fishery from 2018. The use of a draft or seine net on the River Camel will also be prohibited from 2018, although this method is not currently used on this river.

4.2.3 Anglian Coastal fishery

This fishery operates off the Anglian Coast, using a range of different nets. This fishery targets sea trout and catches less than 10 salmon a year across the whole fishery. This equates to less than 1 salmon caught by each netsmen each year. From 2018 this fishery will be able to continue to operate under its current licence conditions (which include an ongoing reduction in licences as existing fisherman leave the fishery), but will be required to return any salmon that are caught if the byelaws are confirmed.

4.2.4 Salmon fisheries on the River Severn

These fisheries catch salmon returning to the Rivers Severn, Wye and Usk which all are predicted to be Probably Not at Risk in 2021. Due to the conservation designations of the Wye and Usk, this fishery is already restricted in its catch of salmon to protect the weakest

⁸ This is the ratio that was applied to determine which fisheries could fish prior to the 1 June when the byelaws to protect spring salmon were originally introduced in 1999. This same approach was used when these byelaws were renewed in 2008 and for their renewal in this proposed byelaw package.

of these stocks. Therefore no additional measures have been proposed for this fishery to those already in place.

4.2.5 North West net fisheries

There are 2 drift net fisheries present on the rivers Ribble and Lune. Both of these rivers are classed as At Risk, and fish cannot be safely returned when using a drift net. The proposed byelaws would require these fisheries to close in 2018.

Hand net fisheries, using either Haaf or Lave nets, operate on the Rivers Lune, Kent and Leven. This method can, to a certain degree, be targeted to catch either salmon or sea trout, or if salmon are caught they can be immediately released with minimal damage. It is estimated that the survival of salmon released by these fisheries is commensurate with the survival of a released rod caught salmon. These fisheries will therefore be able to continue to take sea trout with the release of any salmon caught. The decision for these hand net fisheries is consistent with the approach recently proposed for the Solway Haaf net fishery as part of the Solway, Eden and Border Esk Net Limitation Order and Byelaw Review.

5. Proposed regulations for North East Coast net fishery

5.1 North East Coast net fishery regulations Options appraisal

5.1.1 The pros and cons of options for the regulation of the North East Coast net fishery are presented in Table 9 below.

Table 9: Pros and cons of regulatory options for reduced exploitation of salmon by North East Coast net fishery

	Pros	Cons
<p>NE Option 1</p> <p>National byelaw prohibiting the take of salmon by the North East Coast Net Fishery from 2018.</p>	<p>Accelerates national and international commitment to phase out coastal mixed stock fishery.</p> <p>Meets S5PA commitment to reduce exploitation in short term.</p>	<p>Unpopular with drift nets given previously defined end date for closure of this element of the fishery (by 2022).</p>
<p>NE Option 2</p> <p>National byelaw prohibiting the take of salmon by the North East Coast Net Fishery from 2022.</p>	<p>Meets national and international commitment to phase out mixed stock fishery in medium term.</p>	<p>Short term exploitation of vulnerable stocks continues.</p> <p>Does not meet S5PA commitment to reduce exploitation in short term.</p>
<p>NE Option 3</p> <p>From 2018, revised fishery based Net Limitation Orders and catch/effort controls.</p> <p>These could include further reducing season length and/or equipment modifications and would retain the existing reducing Net Limitation Order and non-transfer of licences.</p>	<p>Potentially more popular with current net licensees.</p>	<p>Adjustments of season or method likely to deliver only modest benefit for vulnerable stocks.</p> <p>Would not fully meet S5PA commitments.</p>

Table 9 continued

	Pros	Cons
<p>Alternative Option</p> <p>Close drift net fishery in 2018.</p> <p>T&J net fisheries to release all salmon caught from 2019 and also see reductions in fishing season for Districts 1-5 to allow specific targeting of sea trout.</p> <p>Night time fishing restrictions for T& J nets from 2019.</p> <p>Byelaw exemption allowing T and J nets to operate in Conservation Areas will be revoked.</p>	<p>Meets national and international commitment to phase out mixed stock fishery.</p> <p>Meets S5PA commitment to reduce exploitation in short term.</p> <p>Maintains sea trout fishery with minimal impact on salmon.</p>	<p>Unpopular with drift nets given previously defined end date for closure of this element of the fishery (by 2022).</p> <p>Unpopular with beach net fishermen who fish the conservation areas as more lucrative with disproportionately larger catches compared to other locations.</p>

5.1.2 The North East Coast net fishery is known to exploit salmon from a wide range of rivers, including many on the Scottish east coast. The conservation status of the respective salmon stocks from these rivers is identified in Table 10 below. Several of those affected English rivers are classified as either At Risk or Probably at Risk. Also, a number of the affected Scottish salmon stocks are in the lowest category that requires zero exploitation.

Table 10: Salmon rivers exploited by the North East Coast Net Fishery and their current stock status

English Principal Salmon River	2021 predicted salmon stock status	Relevant conservation designation
Coquet	Probably at Risk	SSSI
Tyne	Probably Not at Risk	None
Wear	Probably Not at Risk	None
Tees	At Risk	None
Yorkshire Esk	Probably at Risk	None
English recovering salmon river	2021 predicted salmon stock status	Relevant conservation designation
Yorkshire Ouse system	Considered At Risk as recovering salmon river	None
Scottish salmon river	Scottish salmon river stock status proposed grade for 2018	Relevant conservation designation
Tweed	Grade 1	SAC
North Esk	Grade 1	None
South Esk	Grade 2	SAC
Dee (incl Carron, Cowie)	Grade 1 (3)	SAC (None)
Tay (incl Eden & Earn)	Grade 1 (3)	SAC (None)
Forth (incl tribs)	Grade 2 (3)	None
Teith	Grade 1	SAC

Table 10 continued.

Scottish salmon river	Scottish salmon river stock status proposed grade for 2018	Relevant conservation designation
Ugie	Grade 3	None
Thurso	Grade 1	SAC
Spey	Grade 1	SAC
Ness (incl Moriston SAC)	Grade 3/2 (3)	None
Conon	Grade 2	None
Deveron	Grade 2	None
Don	Grade 3	None
Findhorn	Grade 1	None
Forss Water	Grade 3	None
Dionard	Grade 3	None
Halladale River	Grade 1	None
Helmsdale	Grade 2	None
Borgie	Grade 2	SAC
Naver	Grade 1	SAC
Brora	Grade 3	None
Beauly	Grade 3	None
Berriedale	Grade 3	SAC
Shin system	Grade 2	None

Accompanying notes:

1. The Scottish system for determining the conservation status of their salmon stocks follows a similar approach to that undertaken in England and Wales, although a different grading system is used. Grade 1 confers that the exploitation of that stock is sustainable, Grade 2; that action is needed to reduce exploitation and Grade 3; that exploitation is unsustainable and mandatory catch and release for all methods is required for 1 year. In addition to these controls the retention of all salmon caught in Scottish coastal waters has been prohibited due to the mixed stock nature of the fisheries and the limited data on the composition of the catch, this measure will be reviewed in 2018. Further details of the approach that Scotland has adopted are available at:

<http://www.gov.scot/Topics/marine/Salmon-Trout-Coarse/fishreform/licence/status>

5.1.3 Our preferred option is to close the North East Coast Drift Net Fishery for the 2018 fishing season. From the 2019 season all T and J nets will be required to release any salmon caught but may continue to fish for sea trout, with reduced fishing seasons in Districts 1 to 5. Night time fishing will also be prevented by byelaw from 2019 and the byelaw exemption that currently allows T and J nets to operate in Conservation Areas will be revoked.

It is the intention to introduce these byelaws for a typical 10 year period, with a review after 5 years. Earlier reviews may be triggered by changes in stock status.

