Frequently asked questions (FAQs)

Proposals for new fishing controls to protect salmon and sea trout stocks in the River Usk and the River Wye.

Contents

Fish stocks

Q1. What is the life cycle of the salmon and trout?

Salmon: The salmon (*Salmo salar*) begins life in many of the rivers of Wales. Spawning generally occurs in the autumn and winter, with female salmon depositing around 1,000 and 2,000 fertilised eggs (ova) per kilogram of body weight into a nest (or redd) made in the gravel bottom of rivers.

Hatching occurs the following spring. The young salmon (or alevins) emerge from the gravel as fry to commence feeding. After the first year of life, the young fish are known as parr. Following a period of 1 to 3 years in fresh water, the parr undergo the physiological, morphological and behavioural change, known as smoltification, that allows them to adapt to imminent entry to saltwater as smolts. It is at this point in their life cycle, past the stage of density-dependent population regulation, that predation can be a factor adversely influencing future stock size.

Smolts migrate to the sea in the spring and, after one or 2 and in some rare cases 3 years at sea, return as adult salmon to their rivers of origin to spawn. Most salmon die after spawning with only a small proportion, mainly females, returning to spawn again following another trip to sea.

Trout: Sea trout and brown trout are the same species (*Salmo trutta*). A combination of genetics and environmental factors means that some trout go to sea to feed before returning to spawn. These are known as sea trout or in Welsh sewin. Those that stay in the freshwater environment are known as brown trout.

Spawning generally occurs in the autumn and winter, with female trout depositing around 800 and 1,600 fertilised eggs (ova) per kilogram of body weight into a redd made in the gravel bottom of streams and rivers. Hatching occurs in the spring, and the young trout grow for about 2 years before opting to stay in the river where they can mature as brown trout; or to undergo similar smoltification changes to those of salmon and migrate to sea.

Sea trout smolts generally form shoals and together they to migrate to sea, usually around late March/April and usually at night. It is at this point in their life cycle, past the stage of density-dependent population regulation, that predation can be a factor reducing abundance and adversely affecting future stock size.

Some sea trout return to their natal river to spawn, sometimes after only a few months at sea, as small shoal fish often referred to as 'whitling', whilst others remain at sea for a year before returning. Sea trout typically enter our rivers at any time from April onwards, but most will arrive in the summer (June to August).

Unlike most salmon, sea trout do not usually die after spawning. Around 75% of sea trout return to the sea to feed and then come back again to the river to spawn, sometimes in several successive years.

Q2. Why are salmon and trout stocks important?

Salmon and trout are widely distributed around Wales. There are 23 rivers designated as 'principal salmon rivers'. Many of these rivers are also significant for their sea trout stocks and fisheries and form an important part of our 33 'main sea trout rivers' and fisheries in Wales.

Salmon is a species listed under Annex 2 of the EC Habitats Directive (Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora) and currently contributes to the designations as Special Areas of Conservation (SACs), of 6 rivers in Wales: Wye, Usk, Teifi, Eden Cors Goch - Trawsfynydd, Gwyrfai and Llyn Cwellyn, Dee and Bala Lake. The last SAC condition report by the UK in 2019, reported the status of Atlantic salmon as 'Unfavourable-Inadequate', because both population and future prospects were assessed as inadequate.

Both salmon and sea trout are listed as UK BAP (Biodiversity Action Plan) priority species, and both are currently regarded as most threatened and requiring conservation action.

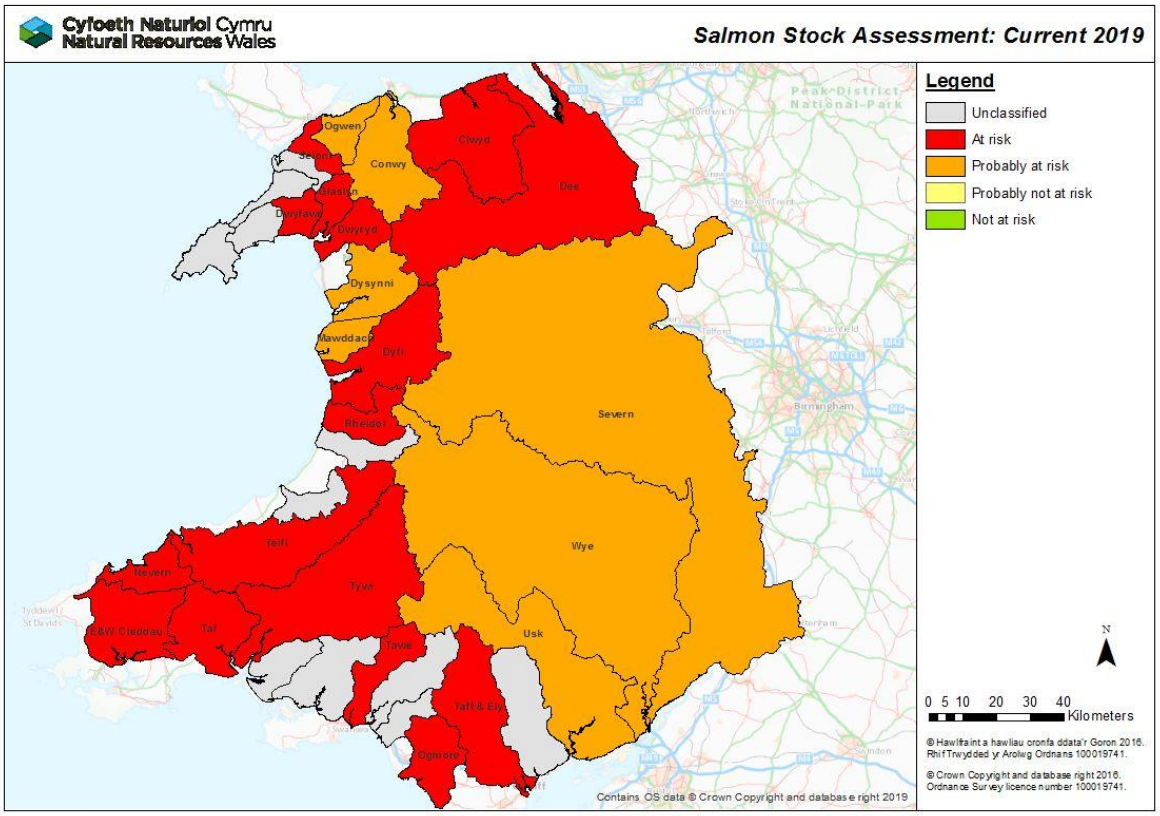
Sustainable salmon and sea trout stocks will support important fisheries in Wales, with high socioeconomic value to communities and the country as a whole.

