

# **Technical case supporting a public consultation on proposals for new net fishing controls to protect salmon and sea trout stocks on the River Dee**

Report No: 847

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## About Natural Resources Wales

Natural Resources Wales' purpose is to pursue sustainable management of natural resources. This means looking after air, land, water, wildlife, plants and soil to improve Wales' well-being, and provide a better future for everyone.

## Evidence at Natural Resources Wales

Natural Resources Wales is an evidence-based organisation. We seek to ensure that our strategy, decisions, operations and advice to Welsh Government and others are underpinned by sound and quality-assured evidence. We recognise that it is critically important to have a good understanding of our changing environment.

We will realise this vision by:

- Maintaining and developing the technical specialist skills of our staff;
- Securing our data and information;
- Having a well-resourced proactive programme of evidence work;
- Continuing to review and add to our evidence to ensure it is fit for the challenges facing us; and
- Communicating our evidence in an open and transparent way.

This document is the Technical case produced by Natural Resources Wales to support decisions on new fishing regulations on the River Dee net fisheries. It contains background, evidence and an appraisal to identify the preferred option to secure the future for our important salmon and sea trout stocks on these two rivers. It forms part of a collection of documents supporting a public consultation:

[See our public consultation](#)

[Ewch i'n hymgyngoriad cyhoeddus](#)

Report series: NRW Evidence Report

Report number: 847

Publication date: 18 December 2024

Title: **Technical case supporting a public consultation on proposals for new net fishing controls to protect salmon and sea trout stocks on the River Dee**

Author(s): **D Mee, I Davidson, R Pierce and K Marshall**

Technical Editor: B Wilson

Quality assurance: Tier 2, Ben Wilson

Peer Reviewer(s) Ben Wilson

Approved By: B Wilson

Restrictions: None

## **Distribution List (core)**

NRW Library, Bangor 2

National Library of Wales 1

British Library 1

Welsh Government Library 1

Scottish Natural Heritage Library 1

Natural England Library (Electronic Only) 1

## **Recommended citation for this volume:**

Mee D., Davidson I., Pierce R., Marshall K., (2024). Technical case supporting a public consultation on proposals for new net fishing controls to protect salmon and sea trout stocks on the River Dee. NRW Report No: 847, 88pp, Natural Resources Wales, Cardiff.

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## Crynodeb Gweithredol

Mae'r ddogfen dechnegol hon yn cyflwyno'r achos dros adnewyddu a chyflwyno rheolaethau pysgota i ddiogelu stociau o eogiaid a brithyllod y môr yn afon Dyfrdwy. Mae'n gosod cynigion ar gyfer is-ddeddfau newydd i reoleiddio pysgodfeydd rhwydi yn aber afon Dyfrdwy. Mae hyn yn dilyn adolygiad o'r dystiolaeth o statws stoc a'r pryderon parhaus ynghylch statws poblogaethau pysgod ifanc.

Mae gan Cyfoeth Naturiol Cymru (CNC) ddyletswydd i reoleiddio pysgodfeydd salmonidau mudol cyhoeddus gan ddefnyddio gorchmynion cyfyngu ar rwydi ac is-ddeddfau. Diffinnir gorchmynion cyfyngu ar rwydi o dan adran 26 o Ddeddf Pysgodfeydd Eogiaid a Dŵr Croyw 1975, ac maent yn rheoli nifer y trwyddedau a roddir i bysgodfeydd rhwydi ar gyfer eogiaid a brithyllod y môr. Rhaid adnewyddu gorchmynion cyfyngu ar rwydi o fewn deng mlynedd a gallai methu â gwneud hynny arwain at bysgodfa heb rwystr, h.y. ni fyddai unrhyw gyfyngiad ar nifer y trwyddedau rhwydi.

Roedd stoc eogiaid afon Dyfrdwy yn is na'i therfyn cadwraeth bron bob blwyddyn yn y 2000au cynnar, ac yn dilyn adolygiad yn 2005 o orchymyn cyfyngu ar rwydi afon Dyfrdwy, cyflwynwyd gorchymyn lleihau o sero ar sail cadwraeth.