5.2 Why this is our preferred option

- 5.2.1 All nets, both drift and beach nets in the North East Coast Net Fishery operate as a coastal mixed stock fishery, in that they exploit salmon from a large number of different populations from the eastern coast of England and in Scotland. This mode of operation introduces difficulties in fisheries management, as it is not possible to effectively protect the most vulnerable of the contributing stocks.
- 5.2.2 The UK Government has international obligations to the North Atlantic Salmon Conservation Organisation (NASCO) to close such coastal mixed stock fisheries, as it is not possible to manage them in such a way as to effectively protect contributing salmon stocks.
- 5.2.3 The Yorkshire and North East Net Fishery catches large numbers of salmon, which were destined for rivers in Yorkshire, north east England and eastern Scotland. These extra fish would make an immediate difference to the number of adult salmon returning to these rivers to spawn, and provide significant support to salmon stocks.
- 5.2.4 We have taken into account the latest evidence available relating to the status of salmon populations in English rivers, the mode of operation and impact of the North East drift and beach nets upon those populations. This includes: catch returns for net and rod fisheries, electric fishing, fish counters and other scientific monitoring data, and the results of tagging and genetic investigations using the latest techniques and analyses.
- 5.2.5 The latest 2016 assessment found that salmon stocks in England are at their lowest levels ever recorded. The North East Coast Drift Net Fishery caught almost 11,000 salmon in 2016, which were destined for rivers in Yorkshire, north east England and eastern Scotland. These extra fish would make an immediate difference to the number of adult salmon returning to these rivers to spawn, and provide significant support to salmon stocks.
- 5.2.6 Our assessments of salmon stocks are based on internationally accepted methods, and are reviewed to ensure they provide us with the most accurate estimates of stock performance possible. Other nations including Scotland, Northern Ireland and the Republic of Ireland, have already closed their net fisheries, and the latest evidence from English rivers leads us to conclude, regrettably, that a similar course of action should be recommended here.

Option 1 fulfils our management objectives, but would require the closure of the beach net fishery for salmon after the start of the 2018 netting season. This would introduce unacceptable economic dis-benefits on licensees in the beach net fishery, as licensed netsmen would have already committed to work these fisheries.

In 2012, the Fisheries Minister Mr Benyon instructed the Environment Agency to close the drift net fishery in 2022. Option 2 would maintain this timetable for closure of the drift net fishery, and extend it to include the beach net fishery for salmon. Since that time, the performance of salmon stocks has further declined and concerns over the future of these stocks have increased. Further protection of salmon stocks is required to ensure their future survival and improvement. Option 2 would not provide adequate protection for the most vulnerable of the contributing stocks, and does not meet S5PA commitment to reduce exploitation in short term.

Option 3 extends the current approach to managing the Yorkshire and North East Net Fishery of controlling effort by some means. The existing Net Limitation Order restricts the issue of licences to those netsmen who held the same type of licence in the previous year. This has the effect of gradually reducing the number of licensees operating in the fishery over time. Further constraints on fishing effort considered, include: reducing the length of the fishing season, reducing the length of the nets (or other modifications to fishing gear design), and reducing the length of time available to fish in each week.

Analysis shows that control of effort has historically been shown to be generally ineffective in regulating the upper level of catches in the net fishery. Similar levels of available effort have resulted in catches of markedly different sizes in different years.

Because effort controls do not directly or predictably constrain maximum catches, further restrictions on effort would need to be extremely precautionary to constrain salmon catches to a minimal level.

Given these factors, we take the view that further regulating fishing effort is neither appropriate nor reliable as a means to control the upper level of future catches in the net fishery.

5.2.7 Our preferred approach is the alternative option which is to close the drift net fishery in 2018, as the drift nets are responsible for the largest impact on contributing salmon stocks and cannot release salmon unharmed. We further propose to close the beach net fishery in 2019 for salmon, allowing beach nets to continue to fish for sea trout where to do so does not exert an unacceptable impact upon salmon stocks.

5.2.8 Other nations including Scotland, Northern Ireland and the Republic of Ireland, have already closed their net fisheries for salmon and the latest evidence from English rivers leads the Environment Agency to conclude, regrettably, that a similar course of action should be recommended here.

5.2.9 The potential to allow a continuing sea trout fishery

We support the maintenance of a sea trout only net fishery which does not have a significant impact upon salmon stocks. With any sea trout only fishery, there would be an unavoidable bycatch of salmon to a greater or lesser degree, and consequent mortality.

The various net types operating in the fishery have different levels of impact depending on their mode of operation, the numbers of salmon captured and the operation of the net by individual licensees.

In determining the potential for a continuing sea trout only fishery we have established a number of criteria any such fishery would need to meet. The following criteria have been established:

- Does not take a significant number of salmon.
- Can operate effective catch & release of salmon.
- Takes large numbers of sea trout & is economically viable.
- Ratio of sea trout to salmon is greater than 4:1.
- Would not increase exploitation of sea trout in the fishery above current levels.
- Operates on contributing stocks in a sustainable, measurable and predictable way.

5.2.10 The fundamental consideration is the level of unavoidable salmon bycatch mortality. This has been determined as allowing a catch in low tens of fish in each district in the fishery.

Because drift nets cannot be selective or operate without damaging or killing any salmon they catch, and can catch a very large number of salmon, (almost 11,000 in 2016) there is no potential to allow these nets to continue on a sea trout only basis,

The beach net fishery is managed in seven coastal districts (D1 to D7 shown in Figure 1), with each having a different level of impact upon salmon. The salmon net catch declines from north to south, with the northernmost district (D1) having the greatest impact and the southernmost districts (D6 & D7) having the least impact upon salmon.

Figure 1: Map of the North East coastal fishery districts



5.2.11 Fishing in District 1: T nets would be able to reliably release free swimming salmon unharmed. However, T nets do catch a high number of salmon. Consequently, T nets operating as a sea trout only fishery would be likely to kill a significant number of salmon, including fish from populations identified as At Risk and Probably at Risk, and from recovering rivers.

In Districts 3-7: J nets catch relatively few salmon, around 400 to 500 per year. If fished with close attendance and observation, a proportion of the salmon and grilse catch could be

returned, and the numbers caught further reduced if the season was shortened. Given the relatively low catch, it is possible to maintain a sea trout only fishery for J nets that catch very few salmon.

We propose that the beach net fishery (T and J nets) is required to release all salmon caught for the whole netting season, and that the season is reduced to lower the catch of salmon to minimal levels. This change is being proposed to offer increased protection to vulnerable salmon stocks, but still allow a sea trout fishery in the earlier part of the year in order to minimise the economic impact on those participating in the fishery.

The end date for each district has been set at that date after which it is estimated that the level of bycatch on salmon becomes too great.

The dates that are proposed are as follows:

- D1, D2 & D3 26 March – 31 May inclusive.
- D4 & D5 26 March – 30 June inclusive.
- D6 & D7 26 March – 31 August inclusive.

5.2.12 Night time fishing restrictions for T& J nets from 2019

We propose revoking the current byelaw allowing T and J nets to fish at night from 2019. This is because the identification and safe return of any salmon captured would prove very difficult in the hours of darkness. It is likely that salmon could become entangled or gilled in beach nets without being observed by netsmen at night. Therefore, to better protect salmon stocks and to facilitate the timely return of any salmon captured, we are proposing there be a prohibition on fishing with a net at night from 2019.

5.2.13 Fishing in Conservation Areas

We propose to revoke the current North East regional byelaw exemption allowing T and J nets to operate in the Tyne and Coquet Conservation Area B.

Conservation Areas have been established around the mouths of specific rivers to prevent nets operating in areas where there is a large concentration of fish. There is currently a regional byelaw exemption to a general prohibition of netting within Conservation Areas, which allows T and J nets to operate close to the mouth of the river Tyne (Tyne Conservation Area B) and in the area between the mouth of the river Coquet and the River Aln (Coquet Conservation Area B).

Analysis of recent net catches indicates that the catch rate for T nets operating in the Tyne, Conservation Area B, for salmon is almost 10 times greater than that for T nets operating outside the Conservation Area. For nets fishing in Coquet, Conservation Area B, catch rates for salmon are almost 4 times higher than for T nets fishing elsewhere in District 1.

Operating as a sea trout only fishery, the rates of capture of salmon in T nets in these areas would expose high numbers of fish to gilling and snagging, leading either to immediate mortality or to scale loss, physical damage and physiological stress, which would result in increased mortality of those fish when released.