Q3. Are stocks in the Wye and Usk any different to the rest of Wales?

The status of the salmon and sea trout stocks in the Usk and Wye is similar to that seen across Wales.

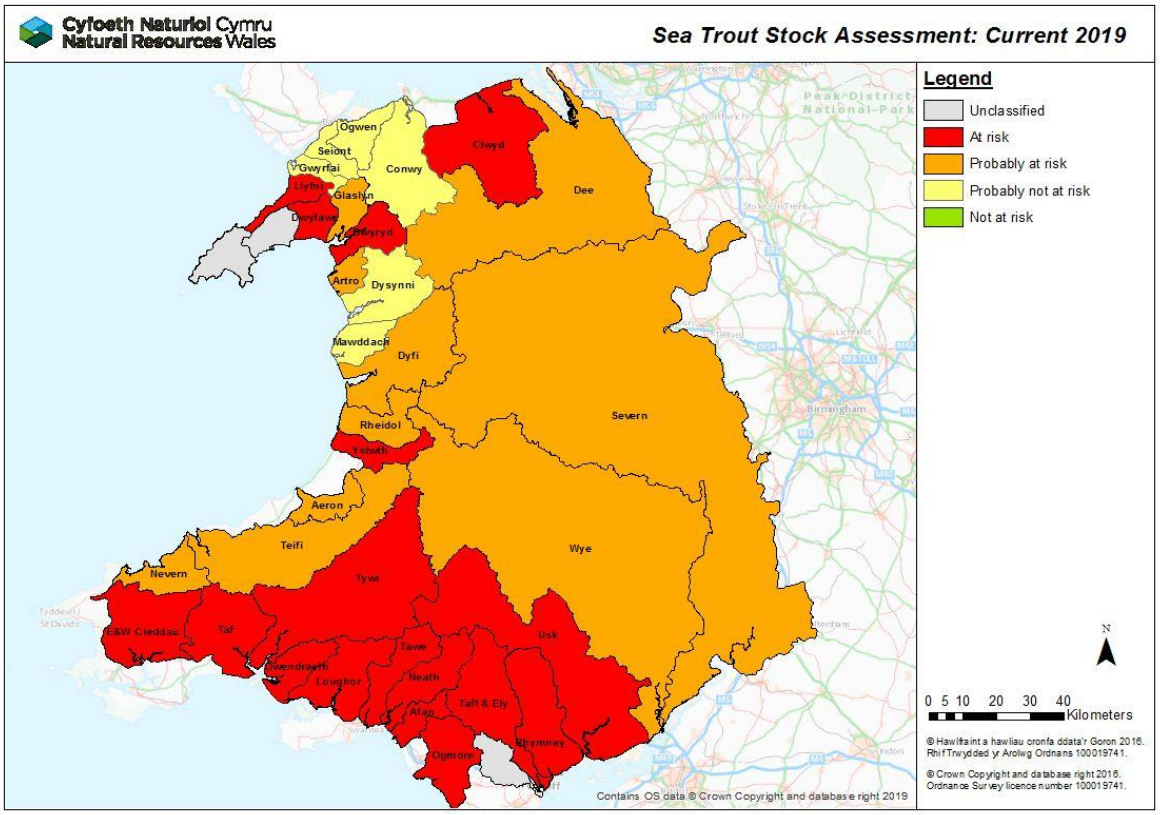
The most recent assessment of our salmon stocks indicates that compliance with conservation limits and management targets across the whole of Wales is very poor. In most cases, stocks are currently performing poorly and are not in compliance with their conservation limits and management targets (Fig. 1). Notably all salmon stocks are in poor condition ('At Risk' or 'Probably at Risk' of failing their management objective). Although this largely reflects an international reduction in stock abundance noted over their range over the past two to three decades, it is important to note that there are also local constraints to the wellbeing of stocks.

Figure 1 'Risk' status for the principal salmon rivers in Wales: 2019 (the most recent definitive data set).



Sea trout stocks are depleted in some areas of Wales, with 27 of the 33 main sea trout rivers in poor condition ('At Risk' or 'Probably at Risk' of failing their management objective). In many cases there are significant egg deficits (Fig. 2).

Figure 2 'Risk' status for the main sea trout rivers in Wales: 2019 (the most recent definitive data set).

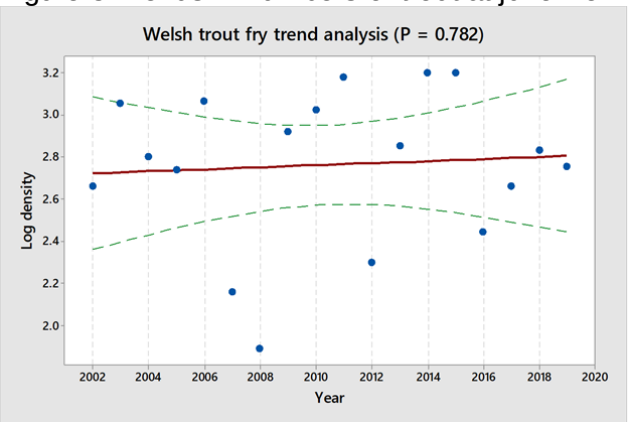


Q4. What is the status of juvenile salmon and trout across Wales?