Mae pysgodfa afon Dyfrdwy yn cynnwys rhwydi sân a thriphlyg, gan dargedu eogiaid yn bennaf a dim ond dal nifer fechan o frithyllod y môr. Mae gorchymyn cyfyngu ar rwydi presennol afon Dyfrdwy yn dod i ben ar 30 Mehefin 2025 ac mae ar gyfer dim trwyddedau, gan adlewyrchu'r angen i warchod eogiaid a brithyllod y môr.

Yn nhymor cyntaf gorchymyn 2005, cyhoeddwyd 13 o drwyddedau rhwyd sân a phedair trwydded rhwyd driphlyg. Ariannodd buddiannau genweirio afon Dyfrdwy brynant llawn o'r bysgodfa rwydo, gan gyflymu'r dirywiad mewn gweithgaredd rhwydo – roedd y trwyddedau pysgodfeydd rhwydi sân a thriphlyg yn sero erbyn 2008 a 2009, yn y drefn honno. Hysbysebwyd a gweithredwyd y gorchymyn cyfyngu ar rwydi (dim trwyddedau) presennol yn 2015; heb gynnal unrhyw drwyddedau, fe ddaw i ben ym mis Mehefin 2025.

Mae natur drawsffiniol afon Dyfrdwy yn golygu bod angen i CNC weithio gydag Asiantaeth yr Amgylchedd a, thrwyddynt hwy, Adran yr Amgylchedd, Bwyd a Materion Gwledig (Defra) a Natural England (NE), wrth adolygu a hysbysebu gorchymyn cyfyngu ar rwydi afon Dyfrdwy.

Yn ystod y degawdau diwethaf, mae statws y rhan fwyaf o'n stociau o salmonidau mudol yng Nghymru wedi dirywio ac nid yw afon Dyfrdwy yn eithriad. Mae ystod gymhleth o ffactorau wedi cyfrannu at hyn, gan gynnwys llai o bysgod yn goroesi yn y môr, pwysau ar gynefinoedd dŵr croyw (gan gynnwys ansawdd dŵr a diraddio cynefinoedd), pysgota anghynaliadwy yn y môr mawr yn y gorffennol, a physgodfeydd rhyng-gipioli eraill, gan gynnwys rhai pysgodfeydd mewn dyfroedd domestig. Mae rhai o'r pwysau hyn wedi cael sylw neu wedi'u dileu, gan gynnwys cyflwyno gorchymyn sy'n gorfodi dal a rhyddhau pob eog yng Nghymru. Serch hynny, nid yw stociau wedi dychwelyd i lefelau hanesyddol, na hyd yn oed i lefelau cynaliadwy a fyddai'n caniatáu manteisio arnynt a'u cynaeafu.



Dyma ein hamcan cyffredinol ar gyfer eogiaid a brithyllod y môr:-

***“Diogelu cynaliadwyedd ein cyflenwad naturiol o stociau eogiaid a brithyllod y môr gwyllt yng Nghymru drwy gymhwyso’r arferion gwyddonol a rheolaeth gorau.”***

Ein safbwynt ni yw mai dim ond pan fydd lefelau’n gynaliadwy y dylid manteisio ar stociau. Hyd nes y bydd stociau uwchben terfyn cadwraeth diogel, ni ellir caniatáu manteisio arnynt.

Mae afon Dyfrdwy wedi’i dynodi’n Ardal Cadwraeth Arbennig (ACA) o dan y Gyfarwydddeb Cynefinoedd, gydag eogiaid yn un o’r nodweddion dynodi.

Os na chaiff cyfyngiadau newydd (gorchymyn cyfyngu ar rwydi neu is-ddeddfau) eu rhoi ar waith ar gyfer tymor Mehefin 2025 ymlaen, mae perygl na fydd stociau bregus o eogiaid a brithyllod y môr yn afon Dyfrdwy yn cael eu hamddiffyn cystal. Wrth werthuso opsiynau rheoli, dylai cadwraeth a chynaliadwyedd hirdymor adnoddau eogiaid a brithyllod y môr gael blaenoriaeth dros ystyriaethau economaidd-gymdeithasol er budd cenedlaethau’r dyfodol.