It is clearly contrary to the management objectives for the fishery to allow nets to continue to fish in these areas, and achieve catch rates for salmon that are far greater than those achieved elsewhere in the T net fishery, and therefore we are proposing to remove this exemption.

6. Proposed regulations for salmon rod fisheries

6.1 Rod regulations Options appraisal

6.1.1 The pros and cons of options for the regulation of rod fisheries are presented in Table 11 below.

Table 11: Pros and cons of regulatory options for reduced exploitation of salmon by rod fisheries

	Pros	Cons
<p>Option 1</p> <p>National byelaw prohibiting the take of salmon from all Principal Salmon Rivers.</p>	<p>Provides highest level of protection for all stocks from exploitation.</p> <p>Unambiguous regulation across all rivers/rod fisheries.</p> <p>Meets S5PA commitment to reduce exploitation in short term.</p>	<p>Prevents the take of a harvestable surplus from stocks above CL.</p> <p>Does not optimise fishing opportunities.</p> <p>Likely to prove unpopular with licensed rod and line anglers on PNaR stocks.</p>
<p>Option 2</p> <p>National byelaw prohibiting the take of salmon from Principal Salmon Rivers that are Probably at Risk (PaR) and At Risk (AR).</p>	<p>Provides highest level of protection from exploitation for stocks below CL.</p> <p>Meets S5PA commitment to reduce exploitation in short term.</p>	<p>Likely to prove unpopular with licensed rod and line anglers on PAR stocks.</p>
<p>Option 3</p> <p>National byelaw prohibiting the take of salmon from Principal Salmon Rivers that are At Risk (AR).</p>	<p>Provides highest level of protection from exploitation for most vulnerable stocks.</p> <p>Consistent with current guidance (Decision Structure).</p>	<p>Does not meet S5PA commitment to reduce exploitation.</p>
<p>Option 4</p> <p>Revised fishery based Net Limitation Orders and catch/effort controls to move to zero exploitation of Probably at Risk (PaR) and At Risk (AR) salmon stocks.</p> <p><i>Please note, and accept our apologies, that the description above is incorrect. It should read: Voluntary catch and release at levels proposed for all rivers post 16 June. Proposed levels: rivers At Risk, close to 100% as possible; rivers Probably at Risk, greater than 90% or maintain existing rates if higher; rivers Probably Not at Risk, increase rates from their current levels.</i></p> <p><i>Corrected 26.03.18</i></p>	<p>Likely to prove most popular with a large proportion of licensed rod anglers.</p>	<p>Does not meet S5PA commitment to reduce exploitation in short term.</p>

Table 11: continued

	Pros	Cons
Alternative option 1 Allocate a bag limit of 1 or 2 salmon per angler per season.	Likely to prove popular with a large proportion of licensed rod anglers.	Could potentially result in higher exploitation than is currently the case. Unlikely to meet S5PA commitment to reduce exploitation in short term. Unlikely to provide any further protection for AR or PAR stocks. Potentially makes it more difficult to manage individual salmon stocks if the angler can take his limit from any river.

- 6.1.2 Some respondents to the initial consultation expressed concern that further regulations would reduce fishing effort, and therefore reduce declared catches further, with the implication that stocks would appear to be reducing still further, therefore requiring further restrictive catch regulations in the future. This will not be the case. Although our stock assessment method relies on rod catch data, we consider how the exploitation rate might increase or reduce, based on independent stock data, particularly from fish counter data or monitoring adult traps. While we do not have fish counter data for every river, we can apply reasonable assumptions from counted stocks to un-counted stocks.
- 6.1.3 Some respondents suggested that the setting of bag limits per angler, or allocation of one or two carcass tags to each rod licence holder, ought to be considered as alternative regulatory options. However such proposals are not likely to provide any substantial reduction in exploitation. It is likely that the allocation of even a 1 salmon per angler per season bag limit could potentially increase exploitation from current levels. Additionally, the rivers that salmon were taken from would not be restricted, which might enable fish to be removed from rivers where stocks are the most vulnerable.
- 6.1.4 At the present time the Environment Agency issues over 30,000 migratory salmonid rod licences per year for fishing in England and Wales. In 2016 we received over 16,700 statutory catch returns, of which 11,886 recorded fishing for salmon on English rivers. A high percentage (78%) of these recorded zero catch, and 9% recorded killing 1 or more salmon (Table 12).

Table 12: The number of anglers submitting catch returns and recording zero salmon catch, 1 or more catch and 1 or more salmon killed in 2016

Year	Licence sales (E&W)	Catch returns (E&W)	Catch returns (E only)	N anglers 0 catch (E only)	N anglers 1+ catch (E only)	N anglers 1+ kill (E only)	% anglers 1+ kill (out of E only returns)
2016	30,214	16,720	11,886	9,234	2,652	1,105	9.29

6.1.5 The number of anglers killing each given number of salmon in 2016 is presented in Table 13 below. It is evident from this distribution of kill, that the majority of anglers only kill one salmon per season. Therefore the potential benefit of capping the kill at 1 salmon per angler per season is quite limited.

Table 13: The distribution of catches and of kills amongst rod anglers 2016

Number of salmon	Number of anglers catching n number of salmon	Number of anglers killing n number of salmon
0	9,234	9,448
1	1,153	723
2	501	221
3	288	82
4	192	33
5	121	21
6	82	6
7	64	7
8	46	6
9	37	3
10	27	2
11	17	0
12	23	1
13	11	0
14	14	0
15	12	0
More than 15	64	0

6.1.6 The percentage of anglers releasing the given range of percentages of the catch for the 10 At Risk rivers in 2016 is presented in Table 14a below. Note that on the rivers Crake, Calder, Wyre, Yealm, Plym and Stour less than 4 salmon were captured. The same statistics for the 27 Probably at Risk stocks is given in Table 14b.

Table 14a: The percentage of anglers releasing the given ranges of the catch for the 10 At Risk English rivers

At Risk stock	Percentage of catch that is released						
	0	1-20	21-40	41-60	61-80	81-99	100
Tees	7.1	0	0	0	3.6	0	89.3
Crake	0	0	0	0	0	0	100
Calder	100	0	0	0	0	0	0
Derwent	20.8	0	3.9	5.2	2.6	5.2	62.3
Lune	27.3	0.7	5.3	10.7	9.3	1.3	45.3
Ribble	12.3	0	0.6	1.3	7.1	2.6	76.1
Wyre	100	0	0	0	0	0	0
Yealm	0	0	0	0	0	0	100
Plym	50	0	0	0	0	0	50
Stour	0	0	0	0	0	0	100

For the River Derwent, for example, just over 20 percent of the anglers who caught salmon released none of them, and over 62 percent of the anglers released everything that they caught.

Table 14b: The percentage of anglers releasing the given ranges of the catch for the 27 Probably at Risk English rivers

Probably At Risk stock	Percentage of catch that is released						
	0	1-20	21-40	41-60	61-80	81-99	100
Coquet	22.0	0	0	10.0	11.0	4.3	52.7
Esk (Yorks)	6.4	0	0	8.5	2.1	4.3	78.7
Itchen	0	0	0	0	0	2.5	97.5
Avon (Hants)	0	0	0	1.5	0	0	98.5
Piddle	No salmon caught in 2016						
Frome	0	0	0	3.0	3.0	0	94.0
Axe	0	0	0	40	20	0	40
Exe	12.5	0	5	2.5	20	10	50
Teign	37.5	0	0	0	18.8	0	43.7
Dart	0	0	0	0	9.1	0	90.9
Avon (Devon)	14.3	0	0	14.3	0	0	71.4

Table 14b continued

Probably At Risk stock	Percentage of catch that is released						
	0	1-20	21-40	41-60	61-80	81-99	100
Erme	0	0	0	0	0	0	100
Tavy	25.0	0	0	8.3	0	0	66.7
Tamar	13.0	0	1.3	3.9	7.8	5.2	68.8
Lynher	11.1	0	0	0	5.6	5.6	77.7
Fowey	11.8	0	0	5.9	11.7	0	70.6
Camel	23.3	0	2.3	11.6	7.0	2.3	53.5
Taw	11.3	0	5.7	7.5	11.3	11.3	52.8
Torrige	3.8	0	0	11.5	7.8	0	76.9
Lyn	0	0	0	0	0	0	100
Kent	26.8	0	1.8	14.3	12.6	7.1	37.5
Leven	0	0	0	0	0	0	100
Esk (Cumbrian)	15.8	0	0	5.3	26.3	0	52.6
Irt	37.5	0	0	6.3	12.5	0	43.7
Ehen	57.1	0	2.4	14.3	9.5	0	16.7
Eden	13.0	0	1.3	5.6	6.1	3.0	71.0
Border Esk	30.3	0	3.0	6.1	12.9	2.3	45.6

While the percentage of anglers that release everything that they catch is well over 50% for most rivers, there are still quite a few anglers who release relatively few or no salmon. For example, just over 30% of the anglers who catch salmon on the Border Esk do not release any of those salmon. In order to achieve high catch and release targets for any of these PaR rivers, the number of anglers that kill a high proportion of their catch needs to be markedly reduced.