An annual programme of juvenile salmonid monitoring is carried out to identify spatial variation in juvenile populations and temporal trends in their abundance. This informs local management action whilst also defining the status of the stocks. The habitat at all sites is also assessed such that the abundance of the juvenile salmon population at any site can be compared with standard reference conditions.

While generally trout parr numbers (offspring of both brown and the migratory sea trout) have remained relatively stable (Fig. 3), juvenile salmon numbers (both fry and parr) have continued to decline both in number and spatial distribution throughout Wales (Fig. 4).

Figure 3 Trends in numbers of trout at juvenile monitoring sites (135) throughout Wales.



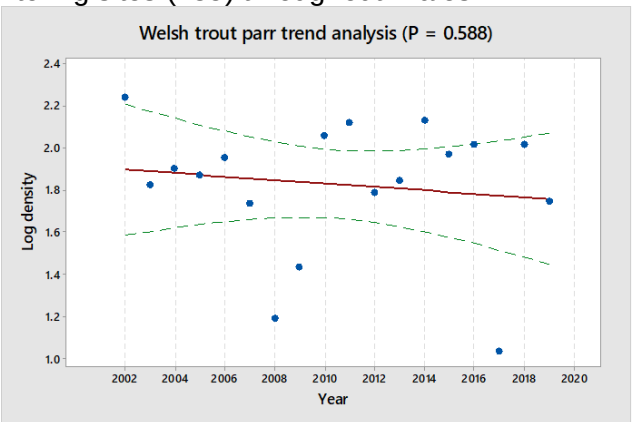
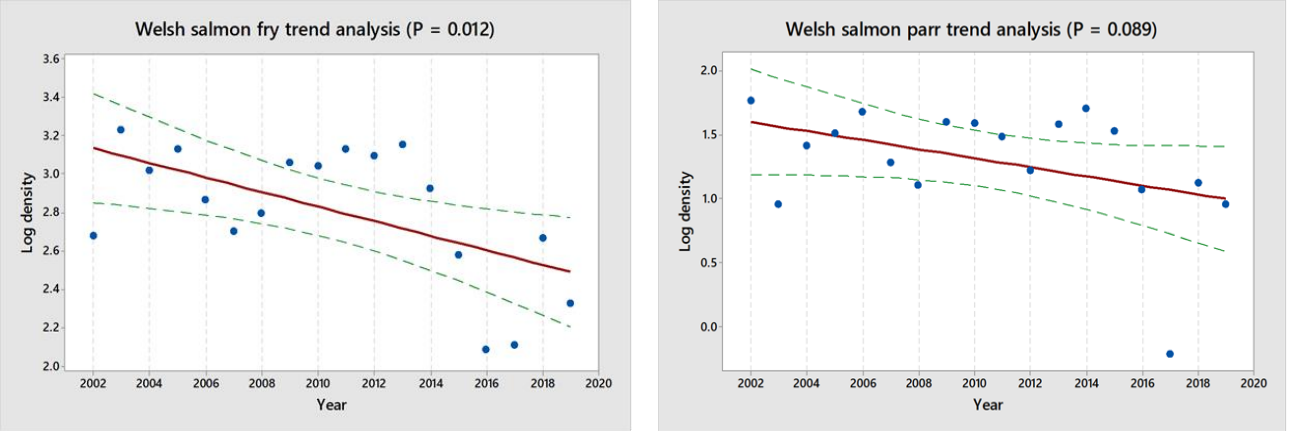
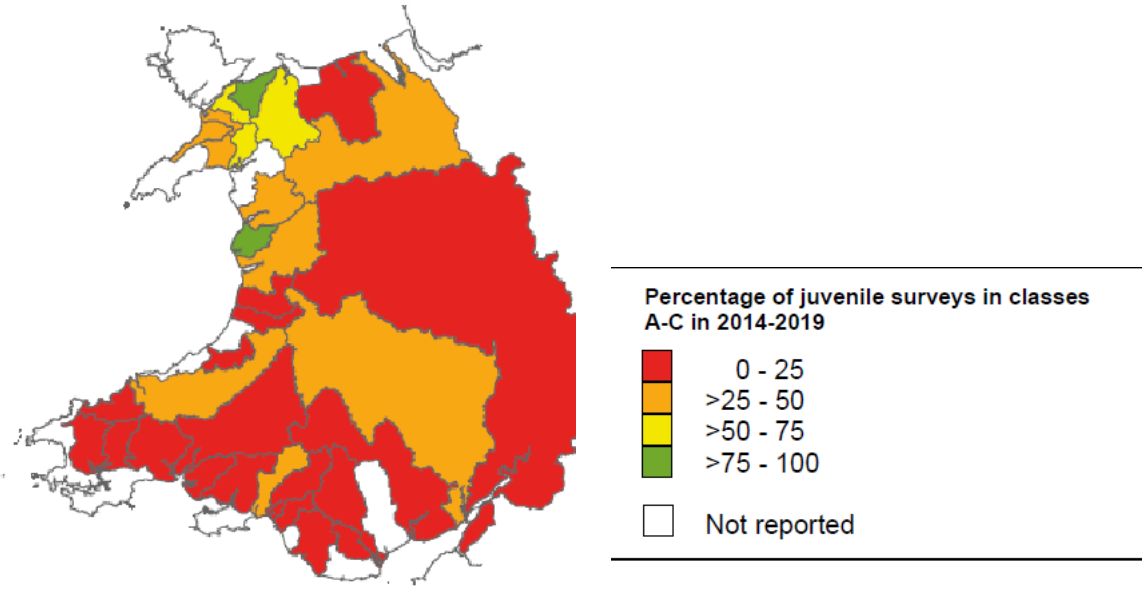


Figure 4 Trends in numbers of salmon at juvenile monitoring sites (135) throughout Wales.