Pe bai’r cynigion yn cael eu cadarnhau a’u gweithredu, byddai is-ddeddfau’n cael eu cyflwyno i gau’r pysgodfeydd rhwydi sân a thriphlyg yn aber afon Dyfrdwy.

Mae Cyfoeth Naturiol Cymru bellach yn ceisio barn ar y cynigion hyn.

## Tystiolaeth

Rydym wedi ystyried tair prif ffynhonnell dystiolaeth wrth bennu’r opsiwn a ffefrir gennym ar gyfer newid mewn rheoli:-

- Statws stociau eogiaid a brithyllod y môr llawndwf
- Statws eogiaid fel nodwedd ddynodedig ACA Afon Dyfrdwy
- Statws stociau eogiaid a brithyllod ifanc

Ar gyfer y ddwy rywogaeth, yr asesiad llawndwf yw’r prif ddull o werthuso statws stociau a llywio’r ymateb rheoli trwy’r strwythur penderfynu.

## Eogiaid

Mae’r asesiad diweddaraf o’n stociau eogiaid yn dangos bod afon Dyfrdwy ar hyn o bryd ‘mewn perygl’ o fethu â chyflawni ei hamcanion rheoli (yn 2023) a rhagwelir y bydd ‘mewn perygl’ ymhén pum mlynedd (yn 2028). Yn seiliedig ar lefelau dyddodi wyau cyfartalog dros y pum mlynedd diwethaf (2019–2023), mae stoc afon Dyfrdwy wedi cofnodi diffygion yn erbyn ei tharged rheoli dangosol o -9.35 miliwn o wyau (-53%). Mae’r diffygion hyn yn cyfateb yn fras i -3,117 o bysgod llawndwf (pysgodyn yn pwyso wyth pwys).

Roedd statws eogiaid fel nodwedd ddynodedig o ACA Afon Dyfrdwy yn 'anffafriol' yn y cylch diweddaraf o asesiadau cyflwr a gyhoeddwyd (Milner ac eraill, 2013), a ysgogwyd yn bennaf gan rediadau llawndwf gwael.

## Brithyllod y môr

Mae'r asesiad diweddaraf o'n stociau o frithyllod y môr yn dangos bod stoc afon Dyfrdwy ar hyn o bryd 'mewn perygl' o beidio â chyrraedd ei therfynau cadwraeth a rhagwelir y bydd dal 'mewn perygl' yn 2028. Yn seiliedig ar lefelau dyddodi wyau cyfartalog dros y pum mlynedd diwethaf (2019–2023), mae stoc afon Dyfrdwy wedi cofnodi diffyg o -2.68 miliwn o wyau (-26%), wedi'i gyfrifo yn erbyn targed rheoli dangosol o ~10.19 miliwn o wyau. Mae'r diffyg hwn yn cyfateb yn fras i 1,339 o hwyfelloedd (pysgodyn yn pwyso tri phwys).

## Salmonidau ifanc

Mae archwiliad o ddata arolwg electrobysgota ifanc ar gyfer afon Dyfrdwy yn dangos bod lefelau cynhyrchu silod mân eogiaid yn is na'r disgwyl yn ystod y deng mlynedd diwethaf ond yn gyffredinol mae niferoedd da o silod mân brithyllod. Mae'r arsylwad cyntaf yn cyd-fynd â statws diffygiol hwyfelloedd eogiaid, ond mae'r olaf yn awgrymu lefelau stoc iachach na'r hyn a ddangoswyd o ddychweliadau brithyllod y môr llawndwf. Bydd stociau brithyllod ifanc hefyd yn cynnwys y pysgod hynny sy'n aros yn yr afon fel brithyllod preswyl.