6.1.7 In Summary, our preferred option incorporates a combination of Option 3 (Table 11) – mandatory 100% catch and release of salmon on At Risk rivers – and high voluntary catch and release targets for salmon on Probably at Risk rivers.

It is the intention to introduce these byelaws for a typical 10 year period, with a review after 5 years. Earlier reviews may be triggered by changes in stock status.

6.2 Why this is our preferred option

6.2.1 Our Decision Structure directs us to reduce exploitation to zero on stocks that are projected to be in the At Risk category in 5 years' time. This direction is applied equitably across both net and rod fisheries where they both exist on At Risk rivers. Voluntary catch and release has clearly increased on many rivers in recent years and now sees, on average, over 80% of salmon returned alive. However, despite there being a generally high proportion of anglers who return all or most of their catch in recent years, there remains a substantial proportion of anglers who release very little or none of their catch. Almost half of the anglers who caught a salmon in 2016, only caught 1. And of the anglers who killed salmon in 2016, roughly 70% killed only 1 salmon. **The greatest benefit in terms of numbers of**

salmon saved, will come from reducing the number of individual anglers who only kill 1 salmon in the season, and this will be best delivered by mandatory 100% catch and release byelaw for At Risk stocks.

- 6.2.2 The mandatory catch and release of At Risk stocks is consistent with our Decision Structure guidance that we have followed since 2007. However, through our Salmon Five Point Approach task of further reducing rod and net exploitation, it has been our intention to provide mandatory catch and release protection for Probably at Risks stocks too. Given the response to the initial consultation we recognise that further regulation could have an impact on angling, so our approach for Probably at Risk Stocks from 2018 will now require PaR rivers to achieve high voluntary catch and release rates of over 90% in the first instance. Where the 90% catch and release target is not exceeded, we will take decisions on a river-by-river basis whether or not mandatory 100% catch and release should be applied by byelaw. **If the current catch and release rate is higher than the proposed rate, then the current rate will be required to be maintained.**
- 6.2.3 The result of these preferred regulations for rod fisheries is presented in Table 15 below.

Table 15: Proposed national catch and release byelaw approaches for rod fisheries applying on a river basis

Location	Net fishery	River	Compliance 2016	Predicted compliance 2021	100% mandatory C&R from 2018	Voluntary C&R @ > 90% from 2018 with review of success in 2019	Voluntary C&R at current from 2018	Notes – C&R data is declared data from 2016 (% C&R for whole season (tot) and post 16 June). Existing byelaws and voluntary measures restricting C&R and angling methods.
NE	North East Drift and Beach (Scottish rivers affected are not shown)	Coquet	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 74% (tot) and 67% (post 16 June). No night fishing, except with natural or artificial bait and hook must pass a 10mm tube.
		Tyne	Probably Not at Risk	Probably Not at Risk	-	-	X	C&R rate of 75% (tot) and 74% (post 16 June). No night fishing, except with natural or artificial bait and hook must pass a 10mm tube.
		Wear	Probably Not at Risk	Probably Not at Risk	-	-	X	C&R rate of 81% (tot) and 80% (post 16 June). No night fishing, except with natural or artificial bait and hook must pass a 10mm tube.
		Tees	At Risk	At Risk	X	-	-	C&R rate of 93% (tot) and 93% (post 16 June). No night fishing, except with natural or artificial bait and hook must pass a 10mm tube.
		Esk (Yorks)	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 87% (tot) and 85% (post 16 June).
Southern	-	Test	Probably at Risk	Probably Not at Risk	-	-	X	C&R rate of 99% (tot) and 99% (post 16 June). Voluntary achievement of 100% catch and release already forms part of measures to protect salmon stocks. Voluntary worm ban – whole season.
	-	Itchen*	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 100% (tot) and 100% (post 16 June). Voluntary achievement of 100% catch and release already forms part of measures to protect salmon stocks. Voluntary worm ban – whole season.
SW	Christchurch Harbour	Avon (Hants)*	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 100% (tot) and 100% (post 16 June). Voluntary achievement of 100% catch and release already forms part of measures to protect salmon stocks. Artificial fly only before 15 May.
		Stour	At Risk	At Risk	X	-	-	C&R rate of 100% (tot) and 100% (post 16 June). Voluntary achievement of 100% catch and release already forms part of measures to protect salmon stocks. Artificial fly only before 15 May.
	Poole Harbour	Piddle	Probably at Risk	Probably at Risk	-	X	-	No catch of salmon in 2016. Voluntary achievement of 100% catch and release already forms part of measures to protect salmon stocks. Artificial fly only before 15 May.
		Frome	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 97% (tot) and 96% (post 16 June). Voluntary achievement of 100% catch and release already forms part of measures to protect salmon stocks. Artificial fly only before 15 May.

Table 15 continued.

Location	Net fishery	River	Compliance 2016	Predicted compliance 2021	100% mandatory C&R from 2018	Voluntary C&R @ > 90% from 2018 with review of success in 2019	Voluntary C&R at current from 2018	Notes – C&R data is declared data from 2016 (% C&R for whole season and post 16 June). Existing byelaws and voluntary measures restricting C&R and angling methods.
SW	-	Axe	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 67% (tot) and 63% (post 16 June). No shrimp, prawn, worm or maggot. Fly only after 31 July below Axbridge.
	Teign	Teign	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 69% (tot) and 64% (post 16 June). Salmon: artificial fly or lure only after 31 August. Sea trout: no worm or maggot before 1 June. Angling rules apply to experimental season extension (1 Oct – 14 Oct 2016): fly only, with single barbless hook & mandatory C&R.
	Dart	Dart*	At Risk	Probably at Risk	-	X	-	C&R rate of 96% (tot) and 96% (post 16 June). Salmon: no worm or maggot. No shrimp or prawn except below Staverton Bridge. No spinning above Holne Bridge. Sea trout: fly only.
	Exe	Exe	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 79% (tot) and 77% (post 16 June). Angling rules apply to experimental season extension (1 Oct – 14 Oct 2016): fly only, with single barbless hook & mandatory C&R. No worm or maggot.
	-	Avon (Devon)	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 73% (tot) and 70% (post 16 June). No worm or maggot.
	-	Erme	At Risk	Probably at Risk	-	X	-	C&R rate of 100% (tot) and 100% (post 16 June). No worm or maggot.
	-	Yealm*	At Risk	At Risk	X	-	-	C&R rate of 100% (tot) and 100% (post 16 June).
	-	Plym	At Risk	At Risk	X	-	-	C&R rate of 50% (tot) and 50% (post 16 June).
	Tavy, Tamar & Lynher	Tavy*	At Risk	Probably at Risk	-	X	-	C&R rate of 80% (tot) and 82% (post 16 June).
		Tamar	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 83% (tot) and 80% (post 16 June). No worm, maggot, shrimp or prawn after 31 August.
		Lynher	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 94% (tot) and 93% (post 16 June).
	Fowey	Fowey	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 74% (tot) and 74% (post 16 June).
	Camel	Camel*	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 67% (tot) and 67% (post 16 June). Emergency angling byelaws for 2018 season – 100% C&R and method restrictions.

Table 15 continued.