A classification scheme is also applied such that the percentage of sites falling into different salmon abundance classes (Classes A to F) provides a measure of the health of the juvenile salmon populations for each river. Figure 5 presents the percentage of sites in each catchment that fall into the top three categories (Classes A to C) over the period 2014 to 2019. Thus, for catchments shaded red, 25% or fewer sites fall within this category, while for those shaded green, more than 75% of sites are at or above average. Overall, about half (51%) of the sites surveyed over the period were in the lowest two classes (Classes E or F).

Figure 5 Juvenile salmon abundance indices for each catchment, presented as percentage of surveys in classes A to C only, 2014 to 2019.



The results of recent monitoring programmes for juvenile salmonids have given rise to very serious concern. Following the exceptionally wet and warm winter of 2015/2016 there was a broad-scale reduction across Wales in the numbers of 0+ fry in most of the rivers, including near-absence in some, notably the Usk.

Q5. What caused the sudden decline in the number of juvenile salmon on the Usk?

Our annual fish monitoring in 2016 showed a marked reduction in the numbers of salmon and, to a lesser extent, trout fry derived from spawning in the winter of 2015/16. This was most notable on the Usk but was also evident on the Wye. These poor fry numbers were seen to track through into parr numbers in 2017.

The results were unprecedented. The effect was found to be wide scale across Wales and was also evident, to a variable extent, in England, Ireland and France. This implied that a broad-scale common factor was implicated, however other issues may also be of significance on a more local scale.

We consider that the crash of 2016 was due to 2015 having the warmest spawning season yet recorded with record high temperatures for December (Gregory *et al*, 2020). This resulted in water temperatures that have previously been widely reported in the literature to cause spawning failure. There were also several high flow events through this spawning season in the Usk and Wye.

Juvenile salmon numbers have not yet recovered to levels observed prior to 2016 in the Usk and remain of serious concern. Returning adult numbers are also now low and will likely compound the low juvenile numbers.

We have carried out additional monitoring in the Usk since 2016 (although not in 2020 due to Covid restrictions) and have used that evidence to inform our work. We will continue to monitor the Usk and Wye, and to work with the Wye and Usk Foundation (WUF) in ensuring we have a flexible and meaningful surveying network in place, and access to all relevant data.

In 2021 we started a salmon smolt tracking project on the Usk to investigate whether there were any pinch-points to the downstream migration of smolts. The project has given us some good data which we will publish later in this year, and will be supplemented in 2022 and beyond, to build knowledge on factors harming smolt migration, using this to guide future management action.

Stock assessment

Q6. When will the review of stock assessments be complete?

The 1998 Ministerial Direction placed a requirement on the Environment Agency (EA) in England and Wales (whose role and duties for fisheries in Wales have been taken on firstly by NRW) to “ensure that target setting and compliance assessment procedures are regularly revised to take account of improvements in methodologies and new data”. Consequently, NRW, working with the EA and Cefas, are currently undertaking such a review. The commitment to do so is included within the NASCO Implementation Plan for England and Wales which has received ministerial approval and commitment.

The review is currently underway, but amendments have not yet been confirmed. We are reviewing the assessment methodology, as well as the associated compliance scheme

and Decision Structure to consider the need for possible improvements. The aim is to undertake this within the next three years with the likelihood that improvements will be introduced in stages as developments allow. The planned timescale for delivery is 2022.

Q7. Why do you place reliance on catch returns when you assess CL compliance?

Among the approximately 80 principal salmon and sea trout rivers in England and Wales, nine (Tyne, Test, Itchen, Hants Avon, Frome, Tamar, Fowey, Dee, Lune) are currently 'monitored rivers'. As such, they operate counters/traps to provide estimates of the number of salmon (and in some cases sea trout) returning each year.

Four of these rivers – Tyne, Tamar, Dee and Lune – are classed as 'Index Rivers' because of the additional biological information they collect on the stock (e.g. age, length, weight, sex, etc.).

For all principal salmon and sea trout rivers we have catch data. On these, we use figures on angling exploitation rate obtained from our network of monitored (Index) rivers to estimate – from rod catches – the numbers of adult spawners and their egg contribution to assess compliance with Conservation Limits (CLs).

Q8. Is reliance on catch returns to make the assessment flawed? Licence return rates are poor, and anglers may not declare what they catch.

No single source of data is perfect, but that does not necessarily make it unreliable, or mean that it should be discounted.

Catch returns for salmon and sea trout are available for all principal rivers in England & Wales and are among our longest running and most consistent data sets.

Since the introduction of the current national rod catch return system in the early 1990s, the total number of rod licences sold each year in England and Wales has remained relatively stable (average around 33,000) as has the proportion of licensees making a catch return.

Most fish are caught by full and concessionary licence holders whereas short-term and junior licence holders catch very few fish. Taking account of these differences, estimates of the catch declaration rate (i.e. the proportion of the total catch declared) can be made. These estimates average around 90% and have been used as a nationally derived correction factor to produce total rod catch estimates for individual rivers from their declared catch figures. These total catch estimates are used in deriving annual egg deposition figures for assessment of compliance with Conservation Limits.

Catch statistics provide some of the most valuable indicators of stock and fishery performance available. This is evident from (i) the common patterns present in sometimes disparate catch records collected over many years and (ii) the strong relationships that exist between rod catches and the fishery-independent estimates of run size obtained on our monitored rivers.

As such catch records can and do provide unique historical insight into the abundance and composition of salmon and sea trout stocks (e.g. required to explore and understand the effects of long-term processes – such as climate change – which may play out over decades) but are also clearly vital to current stock assessment procedures.