## Opsiynau ar gyfer rheoli pysgodfa rhwydi afon Dyfrdwy i gynnal ac adfer stociau

Rydym wedi ystyried y prif opsiynau canlynol:

- **Opsiwn 1 – Gwneud dim (pysgodfa agored)**

Gyda'r opsiwn hwn, byddai'r bysgodfa ar afon Dyfrdwy yn cael ei hailagor gyda nifer anghyfyngedig o drwyddedau ar gael o bosibl.

Mae'r dystiolaeth yn glir ar gyfer statws presennol a rhagamcanol stociau eogiaid a brithyllod y môr: maen nhw 'mewn perygl'. Er bod is-ddeddfau presennol yn diogelu eogiaid rhag cael eu cymryd, byddai pysgodfa rhwydi agored yn lleihau amddiffyniad stociau eogiaid a brithyllod y môr, gan gynyddu'r risg i'w poblogaethau.

Nid yw pysgodfa agored yn cydymffurfio â'n dyletswyddau cenedlaethol a rhyngwladol, ein harweiniad sefydliadol, ein dulliau gweithredu, na'n strwythur penderfynu.

Nid yw hwn yn opsiwn hyfyw.

- **Opsiwn 2 – Adnewyddu'r gorchymyn cyfyngu ar rwydi (dim trwyddedau) am ddeng mlynedd**

Mae'r opsiwn hwn yn cynnal y dull presennol, gan gadw'r cyfyngiadau presennol ar waith gyda dim cynaeafu rhwng 2025 a 2035.

Mae'n cyd-fynd ag amcanion llesiant corfforaethol CNC o dan 'natur yn gwella' ac yn cydymffurfio â'n dyletswyddau cenedlaethol a rhyngwladol.

Nid yw adnewyddu gorchymyn cyfyngu ar rwydi (dim trwyddedau) yn mynd i'r afael â'r ansicrwydd hirdymor a wynebir gan boblogaethau eogiaid a brithyllod y môr, sy'n prinhau.

Mae'n gadael yr opsiwn i adolygu ac o bosibl ailagor y bysgodfa ymhen deg mlynedd, ond gyda'r cynnydd yn y pwysau ar stociau eogiaid, rydym yn annhebygol o weld lefelau cynaeafu yn dychwelyd yn ystod ein hoes.

Mae hwn yn opsiwn hyfyw ond nid yw'n effeithiol o ran amddiffyniad yn wyneb ansicrwydd hirdymor a phwysau ar stociau eogiaid a brithyllod y môr sydd eisoes yn agored i niwed.

- **Opsiwn 3 – Cau'r bysgodfa (is-ddeddf)**

Mae'r opsiwn hwn yn rhoi amddiffyniad tebyg i stociau eogiaid a brithyllod y môr ag Opsiwn 2 dros y deg mlynedd nesaf. Fodd bynnag, mae'n dileu'r gofyniad am adolygiadau o'r gorchymyn cyfyngu ar rwydi yn y dyfodol a gweinyddu'r gorchymyn cyfyngu ar rwydi a chydymffurfio ag ef yn y dyfodol.

Mae'n cyd-fynd ag amcan llesiant cynllun corfforaethol CNC o ran 'natur yn gwella' ac yn cefnogi ein canllawiau, a'n dyletswyddau cenedlaethol a rhyngwladol.

Gyda'r statws presennol a rhagamcanol 'mewn perygl' ar gyfer ein stociau eogiaid a brithyllod y môr yn afon Dyfrdwy, mae cau'r bysgodfa yn rhoi amddiffyniad gwell ar gyfer ansicrwydd newid hinsawdd yn y dyfodol a phwysau cynyddol ar eu poblogaethau.

Mae adferiad y stociau i lefelau gwarged y gellir eu cynaeafu yn ymddangos yn hynod annhebygol yn y dyfodol rhagweladwy; fodd bynnag, byddai opsiwn yn bodoli i ddirymu'r is-ddeddf ac ailagor y bysgodfa pe bai hyn yn digwydd.

Mae'r opsiwn hwn yn ymarferol ac yn rhoi mwy o sicrwydd a diogelwch tymor hwy i'r stociau o eogiaid a brithyllod y môr ar afon Dyfrdwy.