Location	Net fishery	River	Compliance 2016	Predicted compliance 2021	100% mandatory C&R from 2018	Voluntary C&R @ > 90% from 2018 with review of success in 2019	Voluntary C&R at current from 2018	Notes – C&R data is declared data from 2016 (% C&R for whole season and post 16 June). Existing byelaws and voluntary measures restricting C&R and angling methods.
SW	Rivers Taw and Torridge	Taw	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 79% (tot) and 77% (post 16 June). No shrimp, prawn, worm or maggot. No spinning after 31 March. Salmon bag limits per angler of: 2 per day, 3 per week and 10 per season.
		Torridge	Probably at Risk	Probably at iRisk	-	X	-	C&R rate of 83% (tot) and 79% (post 16 June). Salmon bag limits per angler of: 2 per day, 2 per week and 7 per season. No salmon >70cm retained after 1 August. No salmon >70cm retained after 1 August. Angling rules apply to experimental season extension (1 Oct – 14 Oct 2016): fly only, with single barbless hook & mandatory C&R.
	-	Lyn	At Risk	Probably at Risk	-	X	-	C&R rate of 100% (tot) and 100% (post 16 June). No worm or maggot before 1 June.
Midlands / Wales	Severn	Severn	Probably Not at Risk	Probably Not at Risk	-	-	X	C&R rate of 78% (tot) and 61% (post 16 June). No float fishing with lure or bait.
		Wye*	Probably at Risk	Probably Not at Risk	-	-	-	Welsh river, already operates at 100% mandatory C&R.
		Usk	Probably Not at Risk	Probably Not at Risk	-	-	-	Welsh river, proposed new byelaw (currently under consultation) for 100% mandatory C&R.
NW	Ribble	Ribble	Probably at Risk	At Risk	X	-	-	C&R rate of 89% (tot) and 88% (post 16 June). For 2017 a local byelaw restricting anglers to 2 salmon per season post 1 June.
	-	Wyre	AtrRisk	At Risk	X	-	-	C&R rate of 0% (tot) and 0% (post 16 June) – only 1 salmon caught in 2016.
	Lune	Lune	AtRisk	At Risk	X	-	-	C&R rate of 69% (tot) and 69% (post 16 June). Bag limit of 4 salmon per season.
	Kent	Kent	Probably at Risk	Probably at iRisk	-	X	-	C&R rate of 68% (tot) and 67% (post 16 June).
	Leven	Leven	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 100% (tot) and 100% (post 16 June). Salmon bag limit of 3 per season for whole fishery with carcass tagging scheme and mandatory C&R once limit is reached. Voluntary method restrictions also apply to improve survival of released fish.

Table 15 continued.

Location	Net fishery	River	Compliance 2016	Predicted compliance 2021	100% mandatory C&R from 2018	Voluntary C&R @ > 90% from 2018 with review of success in 2019	Voluntary C&R at current from 2018	Notes – C&R data is declared data from 2016 (% C&R for whole season and post 16 June). Existing byelaws and voluntary measures restricting C&R and angling methods.
	-	Crake	At Risk	At Risk	X	-	-	C&R rate of 100% (tot) and 100% (post 16 June). Salmon bag limit of 3 per season for whole fishery with carcass tagging scheme and mandatory C&R once limit is reached. Voluntary method restrictions also apply to improve survival of released fish.
	-	Duddon (& Lickle)	Probably Not at Risk	Probably Not at Risk	-	-	X	C&R rate of 85% (tot) and 85% (post 16 June).
	-	Esk (Cumbria)	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 72% (tot) and 71% (post 16 June).
	-	Irt	At Risk	Probably at Risk	-	X	-	C&R rate of 65% (tot) and 65% (post 16 June).
	-	Ehen*	Probably at Risk	Probably at Risk	-	X	-	C&R rate of 47% (tot) and 48% (post 16 June).
	-	Calder	At Risk	At Risk	X	-	-	C&R rate of 0% (tot) and 0% (post 16 June). 2 salmon caught in 2016.
	-	Derwent*	At Risk	At Risk	X	-	-	C&R rate of 79% (tot) and 79% (post 16 June). Salmon bag limit of 2 per day. Release of all female salmon from 1 October. Voluntary lower bag limits are in place.
	Solway (England)	Eden*	Probably at Risk	Probably at Risk	N/A – local byelaw package being applied for that will specify mandatory catch and release of all salmon caught from 2018. This is for 16 June onwards as renewal of national byelaws requires mandatory catch and release pre 16 June.			C&R rate of 87% (tot) and 79% (post 16 June). Current consultation on new local byelaws requiring release of all salmon from 2018 season. Salmon bag limit per angler of 2 per day has been in place for previous seasons.
		Esk (Border)	Probably at Risk	Probably at Risk				C&R rate of 72% (tot) and 71% (post 16 June). Current consultation on new local byelaws requiring release of all salmon from 2018 season. Salmon bag limit per angler of 2 per day has been in place for previous seasons.

* Rivers where salmon form part of their SAC designation

Note: 2021 predicted status is used to determine measure. If current catch and release rate is higher than the proposed rate, then the current rate will be required to be maintained

6.3 Fishing method regulations

- 6.3.1 Within the initial consultation on “Managing Salmon Fisheries in England and on the Border Esk - 2017”, we set out a number possible mandatory measures that affect angling methods with the aim of improving survival of caught and released salmon. These measures were based on the recommendations made in the report on methods to improve the survival of released fish. This report is available here: <https://www.gov.uk/government/publications/impact-of-catch-and-release-angling-practices-on-survival-of-salmon>.
- 6.3.2 The responses to the 2017 initial consultation (Appendix 1: Section 6.2.3) have been extremely useful in shaping which measures are delivered by a national byelaw rather than either local regulations or a voluntary code of practice. We have set out each of the measures that we sought views on in Table 16 below, and what the outcome for each of these measures is.

Table 16: proposed fishing method restrictions

	Proposed measure	Consultation response (numbers rounded to nearest 50)	Outcome
1	Mandatory requirement to have a landing net present at all times.	900 responses received with half adding further comments. Vast majority agree that having a net was the best way to land a fish, although many would not want to be required to use a landing net. Respondents did question how “available to use” could be defined.	The majority of responses think a landing net is the best and least stressful way to land a salmon or sea trout. There was less traction with it being a mandatory byelaw as specific conditions meant a national measure would be too blunt and complex to enforce.
2	Landing net mesh size of 20mm or less should be mandatory.	900 responses received with a further 200 extra comments. Majority agreed that 20mm or less mesh size would be appropriate. However, a notable minority said a small mesh size in fast water was difficult to use and dangerous at times. They therefore consider that making it a mandatory byelaw is inappropriate and counter-productive.	Outcome is to not bring in a national measure but to promote the use of a landing net as part of catch and release best practice. No new national byelaw.
3	Should barbed hooks be prohibited by byelaw when fishing using flies, lures or bait?	900 responses received with half adding extra comments. The majority of respondents did not consider a byelaw prohibiting barbed hooks is appropriate and the use barbless or de-barbed hooks should be voluntary. It was often stated by respondents that fish were more likely to be lost using barbless hooks which would mean that could not be supported in their recovery. It was also stated that by proposing that this byelaw would apply when fishing for salmon or sea trout would result in a high proportion of sea trout being lost, due to the way they fight. Some also stated	The evidence suggests that barbless hooks are consistently less injurious and lead to faster unhooking times than barbed hooks (see report on methods to improve survival of released fish Section 3.2). However we recognise the impacts of applying this byelaw when fishing for either salmon or sea trout (which we consider is necessary for its effective enforcement) would have. We therefore consider that the use of barbless or de-barbed hooks is best promoted