It is essential that catch recording systems remain as consistent and effective as possible in order to maintain the quality of data collected and ensure that the accuracy of associated assessments is not compromised.

Q9. Is the Conservation Limit (CL) ambitious enough?

Figure 1 in the technical case refers to three Biological Reference Points:

1. Conservation Limit (CL)
2. Management Target (MT)
3. Maximum Smolt Output:

The CL is set at the point of 'Maximum Sustainable Yield'; i.e. the point at which (for a given stock-recruitment (SR) curve and replacement line) catches to the fisheries can be maximised.

Below the CL, stocks become increasingly vulnerable and at risk of decline and collapse. Hence our 'management objective' is precautionary and aims to ensure that stocks remain above the CL four years out of five, on average. This equates to the Management Target – a point on the SR curve someway above the CL, which is suitably protective of stocks.

The third reference point – Maximum Smolt Output – could also have been used for stock assessment. This is the most protective of the three reference points as it seeks to allow sufficient fish to spawn to maximise the smolt output from a catchment; hence managing toward this point would require greater constraints on the fisheries.

Q10. What is the Decision Structure?

The Decision Structure (Annex 1) is a simple flow diagram to help identify the level and type of fishery management intervention required to address stocks assessed as formally passing ('not at risk') or failing ('at risk') their Conservation Limits, or in some intermediate position ('probably not at risk', 'probably at risk').

The Decision Structure has been used in salmon fishery management in England and Wales for many years now and so will be familiar to most fisheries interests.

Q11. Why are catches not as high as they used to be despite using CL to manage salmon stocks?

Two main factors are likely to be supressing salmon populations below the levels we have seen historically:

- Poor marine survival – current survival rates are the lowest on record and less than a third of the rate evident approximately 30 years ago. This means, for example, that for every 100 smolts leaving the river, ~approximately five would survive to return as adults today compared to approximately 15 three decades ago. The decline in marine survival has affected salmon stocks across the North Atlantic range, and particularly fish in the southern north-east sector, including England and Wales.

- Poorer environmental quality than predicted by our salmon CL model (which assumes a pristine freshwater environment); i.e. the 'carrying capacity' of catchments in terms of smolt production is less than the 'pristine' benchmark. This is likely to be less universal as a factor than marine survival but could be locally important.

The reduction in marine survival is likely to be driven by adverse environmental conditions at sea which are probably linked to climate change. This is the subject of extensive research across the North Atlantic, including the NASCO SALSEA programme. Of course, there is not much we can do to remedy changing marine environmental conditions (aside from protecting estuarine and in-shore waters from harmful developments or illegal fisheries, etc.), so increased restrictions on fisheries over the past 10-20 years have partly been required to compensate for the reduced marine survival of fish.

Q12. How will NRW account for the decline in anglers in the stock assessments after C&R? Does less fishing mean less fish leading to a false stock assessment?

There is a risk that mandatory C&R measures will deter some anglers from fishing - hence effort, and catches, may fall. However, the proposed measures for C&R are re-instating what is already in place on both the Usk and Wye and has been on the latter since 2012. Evidence from the Wye is that C&R has not led to a marked decline in fishing effort on the river, in fact, days reported fished on the Wye has increased in the last ten years.

In part, methods used to estimate angling exploitation rate (used to derive run size from catch on rivers where there is no fishery independent count of the numbers of returning fish) take account of fishing effort – so should there be a change to fishing effort, this would be accounted for. However, it is widely recognised that these methods need to be improved and work in this area is being progressed.

A second concern is that, on rivers where catches fall to very low levels – either because fewer anglers are fishing and/or because stocks continue to decline, then our assessment methods – which are so dependent on catch – could become unreliable.

One way to address this is to make better use of other, fishery independent, information in the stock assessment process – namely electrofishing (EF) survey data on juvenile abundance. This is the approach used in Ireland, where results from low effort (5-minute) timed EF surveys – which allow a number of sites to be fished on the main catchments each year – are used to trigger the re-opening of fisheries which have been closed due to the poor status of stocks. In this case, a specified threshold (average) count of juvenile fish must be reached before a fishery can be reopened (and catch data become available again for use in stock assessment).

We are exploring options for formally incorporating juvenile EF data in stock assessment procedures. This is likely to involve the routine use of such data alongside catch data – not just when catches fall to very low levels or are even absent.

Q13. Does catch and release work?

The 2020 ICES report states that:

> "Since 1993, rod catches include an increasing proportion of fish that have been caught and released. In 2020, it is provisionally estimated that 10,672 salmon (93% of the catch) were released across England and Wales, the highest percentage ever recorded. Released fish are estimated to have contributed more than 21 million eggs to the breeding population."

The National Spring Salmon Byelaws were part of a number of measures put in place in 1999 to halt the decline in the numbers of spring salmon in our rivers. Since then some rivers are showing a slight increase in the number of spring fish returning (for example the Dee, Severn and the Wye), indicating that this appears to have been a success.

Relatively small numbers of fish can be crucial in order to aid recovery of a stock, and it is noted that there will be cumulative benefit over time. It is therefore essential that spawning stocks are maximized if populations are to have the best chance of recovery.

Proposals

Q14. How long will the proposals last for?

We have proposed that the new measures should be in place until 31st December 2029, with no mid-term review. This date was selected to synchronise dates with the period of the 'All Wales' and 'Cross Border' byelaws that were implemented in January 2020.

Q15. Will any changes be brought into effect for the 2022 fishing season?

The aim is for the measures to be in place for the start of the 2022 season.

Q16. Why bother regulating for such small numbers of fish?