**Effeithiau economaidd-gymdeithasol:** Gan nad oes pysgodfeydd rhwydi wedi bodoli yn ystod y 15 mlynedd diwethaf, ni fu unrhyw fudd economaidd-gymdeithasol i'r cymunedau lleol o'r gweithgaredd hwn ac ni fydd cau'r bysgodfa yn newid hyn. Bydd manteision y mesurau arfaethedig yn cyfrannu at gadw stociau eogiaid a brithyllod y môr yn rhannau Cymreig afon Dyfrdwy a'u gwydnwch yn y dyfodol.

**Ymgynghori anstatudol – ymgysylltu a chydgyssylltu â rhanddeiliaid:** Mae CNC wedi trafod y cynigion gyda'r rhanddeiliaid pysgodfeydd lleol. Yng Ngrŵp Cynghori Pysgodfeydd Lleol y Gogledd a Fforwm Pysgodfeydd Cymru, ceisiasom farn a chynghor ar reoli pysgodfeydd rhwydi ar afon Dyfrdwy, gan ystyried statws y stociau cynhaliol.

Roedd cefnogaeth eang gan y ddau grŵp i gau'r bysgodfa rhwydi trwy is-ddeddf. Nid oedd unrhyw gefnogaeth i adnewyddu'r gorchymyn cyfyngu ar rwydi gyda dim trwyddedau, na chwaith i adael i'r gorchymyn cyfyngu ar rwydi presennol ddod i ben, heb fesurau yn eu lle i sicrhau na fyddai stociau eogiaid a brithyllod y môr afon Dyfrdwy yn cael eu hecsbloetio ymhellach.

Ein casgliad yw:

Yr opsiwn a ffeirir yw Opsiwn 3, sef cau'r bysgodfa drwy is-ddeddf. Hwn sy'n darparu'r amddiffyniad mwyaf rhag yr ansicrwydd a wynebir gan stociau eogiaid a brithyllod y môr yn afon Dyfrdwy yn y dyfodol ac mae'n cyd-fynd â'n hamcan cyffredinol "i amddiffyn, trwy gymhwyso arferion gwyddoniaeth a rheolaeth gorau, gynaliadwyedd ein hadnodd naturiol o stociau eogiaid gwyllt a brithyllod y môr yng Nghymru".

## Ein cynigion

Rydym yn cynnig ceisio cadarnhau is-ddeddfau newydd ar gyfer pysgota rhwydi yn aber afon Dyfrdwy, gan gau'r bysgodfa bresennol i bob pwrpas.

## Afon Dyfrdwy

### **Is-ddeddfau Eogiaid a Brithyllod y Môr (Gwahardd Pysgota â Rhwydi) (Afon Dyfrdwy) (Cymru) 2025**

Is-ddeddf 4 – Gwahardd pysgota â rhwydi am eogiaid neu frithyllod y môr ar afon Dyfrdwy.

Noder: Mae CNC yn gweithio gydag Asiantaeth yr Amgylchedd ar yr achos technegol ac is-ddeddfau pysgota â rhwydi ar gyfer afon Dyfrdwy ac yn ceisio sicrhau is-ddeddfau cymesur ar gyfer afon Dyfrdwy yn Lloegr, a thrwy hynny sicrhau dull dalgylch cyson ar gyfer yr afon drawsffiniol.

## Eich ymateb

Hoffem glywed eich barn am ein cynigion a'ch gwahodd i gyflwyno'r rhain gan ddefnyddio'r ffurflen sydd wedi'i chynllunio at y diben sydd ar gael drwy ein canolfan ymgynghori.

[Ymateb i'r ymgynghoriad](#)

Gallwch ofyn am gopiâu o'r dogfennau drwy e-bostio [fisheries.wales@naturalresourceswales.gov.uk](mailto:fisheries.wales@naturalresourceswales.gov.uk) neu drwy ysgrifennu at

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Dylai ymatebwyr nodi'n ofalus y bydd sylwadau i'r ymgynghoriad hwn ar drefniadau yng Nghymru yn cael eu derbyn gan Cyfoeth Naturiol Cymru. Bydd yr ymgynghoriad ar gyfer afon Dyfrdwy yn Lloegr yn ymgynghoriad gwahanol a bydd sylwadau i hwnnw'n cael eu derbyn naill ai gan Asiantaeth yr Amgylchedd neu gan Defra.