		<p>that barbless hooks move around more and can do more damage than barbed hooks. Some respondents consider that micro-barbed hooks provide a good compromise.</p> <p>There were notable responses saying that barbless hooks are mandatory in other countries and that they see no difference in the effectiveness of landing fish on either hook type.</p>	<p>through catch and release best practice, rather than required through a new national byelaw.</p> <p>No new national byelaw.</p>
4	<p>Should treble hooks be prohibited by byelaw when fishing using flies, lures and bait?</p>	<p>900 responses received with 400 adding extra comments. The responses were relatively evenly placed between no; yes, all and yes, only size 8 and above.</p> <p>Common responses included:</p> <ul style="list-style-type: none"> • Not being able to use many of existing flies • Smaller trebles can be easily removed and no difference in damage observed between double and treble hooks. • Some lures are designed for the weight of treble hooks e.g. Rapalas. <p>Some respondents would favour them being prohibited for salmon fishing but not when fishing for sea trout.</p>	<p>We do not consider that there is sufficient justification for the outright prohibition of using treble hooks when fishing for salmon or sea trout. We also do not consider it's appropriate to only prohibit their use when fishing for salmon (due to difficulties in effective enforcement).</p> <p>We do consider that the treble hooks should be prohibited when fishing with lures and that their size is restricted for fishing with flies or when using prawn and shrimp as bait. This is to reduce the risk of damage to fish and enable fish to be easily unhooked.</p> <p>Adapted new national byelaw proposed, see Section 6.3.3..</p>
5	<p>Use of circle hooks when using worm as bait?</p>	<p>850 responses received with 400 further comments. Many respondents said that worming, or all bait fishing should be banned whilst the majority said that if worming was allowed, it should be with circle hooks. However, several angling clubs, responded and said that trials of circle hooks in their waters showed that they do not work as designed when fishing for salmon and can do more harm than good (as they are harder to remove if deep hooking occurs).</p>	<p>A national byelaw requiring the use of circle hooks would not be useful to protect salmon across the country. Local rules governing the use of worm as bait and the hooks used are likely to be more effective in minimising the impact of this method, as these can be tailored to the individual circumstances of the river and how these methods are employed.</p> <p>No new national byelaw</p>
6	<p>Restriction on the use of flying 'C's</p>	<p>850 responses received with 400 making extra comments. A slight majority of respondents said that there should be no restriction on the use of flying 'C's, compared to those that said that they should only be allowed with single hooks.</p>	<p>The responses to this question and question 4 in this table have helped us focus the type of hook used rather than the type of lure. We have also further considered the enforceability of byelaw solely for flying 'C's. We have therefore concluded</p>

	<p>Many respondents asked why flying 'C's had been singled out when other types of lure, such as Mepps, are similar. They also stated that multi hook lures such as Rapalas cause more damage than lures with only 1 hook. For those that already use flying 'C's with single hooks they said that they are easy to unhook especially if the hook is barbless.</p>	<p>that all lures should only be used with a single hook (rather than double or treble hooks).</p> <p>Adapted new national byelaw proposed, see Section 6.3.3.</p>
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6.3.3 As a result of the responses to the initial consultation, the evidence that is provided in the report on methods to improve the survival of released fish and to ensure that we have byelaws that can practicably be enforced, we are proposing byelaws that would require, when fishing for salmon or sea trout in England and on the Border Esk, that:

- Fishing with a prawn or shrimp as bait is only carried out with a single, double or treble hook with a gape (measured from shank to hook point) of 7 millimeters or less.
- Fishing with an artificial lure is only carried out with a single hook with a gape (measured from shank to hook point) of 13 millimeters or less.
- Fishing with an artificial fly with a treble hook is only permitted if the gape (measured from shank to hook point) of the treble hook is 7 millimeters or less.

Please note there is no restriction proposed on the use of artificial flies with single or double hooks.

These measures are intended to minimise the risk of injury, and enable salmon to be returned with the minimum of delay. To enable anglers time to adapt their existing tackle, it proposed that these measures would be implemented for the 2019 fishing season.

It is the intention to introduce these byelaws for a typical 10 year period, with a review after 5 years. Earlier reviews may be triggered by changes in stock status.

7. Benefits and Impacts of proposed regulations

7.1 Introduction

7.1.1 The Environment Agency will need to demonstrate we have considered financial impacts before seeking confirmation of the byelaws, and these will be submitted directly to Defra as part of this byelaw package. Information of these assessments cannot be made publicly available for Data Protection reasons. Where fisheries are small, it would be hard to not identify individuals.

7.2 Salmon net fishery

7.2.1 Different levels of impact will be felt from different parts of the fishery, as the proposed measures differ by district and netting method. We need to consider these differences in our approach to our proposed national salmon byelaws. These include a proposal to prohibit salmon fishing in certain fisheries.

Table 17 below, indicates the numbers of salmon that would be “free to return” if the net fishery was to cease.

These estimates are calculated as additional salmon available to spawn that would result from the closure of the specified net/fixed engine fishery. The calculations take account of the catch and release rate (as outlined in Section 6) of the rod fishery, and some mortality of released fish. To do this, the following assumptions have been made:

- A rod exploitation rate of 15% applies - it is recognised that rod exploitation rates will vary across rivers, so a standard rate has been used to simplify the calculation of these estimates.
- 100% catch and release for rivers that are in the At Risk compliance category.
- 90% catch and release for rivers that are in the Probably at Risk compliance category, unless the current catch and release rate is higher, in which case the latter is used.
- Catch and release rates are maintained at their 2016 levels for rivers that are in the Probably Not at Risk compliance category.
- A figure of 10% mortality for released salmon has then been applied, which takes into account the reduction in mortality that might be achieved by the use of best practice angling techniques.

The Ribble net fishery has had additional controls, which further restrict net catches put in place for the 2017 season, to those that were in place for the 2016 season. Therefore, the gains in salmon for this river will be less than are estimated here, as the calculations are based on 2016 data.

The north-east coast and Solway fisheries take salmon returning to Scottish rivers, and the Severn fishery exploits fish returning to rivers in Wales (Wye and Usk). Therefore, the closure of these fisheries would allow additional salmon to return. These extra fish are not represented in the table below.

Table 17: provisional estimates of additional salmon expected to be available to spawn, in the first year, for different rivers and assuming the closure of the specified net/fixed engine fishery (estimates based on catch levels in 2016)

Net fishery	English rivers with salmon stocks exploited by net fisheries	2021 predicted compliance category	Approximate number of additional salmon available to spawn
North East Coast Net Fishery	Coquet	Probably at Risk	600
	Tyne	Probably Not at Risk	2,700
	Wear	Probably Not at Risk	1,250
	Tees	At Risk	200
	Esk (Yorks)	Probably at Risk	250
Christchurch Harbour*	Avon (Hants)	Probably at Risk	See note 1
	Stour	At Risk	See note 1
Poole Harbour*	Piddle	Probably at Risk	See note 1
	Frome	Probably at Risk	See note 1
Exe	Exe	Probably at Risk	100
Teign	Teign	Probably at Risk	50
Dart*	Dart	Probably at Risk	See note 1
Tavy	Tavy	Probably at Risk	5
Tamar	Tamar	Probably at Risk	60
Lynher*	Lynher	Probably at Risk	See note 1
Fowey*	Fowey	Probably at Risk	See note 1
Camel	Camel	Probably at Risk	15
Rivers Taw and Torridge	Taw	Probably at Risk	30
	Torridge	Probably at Risk	10
Severn	Severn	Probably Not at Risk	24
Ribble	Ribble	At Risk	51
Lune	Lune	At Risk	317
Kent	Kent	Probably at Risk	1
Leven	Leven	Probably at Risk	1
Solway (England)	Eden	Probably at Risk	176
	Esk (Border)	Probably at Risk	90

Notes:

1. These estimates are based on 2016 declared catch data, rather than an average annual net catch data from a number of years, as a number of net fisheries have had reducing exploitation measures in place. Fisheries marked with a * denotes where zero exploitation of salmon took place in 2016 as a result of existing controls, agreements or buyouts for that fishery.

7.2.2 Value of the net fisheries

Using catch returns, each fishery was examined with assumptions of basic costs across the entire country. The same cost of salmon and sea trout per kg was used for all calculations. The cost of the net licence was included, which is different for each fishery. Using this information, we calculated likely profits and incomes. The full information has been redacted for Data Protection reasons, but the following table shows, in relative terms, which fisheries are most likely to have a negative impact on likely income generated from fishing for salmon and sea trout.