Even relatively small numbers of fish can be crucial in order to aid recovery of a stock, and it is noted that there will be cumulative benefit over time. It is therefore essential that spawning stocks are maximised if populations are to have the best chance of recovery. We have taken the approach that 'every fish matters' if the stock is to return to a sustainable level.

To maintain stocks at a stable level one spawning pair of salmon must, on average, produce one spawning pair in the next generation. In the wild, salmon lay many eggs,

typically around 5,000 per female, as insurance against natural losses and to ensure a surplus production maximising opportunistic use of available habitat and food. From these 5,000 ova, about 4,700 will hatch the following spring as alevins in suitable spawning habitat, but perhaps only 360 will survive as parr by the end of the first year. Of these, only around 50 (1% of the eggs laid) will make it to the sea as smolts. Under 'normal' conditions around 5% of smolts (less than 3 fish) might be expected to return as adults, although current marine survival rates are thought to be lower than this. So, only a small proportion of a salmon's eggs will become adults.

Populations are regulated through density-dependent mechanisms in which mortality can be higher at high population densities, but the survivors fare better at the resulting lower densities. This mechanism ceases during the second year in freshwater, and thereafter any losses are not compensated by this regulatory mechanism. Thus, the mortality of smolts, post-smolts or adult fish at any time is an un-compensated loss to the stock.

Q17. Why didn't we adopt suggested new method restrictions for coarse fishing on the Wye (changes to hooks and banning earthworm)?

These proposals were put forward in the Wye Local Fisheries Group (LFG), but notably not supported by the whole group, as a method of ensuring good rates of post release survival of any salmon caught accidentally by coarse anglers.

There is little evidence of accidental bycatch of salmon by coarse anglers, and our enforcement team are trained and experienced in recognising anglers who are using coarse methods to target salmon illegally.

These proposals could have an unintended adverse impact on coarse angling, which has become increasingly popular and more accessible over the past 20 years in the catchment, supporting many fisheries. There have been objections from some coarse angling representation on Wye LFG and there is no support from the coarse angling community in general.

It was suggested that clubs or waters could apply or be exempted from the proposals, this would however be burdensome to manage and complicated to implement and enforce. There is nothing to stop clubs from implementing these restrictions on their own waters as they see necessary.

Q18. Why not amend the season start-date on the Wye?

A proposal was made by some Wye fishery owners for an earlier start of the salmon angling season as a way of addressing some concerns raised around the loss of fishing opportunities during peak canoe season. It is suggested that a season commencing on January 26th, a start-date prevailing until about 25 years ago, would give opportunities for un-disturbed angling prior to March.

NRW assessed this proposal carefully and, in doing so, considered the potential increase in exploitation of a vulnerable stock, one which is markedly below its Conservation Limit. In this assessment, we concluded that there would be an increased loss of fish to the stock

after post release mortality was accounted for. Whilst this number was not high, even relatively small numbers of fish can be crucial in order to aid recovery of a stock, and it is noted that there will be cumulative benefit over time. Increasing exploitation would not be consistent with our principles or our current approach to the regulation of exploitation. Furthermore, it would not be consistent with NASCO advice and would be unlikely to be acceptable in an HRA (Habitats Regulations Assessment).

The matter of disturbance of angling by canoe activity is one that should rightly be referred to the statutory Wye Navigation Advisory Committee.

Q19. Why propose to end the season a week earlier on the upper Wye (above Llanwrthwl Bridge and in the tributaries) when it won't save many fish?

The end of the season on the River Wye upstream of Llanwrthwl Bridge and in tributaries is currently 26th October, compared to 17th October on the river downstream of Llanwrthwl Bridge. This historic extension to the season recognised the late arrival of fish in the upper reaches but was conceived during a time of relatively high abundance of returning salmon.

The additional weeks' fishing has exploited a component of the stock which has travelled a long way up the catchment, are close to their spawning grounds and in an advanced stage of maturation; the stock is probably better served by preserving these fish.

Whilst it is recognised that not many fish are caught in this final week, the proposal is made on the basis of saving salmon near their spawning grounds and in a late stage of maturation, and also to achieve consistency throughout the catchment.

Q20. Why not extend the shrimp / prawn fishing season on the Usk?

Under the 'All Wales' byelaws, the start of the shrimp / prawn fishing season on all rivers was moved to the 1st September. This was done because shrimp / prawn fishing can be particularly effective in low water conditions during the summer when water temperatures are generally above 18 degrees Celsius. Salmon caught at these temperatures and above have a markedly reduced probability of surviving C&R. No change was made to the end of the shrimp / prawn fishing seasons on any river in Wales.

We acknowledge that a 15 day season for shrimp / prawn fishing on the Usk is shorter than many of the other rivers in Wales, and we assessed the option to increase the season, as suggested in the Usk LFG. In doing so, we had to consider the potential increase in exploitation of a vulnerable stock, one which is below its Conservation Limit. Increasing exploitation would not be consistent with our principles or our current approach to the wider regulation of exploitation. Furthermore, it would not be consistent with NASCO advice and would be unlikely to be acceptable in an HRA (Habitats Regulations Assessment).

Whilst the estimated additional loss to the spawning stock may not seem a lot, relatively small numbers of fish can be crucial in order to aid recovery of a stock, and it is noted that there will be cumulative benefit over time.

Q21. Why not ban shrimp fishing for salmon on the Usk?

Listening to the feedback received from our public engagements, there was little support for the measure to ban shrimp / prawn fishing for the entire season on the Usk. We believe that the method controls introduced in the 'All Wales' byelaws will help to improve post release survival. Furthermore, we concluded in our Equalities Impact Assessment from the 'All Wales' byelaws that "A full bait ban might have a differential impact on anglers who may be elderly or disabled and potentially less able to practice other fishing techniques."

Q22. Why are we not proposing to start the spinning season earlier on the Usk?