## Executive summary

This technical document sets out the case for the renewal and introduction of fishing controls, to protect stocks of salmon and sea trout in the River Dee. Setting out proposals for new byelaws to regulate the net fisheries in the Dee Estuary. This follows a review of the evidence of stock status and the continued concerns over the status of juvenile fish populations.

Natural Resources Wales (NRW) has a duty to regulate public migratory salmonid fisheries using Net Limitation Orders (NLOs) and byelaws. NLOs are defined under the Salmon and Freshwater Fisheries Act 1975 - Section 26, they control the number of licences issued on net fisheries for salmon and sea trout. NLOs must be renewed within 10 years and failure to do so, could result in an unrestricted fishery *i.e.* there would be no limit on the number of net licences.

The Dee fishery comprises draft (seine) and trammel nets and has primarily targeted salmon with only a small catch of sea trout. The Dee salmon stock was failing its Conservation Limit in most years in the early 2000s and following the review in 2005 of the Dee NLO, a Reducing Order of Zero was introduced on conservation grounds.

In the first season of the 2005 Order, 13 draft and 4 trammel net licences were issued. Dee angling interests funded a full buy-out of the net fishery; accelerating the decline in netting activity. The trammel and draft net fisheries licences were zero by 2008 and 2009, respectively. The current Zero NLO was advertised and implemented in 2015, maintaining no licences reflecting the need to conserve salmon and sea trout. It expires in June 2025.

The cross-border nature of the Dee necessitates that NRW works with the Environment Agency (EA) and, through them the Department for Environment, Food and Rural Affairs (Defra) and Natural England (NE), when reviewing and advertising the Dee NLO.

In recent decades the status of most of our stocks of migratory salmonids in Wales have declined and the River Dee is no exception. There are a complex range of factors that have contributed to this, including reduced survival of fish at sea, pressures on freshwater habitats (including water quality and habitat degradation),

past unsustainable fishing effort in the high seas and other interceptory fisheries including some fisheries in home waters. Some of these pressures have been addressed or removed, including introduction of mandatory catch and release of all salmon in Wales. Stocks, however, have not returned to levels of historical abundance, or even to a position of sustainability, where exploitation and harvest can be allowed. The effects of climate change are thought to be a major contributory factor in the ongoing decline of both salmon and sea trout stocks in both freshwater and marine ecosystems.

Our overall objective for salmon and sea trout is:-

***“To protect, through the application of best-practice science and management, the sustainability of our natural resource of wild salmon and sea trout stocks in Wales.”***

Our position, directed by our statutory duties and international obligations, is that stocks should only be exploited when they are at sustainable levels. Until stocks exceed a safe conservation limit, there is no scope for an exploitable harvest.

The River Dee is designated as a Special Area of Conservation (SAC) under the Habitats Directive, with salmon as one of the designating features.

New restrictions (NLO or Byelaws) are required by June 2025 to protect vulnerable salmon and sea trout stocks in the River Dee. In evaluating management options, the long-term conservation and sustainability of the salmon and sea trout resources take precedence over socio-economic considerations for the benefit of future generations.

The proposals will, when confirmed and implemented, see byelaws introduced to close the draft and trammel net fisheries in the Dee Estuary.

Natural Resources Wales is now seeking views on these proposals.

## Evidence

We have considered three principal sources of evidence in determining our preferred option for management change: -

- The status of adult stocks of salmon and sea trout
- The status of salmon as a designated feature of the Dee SAC
- The status of juvenile salmon and trout stocks

For both species, the adult assessment, is the primary means of evaluating stock status and informing the management response via the Decision Structure (DS).