Table 18: Relative values of the salmon and sea trout fisheries licensed 2016

Relative Economic Value	Fishery	Number of licences	Economically viable fishery?	
			Before measures	Post measures
High	NE Drift nets	9 licensees.	yes	No as will close
	NE Drift & T net (combined)	2 licensees	yes	Possibly
	NE Districts 1-3	21 licensees.	Yes	Possibly
	NE Districts 4&5	8 Licensees.	yes	Probably for most
	NE Districts 6&7	12 Licensees. Average.	yes	Yes
Medium	NW/SW Drift nets	14 licensees.	Marginal for some	No as will close
	Lune Haaf nets	12 Licensees.	Marginal for some	No
	SW seine nets	14 Licensees.	Marginal for some	No
Low	Anglian Coast		Marginal with no change	
	Southern Coast	No sale of fish	Marginal with no change	
	Kent & Leven Lave nets	5 Licensees.	No	No

Income made from salmon and sea trout fishing varies extensively from an annual income in excess of £80,000 for 1 individual, to a loss. The full data we have used cannot empirically state how much of an individual's income is dependent on salmon and sea trout because we have no information about individual circumstances, proportions of salary relative to other work and/or other catches or stocks that some fishermen may also target.

7.2.3 Cultural value of salmon and sea trout fishing

The cultural traditions and practices associated with salmon netting is very high, and where these fisheries close there will be a loss to that community. Many fishermen net for salmon for the love of the activity, and the historical and cultural pleasure that salmon and sea trout fishing brings. Many licensees are fifth or sixth generation fishermen.

We recognise that the loss of this activity could be deeply felt in many places, but there can be no fishery without a salmon population. Therefore to ensure the longer term survival, these measures have been proposed.

The benefits of the proposed measures in terms of fish saved, are difficult to link to a clear metric for environmental benefits. The proposed measures will contribute to the preservation of salmon stocks, but are not the only factor in maintaining these stocks. Estimates of the total value of these stocks is £453m, based on willingness to pay estimates for the general public (all households).

7.3 Salmon rod fishery

7.3.1 Estimated gains from rod fishery options

In Table 19 we have provided provisional estimates of the number of additional salmon that might be expected to be available to spawn on an individual river basis, if the voluntary rod catch and release and best practice angling measures were adopted for that river. A number of assumptions have been made in deriving these estimates, and so the values are intended to be indicative (see footnotes for details).

It is important to note that the estimates provided in Table 19 give the number of additional salmon which might be available to spawn in a particular river for the first year the measures are applied from. In each subsequent year the additional salmon would be expected to increase further, as each generation produces more smolts and therefore more fish return. As a result, even small numbers of additional salmon available to spawn can accrue over a number of generations to provide a useful contribution to the sustainability of that river's salmon population.

Table 19: estimates of additional salmon returning to spawn resulting from option 3 (rod fisheries), based on catch levels in 2016

	River	2021 Status	Estimated additional salmon returning to spawn from rod measures:
NE	Coquet	Probably at Risk	195
	Tyne	Probably Not at Risk	291
	Wear	Probably Not at Risk	81
	Tees	At Risk	21
	Esk-Yorks	Probably at Risk	33
Southern	Test	Probably Not at Risk	17
	Itchen	Probably at Risk	20
SW	Avon-Hants	Probably at Risk	19
	Stour	At Risk	0
	Piddle	Probably at Risk	0
	Frome	Probably at Risk	7
	Axe	Probably at Risk	3
	Exe	Probably at Risk	48
	Teign	Probably at Risk	26
	Dart	Probably at Risk	3
	Avon-Devon	Probably at Risk	3
	Erme	Probably at Risk	0
	Yealm	At Risk	0
	Plym	At Risk	1
	Tavy	Probably at Risk	6
	Tamar	Probably at Risk	54
	Lynher	Probably at Risk	6
	Fowey	Probably at Risk	24
	Camel	Probably at Risk	33
	Taw	Probably at Risk	43
	Torridge	Probably at Risk	13
	Lyn	Probably at Risk	1
Midlands	Severn	Probably Not at Risk	26
NW	Ribble	At Risk	89
	Wyre	At Risk	1
	Lune	At Risk	237
	Kent	Probably at Risk	41
	Leven	Probably at Risk	2
	Crake	At Risk	0
	Duddon (& Lickle)	Probably Not at Risk	4
	Esk	Probably at Risk	15
	Irt	Probably at Risk	8

	Ehen	Probably at Risk	34
	Calder	At Risk	2
	Derwent	At Risk	58
	Eden	Probably at Risk	160
	Esk-Border	Probably at Risk	124

Notes:

1. These figures represent the additional salmon estimated to spawn resulting from the introduction of improved catch and release levels together with best practise angling techniques. The 2016 declared rod catch data for that river has been used as the basis for these calculations.
2. The estimates are based on a rivers current (2016) salmon run with the addition of any extra salmon which would be provided as a result of the nets stopping the take of salmon.
3. The above estimates are based on the following assumptions:
 - 100% catch and release applies for rivers that are in the At Risk compliance category.
 - 90% catch and release applies for rivers that are in the Probably at Risk compliance category, unless the 2016 catch and release rate is higher than this, in which case the latter is used.
 - Catch and release rates are maintained at their 2016 levels for rivers that are in the Probably Not at Risk compliance category.
 - Post release mortality following catch-and-release set at 10% (rather than 20% as at present). This takes into account the reduction in mortality that might be achieved by the use of best practice angling techniques.
4. There are a number of rivers (e.g. Hants Avon, Frome, Piddle, Test and Itchen) where 100% catch and release of salmon is already being practiced and a number of the good practice angling techniques are already being applied. The values provided for these rivers are therefore likely to be over-estimates.

For a small number of rivers zero values are given. This is as a result of that river having an existing catch and release rate equal or above that used in the calculations and a very low overall rod catch. Therefore the overall gains in salmon for these rivers is estimated as fractions of a fish and have been recorded as zero.

7.3.2 Angler behaviour: Initial consultation feedback.

The initial consultation did ask ‘would you stop fishing for salmon if the proposed levels of catch and release were implemented?’ Most of the 1,100 responses said that it would not impact on their fishing choices at all. 125 stated that if the proposed measures were implemented, they would stop.

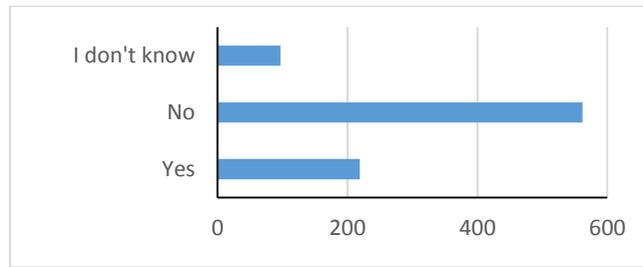
For respondents who answered “No” they typically said that there reasons for this were:

- They enjoyed fishing their local river and wouldn’t want to fish anywhere else.
- The cost of fishing a river further from home would be prohibitive to them.
- They already practice 100% catch and release and therefore wouldn’t want to move to a river were they might be able to take a salmon home.

For respondents who answered “Yes” they typically said that the reasons for this were:

- I would want to be able to take an occasional fish home.
- Only if there was river with lower catch and release requirements close to me because a river with lower catch and release requirements would imply that there is a better opportunity of catching a fish.

The initial consultation posed the question, “would you consider moving to a river where lower levels of catch and release were required?” Almost 900 responses to this question provided the following results:



371 further answers to "If you wish, please provide us with your reasons for your answer".

For respondents who answered "No" they typically said that their reasons for this were:

- They enjoyed fishing their local river and wouldn't want to fish anywhere else.
- The cost of fishing a river further from home would be prohibitive to them.
- They already practice 100% catch and release and therefore wouldn't want to move to a river where they might be able to take a salmon home.

For respondents who answered "Yes" they typically said that their reasons for this were:

- I would want to be able to take an occasional fish home.
- Only if there was a river with lower catch and release requirements close to me.
- A river with lower catch and release requirements would imply that there is a better opportunity of catching a fish.

7.3.3 Consideration of mandatory catch and release on 'at risk' rivers

The mandatory measures will apply to less than 25% of English rivers. This is in comparison to 70% in Scotland and Eire and 100% in Wales. Of the 10 rivers that are classed as 'At Risk', The Rivers Ribble, Lune and Derwent are the most substantial fisheries. All have active fisheries, clubs, syndicates and day ticket waters along most of their lengths.