It is acknowledged that the Usk is different to most other Welsh rivers in that the spinning season starts later than the fly fishing season. However, in assessing the option proposed at the Usk LFG, we had to consider the potential increase in exploitation of a vulnerable stock, one which is below its Conservation Limit. Increasing exploitation would not be consistent with our principles or our current approach to the wider regulation of exploitation. Furthermore, it would not be consistent with NASCO advice and would be unlikely to be acceptable in an HRA (Habitats Regulations Assessment).

Whilst the estimated additional loss to the spawning stock may not seem a lot, relatively small numbers of fish can be crucial in order to aid recovery of a stock, and it is noted that there will be cumulative benefit over time.

Furthermore, there is a potential risk of a move from fly to spin as method of choice, which is can be less compatible with high levels of catch and release survival.

Q23. Why are we not proposing to delay the start of the spinning season on the River Usk?

The suggestion to delay the start of the spinning season, as put forward in the Usk LFG is not a measure that is consistent with our approach taken in the 'All Wales' byelaws. It would impose additional restrictions on one of the two principal angling methods on the river, one which is already limited in season. The measure was not broadly supported by the Usk LFG, and whilst it is acknowledged that there would be a saving to the stock, it was not a measure that was deemed proportionate.

Q24. Why not go for 100% C&R on sea trout on the Usk?

Whilst we acknowledge that stocks of sea trout are vulnerable in the Usk and that this measure would bring a saving to the stock, we do not think that 100% C&R on the Usk would be proportionate. We did consider the proposal (made at the Usk LFG) carefully, and whilst there are advantages to aligning the river with the measures proposed for the Wye and the Severn, the Usk does differ from these rivers in having a sea trout fishery, albeit a small one. As such, we have sought to align the measures with those taken in most other rivers in Wales under the 'All Wales' byelaws.

Q25. Why not ban worm fishing for sea trout on the Usk?

Whilst we acknowledge that this may have had some benefits to the sea trout stock, it was not deemed to be a proportionate response. It would not have been consistent with the approach taken on most other rivers in Wales, under the 'All Wales' byelaws. It was also noted that there was the potential for confusion and conflict with rules on brown trout fishing, where worm bait is allowed; and there was little support for the measure from the Usk LFG.

Other

Q26. If conditions continue to get worse do you envisage closing fisheries?

Closure of fisheries is considered as an option within the technical case, however this is not a preferred option at the present time. In our approach we have been mindful to maintain socio-economic benefits that would be lost if fisheries were closed.

The proposed measures have a 'sunset' clause of 8 years to coincide with the expiration of the 'All Wales' and 'Cross-border' byelaws. Normally we propose a 10-year period which relates to two full life cycles for the principal age of salmon and is consistent with the approach previously taken.

If stocks improve, such as they are 'Not at Risk' we would look to maximise fishing opportunities which would include the relaxation of fishing control.

Q27. Will licence sales go down as a result of these changes?

We do not anticipate that there will be a marked drop in licence sales or in fishing effort on the Wye or the Usk as a result of these proposals.

The proposed byelaws reinstate the current measures relating to C&R. The Wye has been under C&R restrictions since 2012, during this time, fishing effort has not declined, and has in fact, shown a small increase.

Q28. What are you doing about fish eating birds?

In response to concerns over fish eating birds (FEBs), NRW set up an FEB external advisory group. This is a well-established group with balanced representation between fisheries and bird conservation NGOs and is supported by two independent scientific advisors – one each on fish and bird population dynamics. Membership also includes Welsh Government and Natural England; the group is administered by NRW.

The group is working on an evidence-led process that would potentially result in new policy in this important area of work. Recent work has seen implementation of full catchment FEB surveys in 10 of the most important salmonid catchments across Wales. A subsequent full survey in one of these rivers during the smolt migration season was scheduled alongside a

smolt telemetry study, and the evidence from this will be important to any future policy proposals.

The broader survey has been used to generate population estimates of cormorant and goosander in Wales. The evidence will also be used to develop catchment-specific FEB population models that will be used to explore various scenarios of control as an aid to salmonid conservation action and to prevent serious damage to still-water fisheries in Wales.

Regular updates from the FEB advisory group are given at the Welsh Fisheries Forum (WFF) and Local Fisheries Group (LFG) meetings.

Q29. Other issues are threatening fish abundance what are you doing to tackle these?

It is acknowledged that catches are not the causative issue around poor and vulnerable stocks, and the more relevant of these are discussed below. However, killing of fish whilst stocks are unsustainable cannot be allowed to continue and threaten stocks further. We have therefore followed international advice on managing fish stocks.

Climate change: Complex and far-reaching, climate change impacts both the marine and freshwater habitats and phases of the salmon and trout's life cycle through changes in water temperature, habitat quality and survival at sea. Salmon have been described as one of the most vulnerable species to climate change.

Salmon and trout are fundamentally a cold water species, and this governs their geographical distribution.

The overall projection for Wales is for warmer and drier summers, and warmer and wetter winters. There is much uncertainty, however key issues are emerging: increasing air temperatures will lead to increases in surface water temperature, and as this occurs a number of negative effects on salmon may arise. Direct biological impacts on salmon include physiological stress, increased depletion of energy reserves, increased susceptibility and exposure to disease, and disruptions to breeding efforts.

Taken together these changes place stress on both species and have a critical effect on particularly sensitive stages of their lifecycle, notably reproduction. We are already observing these impacts.

Habitat degradation: Activities such as intensive agriculture, some forestry operations and localised gravel extraction and commercial substrate removal for drainage schemes can alter a river's structure, increase sedimentation and reduce the quality of salmonid habitat. Additionally, water extraction and hydro-regulation can greatly alter a river's hydrology, with the changes in river flow, temperature and quality having a negative impact on the productivity of salmonid populations.