## Salmon

The most recent assessment of our salmon stocks indicates that the Dee is currently ‘At Risk’ of failing to achieve their Management Objective (in 2023) and is projected

to be 'At Risk' in 5 years' time (in 2028). Based on average egg deposition levels over the last 5-years (2019-2023), the Dee stock has recorded deficits against its indicative Management Target of -9.35million eggs (-53%). These deficits approximate to -3,117 adults (8lb fish equivalents).

The status of salmon as a designated feature of Dee SACs was 'Unfavourable' in the most recently published round of Condition Assessments, driven largely by poor adult runs.

## Sea trout

The most recent assessment of our sea trout stocks indicates that the Dee stock is currently 'At Risk' of failing to meet its conservation limits and is projected to remain 'At Risk' in 2028. Based on average egg deposition levels over the last 5-years (2019-2023), the Dee stock has recorded a deficit of -2.68 million eggs (-26%) calculated, against an indicative Management Target of ~10.19 million eggs. This deficit approximates to 1,339 spawners (as 3lb fish equivalents).

## Juvenile Salmonids

Examination of juvenile electrofishing survey data for the Dee indicates below expected levels of salmon fry production in last 10 years but generally good numbers of trout fry. The former observation is in-line with the failing status of salmon spawners, but the latter suggests healthier stock levels than indicated from returns of adult sea trout. Juvenile trout stocks will also include those fish that remain in the river as resident brown trout.

## Options for the management of the Dee net fishery to sustain and restore stocks

We have considered the following principal options: -

- **Option 1 – Do Nothing (allow NLO to lapse)**

With this option, the fishery on the Dee would be re-opened with potentially an unlimited number of licences available.

The evidence is clear for the current and projected status of salmon and sea trout stocks. They are 'At Risk'. Although, current byelaws protect salmon from being taken, an open net fishery would reduce protection of both salmon and sea trout stocks, increasing the risk to their populations.

An open fishery does not comply with our national and international duties, our organisational guidance, approach and Decision Structure.

This is not a viable option.

- **Option 2 – Renew Zero NLO for 10 years.**

This option maintains the current approach, keeping current restrictions in place with no harvest from 2025 until 2035.

It does align with NRW corporate wellbeing objectives that ‘Nature is Recovering’ and does comply with our national and international duties.

Renewal of a zero NLO does not address the long-term uncertainties faced by salmon and sea trout populations, that are declining.

It does leave the option to review and potentially re-open the fishery in 10 years’ time, however, with the increase in pressures on salmon stocks, we are unlikely to see harvestable levels return in our lifetime.

This is a viable option but provides minimal protection in the face of long-term uncertainties and pressures on already vulnerable salmon and sea trout stocks.

- **Option 3 – Close fishery (Byelaws)**

This option provides similar protection to salmon and sea trout stocks as option 2, over the next 10 years. However, it removes the requirement for future NLO reviews and future administration and compliance of the NLO.

It aligns with the NRW corporate plan wellbeing objective ‘Nature is Recovering’ and supports our guidance, national and international duties.

With the current and projected status of ‘At Risk’ for our salmon and sea trout stocks on the Dee, the closure of the fishery provides greater protection for the future uncertainties of climate change and increased pressures on their populations.

This option aligns with the intent of the 2009 buy-out to cease commercial exploitation. The recovery of the stocks to harvestable surplus levels, seems extremely unlikely in the foreseeable future, however, there would still be an option to reopen the fishery if this ever occurs.

This option is viable and provides greater security and longer-term protection to the stocks of salmon and sea trout on the Dee.

**Socio-economic impacts:** With no net fishery in existence for the last 15 years, there has been no socio-economic benefit to the local communities from this activity and the closure of the fishery will not change this. The benefits of the proposed measures will contribute to the preservation of Welsh Dee salmon and sea trout stocks and their future resilience.

**Non statutory consultation engagement and liaison with stakeholders:** NRW has discussed the proposals with our local fisheries stakeholders. At the North Wales Local Fisheries Advisory Group (LFAG) and Wales Fisheries Forum (WFF), we sought views and advice on the management of the net fisheries on the Dee, considering the status of the supporting stocks.