There is significant concern that there will be a marked decline in angler visits if all fish were required to be returned by byelaw. Currently some clubs already impose 100% catch and release on their members through club rules, and some have waiting lists in respect to membership. However, there is also a strong view that being forced to put fish back will damage the efforts already made and people will stop fishing as the choice has been made for them. A lack in angler visits/membership could damage income and put payment of leases in jeopardy causing businesses to suffer.

7.3.4 Economic considerations

We recognise that anglers fish for salmon for a wide variety of reasons. For some anglers, the enjoyment of the sport and the skill of pursuing an elusive and wary quarry is their prime motive. For others, enjoyment of the outdoors and the tranquil enjoyment of nature are important benefits. We also understand that for some salmon anglers, the option to take a fish home, should they be lucky and skilful enough to land a salmon, is extremely important.

On average 69% of salmon and salmon trout angling is undertaken by home anglers and 31% is undertaken by visitors. The split between home and visitor angling differs substantially between regions. Of the 3 main districts, Northumbria has the greatest number of visitors (15,000) and the greatest proportion of visitors (39%). The South West has 6,300 visitors, 21% of the total for the district and the North West 1,700 visitors, just 7% of the total.*

Where mandatory measures have been brought in on some rivers e.g. River Wye, there were initial reductions in the number of anglers, but these have now recovered. The initial consultation did show regional differences in how anglers would react to mandatory catch and release. For most areas of the country, around 10% stated they would move rivers to those without mandatory catch and release, but in the North West 21% of anglers said they would be prepared to move river.

The catch returns in 2016 show that 78% of all salmon anglers do not catch a salmon. The value of personal enjoyment from recreational rod or net salmon fishing is unique to each individual, and does not have a simple monetary representation. For recreational anglers it is partially informed by answers to the consultation question “Would you stop fishing if the measures were introduced?”, as the inference is that the financial costs then outweigh the value of enjoyment.

From a rod fishery perspective, we are not closing rod fisheries. We are preventing the take of fish where the stocks are the most vulnerable. Given the response to the initial consultation we recognise that further regulation could have an impact on angling. So our approach for Probably at Risk Stocks from 2018 will now require PaR rivers to achieve high voluntary catch and release rates of over 90% in the first instance. Where the 90% catch and release target is not exceeded, we will take decisions on a river-by-river basis whether or not mandatory 100% catch and release should be applied by byelaw. If the current catch and release rate is higher than the proposed rate, then the current rate will be required to be maintained. Fishermen will still be allowed to pursue their sport and the local economies will still benefit from their activity.

On some rivers, negative economic impacts will be realised without these measures in place if stocks continue to decline. Our primary purpose is to protect the salmon stock going forward, and allow exploitation where there is a harvestable surplus

*RPA (2017) “A survey of freshwater angling in England and associated economic activity and value”

Glossary

This glossary has been extracted from various sources, but chiefly the EU SALMODEL report (Crozier *et al.*, 2003⁹) and Environment Agency reports.

Adult - Salmon after the middle of the first winter spent at sea, after which the main categorisation is by sea-age, measured in sea-winters (e.g. grilse, or 1SW; two sea winter, or 2SW).

Anadromous fish - Fish, born in freshwater, that migrates to sea, to grow and mature, and then returns to freshwater as an adult to spawn (e.g. salmon, sea trout).

Catchment - The area of land drained by a river (e.g. River Tyne catchment).

Conservation Limit (CL) - The minimum spawning stock levels below which stocks should not be allowed to fall. The CL for each river is set at a stock size (defined in terms of eggs deposited) below which further reductions in spawner numbers are likely to result in significant reductions in the number of juvenile fish produced in the next generation.

Exploitation - Removal of fish from a stock by fishing.

Fecundity – the number of eggs produced by a female salmon.

Fixed engine (FE) - The term fixed engine is an ancient one used in the UK as a general descriptor of stationary fishing gears.

Fork length - The length of a fish from the tip of its snout to the centre of the fork in its caudal fin (tail).

Fry - Young salmon that have hatched out in the current year, normally in May at the stage from independence of the yolk sac as the primary source of nutrition up to dispersal from spawning areas (redds).

Grilse - An adult salmon that has spent only one winter feeding at sea before returning to freshwater to spawn; normally only applied to salmon in home waters (see also one sea-winter salmon).

Management target (MT) - A spawning stock level for managers to aim at in order to meet the management objective. The 'management objective' used for each river in England and Wales is that the stock should be meeting or exceeding its CL in at least four years out of five (i.e. >80% of the time), on average.

Mixed stock fishery (MSF) - A fishery that predominantly exploits mixed river stocks of salmon. The policy in England and Wales is to move to close coastal net fisheries that exploit predominantly mixed stocks where the capacity to manage individual stocks is compromised. Fisheries, including MSFs, operating within estuary limits are assumed to exploit predominantly fish that originated from waters upstream of the fishery; these fisheries are carefully managed to protect the weakest of the exploited stocks, guided by the decision structure and taking into account socio-economic factors and European conservation status where applicable.

Multi Sea-Winter (MSW) salmon - An adult salmon that has spent two or more winters at sea.

Net Limitation Order (NLO) - Mechanism within the Salmon and Freshwater Fisheries Act 1975 whereby the competent authority may apply to limit the number of nets or traps fishing a particular area.

1-Sea-Winter (1SW) salmon - An adult salmon that has spent one winter at sea (see also grilse).

⁹ Crozier, W.W., Potter, E.C.E., Prevost, E., Schon, P-J. and O'Maoileidigh, N. (editors) 2003. A coordinated approach towards the development of a scientific basis for management of wild Atlantic salmon in the north-east Atlantic (SALMODEL). Queens University of Belfast, Belfast. 431 pp.

Parr - Juvenile salmon in the stage following fry until its migration as a smolt, Salmon parr are typically <16 cm long and have parr-marks (dark vertical bars) on the sides of the body.

Post-smolt - Young salmon, at the stage from leaving the river (as smolts) until the middle of its first winter in the sea.

Pre-fishery abundance (PFA) - The PFA of salmon from England and Wales is defined as the number of fish alive in the sea on January 1 in their first sea winter. This is split between maturing (potential 1SW) and non-maturing (potential MSW) fish.

Production - The assimilation of nutrients to produce growth in a population over a given period.

Reference point - An estimated value derived from an agreed scientific procedure and/or model which corresponds to a state of the resource and/or of the fishery and can be used to assess stock status or inform management decisions.

Run - The number of adult salmon ascending, or smolts descending, a river in a given year. The main smolt run takes place in spring, whereas adult salmon runs may occur in spring, summer, autumn or winter.

Special Area of Conservation (SAC) - An area designated under the EU Habitats Directive (92/43/EEC) giving added protection to identified species and habitats. Where salmon is a "qualifying species", additional protection measures are required specifically for salmon.

Sea age - The number of winters that a salmon has remained at sea.

Sea trout - Anadromous form of the trout (*Salmo trutta*) from the post-smolt stage; the brown trout remains in freshwater throughout its life.

Site of Special Scientific Interest (SSSI) - An area of land notified under the Wildlife and Countryside Act 1981 by the appropriate nature conservation body as being of special interest by virtue of its flora and fauna, geological or physiographical features.

Smolt - The stage in the life cycle of a salmon when the parr undergo physiological changes, become silver in appearance and migrate to sea. Salmon smolts are typically 12–16 cm long and migrate to sea in spring.

Smolt age - The number of winters, after hatching, that a juvenile salmon remains in freshwater prior to emigration as a smolt (this does not, therefore, include the winter in which the egg was laid).

Spring salmon - Multi-sea-winter salmon which return to freshwater early in the year, usually before the end of May.

Stock - A management unit comprising one or more salmon populations, which may be used to describe those salmon either originating from or occurring in a particular area. Thus, salmon from separate rivers are referred to as "river stocks". (N.B. Very large management units, such as the salmon exploited at West Greenland, which originate from many rivers, are often referred to as 'stock complexes').

2 sea winter salmon (2SW) - An adult salmon that has spent two winters at sea.

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