Predators: Predation occurs both in freshwater and at sea with a variety of birds, other fish and mammals all feeding on salmon during different life stages. Predation is a naturally occurring phenomenon, but issues arise when fish numbers are low or migrations

are restricted by barriers, and when predator numbers are unnaturally high due to human intervention or shifting ecosystem conditions.

Predation on the various life stages can be critical, however it is during the freshwater juvenile stages where impacts are potentially greatest. Data from monitored rivers suggests that the capacity for population compensation mechanisms of both salmon and trout, minimising the impact of predation losses, diminishes after the fry and early parr stage, and ends before the smolt stage. It is therefore during the critical smolt stage and their migrations that the highest levels of impact may occur. This is of greatest concern.

Migration barriers: Migration from river to sea and back again is a key part of the salmon and sea trout's life cycle, but it is a journey made even more challenging by the many weirs, dams, tidal barrages, hydro-electric projects, culverts, bridge aprons and sills that block or impede their path. Even with fish passes and easements in place to help them move around these barriers, there are often migratory delays that cause risk of failed migration to important areas of habitat, and these bottlenecks can represent predation 'hotspots'.

Water quality (pollution): Water pollution is a major cause of the decline in stocks, with all life stages of fish affected both directly (through exposure to chemicals and acidified waters) and indirectly (through runoff causing eutrophication of aquatic habitats) in fresh water and the ocean.

Sustainable exploitation: Over-exploitation occurs when too many fish are removed from a population in freshwater or marine environments, leading to that population falling below a sustainable level. Ultimately, this results in fewer returning adult females laying fewer eggs and a far less resilient population.

NRW has in recent years introduced a suit of measures to reduce exploitation of unsustainable stocks by both anglers and netsmen.

Diseases and parasites: Of the 80 or so diseases and parasites that affect salmon, only a few have been documented to have significant impacts on wild populations. Furunculosis (a bacterial disease), Gyrodactylus salaris (a type of parasitic flatworm) and Ulcerative Dermal Necrosis (a skin disease) are three that have decimated populations in specific areas. All are very rare or currently absent from Wales and the UK, however new conditions often arise, e.g. Red Skin Disease.

Invasive species: Some evidence exists of negative effects of certain invasive species on wild salmon and trout populations, with general worldwide increases in the introduction and spread of non-native and invasive plants and animals (e.g. non-native fish species, Japanese knotweed, and some pathogens). This pressure might become even more important in the future through climate change, increasing competition, predation and disease.

Q30. What is the 'Plan of Action for Salmon and Sea Trout 2020'?

This plan sets out the issues and actions to which NRW is committed in order to secure the protection and restoration of populations of salmon and sea trout in Welsh rivers.

Both are iconic species, requiring high quality freshwater habitats to thrive. They demonstrate to society the environmental quality of our catchments, whilst also providing important opportunities for healthy and valuable recreation.

Read the 'Salmon and sea trout plan of action for Wales 2020'

In common with most other countries across the North Atlantic distribution of salmon and the European range of sea trout, populations have declined over the past few decades. This has been most evident for salmon, but recently a sharp decline in Welsh sea trout stocks has also occurred.

The Plan indicates that Welsh Government, NRW and our partners and stakeholders understand the current severity of the status of salmon and sea trout stocks and the multiple factors affecting them, and that together we will take steps to address and resolve these.

Q31. Stocking would increase the number of fish returning to Welsh rivers, so why did NRW ban stocking?

A full review of stocking and its impacts and potential risk was carried out by NRW in 2014 and as a result of the potential negative impacts all salmon and sea trout stocking was brought to a close. No further stocking schemes, other than those confirmed to be required for closely specified and targeted research and, in very extreme cases, restoration will be permitted.

Q32. What do I do with a dead or dying fish?

It is unfortunately an inevitability that there will occasionally be a mortality from angling. This is an accepted consequence, although we hope that the frequency of this will be very low – especially given the method control set out in the ‘All Wales’ and ‘Cross Border’ byelaws ensuring risks to released fish are minimised.

Our experience on the Wye for the past 10 years and elsewhere is happily that the immediate mortality of rod-caught fish is low.

The risks around keeping rivers open and allowing fishing to continue maintains the social and economic benefits whilst trying to protect stocks in the river.

If a fish dies after capture the fish should be left in the river and the angler should phone our customer care centre (0300 0653000). If we can, we will collect the carcass from the river. We may be able to get valuable biological information from the carcass.

Q33. What is the point in responding to the consultation when you have already made up your minds?

We have sought to engage widely with stakeholders in our informal liaison at meetings of the Usk and Wye LFGs. We have contributed to debate and listened carefully to all views and the final proposals put forward by the Groups, carefully assessing each option.

We have made our byelaw proposals as the best option for protecting the vulnerable salmon and sea trout stocks on the Usk and Wye, whilst also allowing fishing to continue maintaining much of the socioeconomic benefits.

We will consider all additional information arising from the consultation and respond to representations received in response to our proposals. Any evidence provided in representations that is new or different to that which we have used in our assessments will be considered and, if appropriate, the proposals may be changed. In adopting or declining new proposals, we will seek to fully address questions and to encourage objections to be withdrawn. All extant objections will be included in our consultation report and request for approval submitted to the WG Minister.

Q34. Where can I get more information?

If you have any queries, please contact us on 0300 065 3000 or by emailing

Fisheries.Wales@cyfoethnaturiolcymru.gov.uk

References

Gregory, S.D., Bewes, B.E., Davey, A.J.H., Roberts, D.E., Gough, P. and Davidson, I.C. (2020). Environmental conditions modify density-dependent salmonid recruitment: Insights into the 2012 recruitment crash in Wales. Freshwater Biology 2020;00:1-19. DOI:10.1111/fwb.13609.

Read more about the precautionary approach adopted by NASCO and its parties

Read the NASCO Implementation Plans and Annual Progress Reports