There was widespread support from both groups to close the net fishery through byelaw. There was no support to Renew the Zero NLO or let the existing NLO lapse, without measures in place, to ensure no further exploitation of the Dee salmon and sea trout stocks.

We conclude that:

Option 3 is the preferred option, to close the fishery by Byelaws. It provides the greatest protection from the future uncertainties faced by salmon and sea trout stocks in the Dee and aligns with our overall objective to “to protect, through the application of best-practice science and management, the sustainability of our natural resource of wild salmon and sea trout stocks in Wales”.

## Our proposals

We are proposing to seek confirmation of new byelaws for net fishing in the River Dee and Dee Estuary, effectively closing the existing fishery.

### River Dee

#### **The Salmon and Sea Trout (Prohibitions of Net Fishing) (River Dee) (Wales) Byelaws (2025)**

Byelaw 4 – Prohibition of Net Fishing for Salmon or Sea Trout on the River Dee.

Note: NRW is working with the Environment Agency on the Technical case and net fishing byelaws for the Dee and is seeking to ensure commensurate byelaws for the Dee in England, thereby ensuring a consistent catchment approach for the cross-border river.

## Your response

We would like your views on our proposals and invite you to submit these using the form designed for the purpose which is available via our consultation hub.

[Respond to the consultation.](#)

Hard copies of the documents can be requested by emailing [fisheries.wales@naturalresourceswales.gov.uk](mailto:fisheries.wales@naturalresourceswales.gov.uk): Or by writing to:-

Richard Pierce  
Dee net fishing regulation  
Natural Resources Wales  
Chester Road  
Buckley  
Flintshire  
CH7 3AJ

Respondents should note carefully that representations to this consultation for arrangements in Wales will be received by Natural Resources Wales. The consultation for the River Dee in England will be a different consultation and representations to that will be received by either the Environment Agency or by Defra.

# 1. Introduction

The current Dee NLO which implemented a zero net allocation from 2015, (following a buy-out of the netting interest in 2008/09), is due to expire on 30<sup>th</sup> June 2025. Unless new regulations are implemented, this will end any requirement not to issue net licences to fish for salmon and sea trout in the Dee Estuary.

This document is the Technical case supporting our proposals for the future regulation of net fishing for salmon and sea trout on the Dee (in Wales).

NRW is the lead agency for diadromous fish stock management on the River Dee, but as it is a cross-border river, we liaise closely with the Environment Agency (EA). Both bodies have agreed to progress a single technical case and set of byelaws in the statutory consultation with the intent to introduce new measures, prior to the expiration of the current Dee NLO. These proposals also seek to ensure a continuation to the integrated approach to fishery regulation on the Dee.

## 1.1 Mission Statement

NRW's primary objective for wild salmon and sea trout stocks in Wales is to maintain and restore this valuable natural resources so that the multiple; environmental, socioeconomic and wellbeing benefits they bring are secured and protected for current and future generations.

These objectives are shaped by our general duty under Article 4 of The Natural Resources Body for Wales (Establishment) Order 2012 to pursue sustainable management of natural resources and apply the principles of sustainable management of natural resources, as contained in Section 4 of the Environment (Wales) Act 2016, in the exercise of its functions:-

[Read Introducing Sustainable Management of Natural Resources](#)

and our duties to “..maintain, improve and develop fisheries...” placed upon us under the Environment Act (1995):-

[Read the Environment Act 1995](#)

From this we draw our mission statement for the management of salmon and sea trout in Wales:-

**“To protect, through the application of best-practice science and management, the sustainability of our natural resource of wild salmon and sea trout stocks in Wales.”**

## 1.2 Sustainability of salmon and sea trout stocks

Our fisheries duties are set out in the sections below. Welsh legislation supports core duties for freshwater and migratory fisheries set out in national legislation (Environment Act, 1995; Marine and Coastal Access Act, 2009); to define a legal

framework for the way in which NRW manages inland and diadromous fisheries resources. As set out in our mission statement above, we will manage the sustainability of our wild fisheries resource using best practice science and management measures. We seek to improve stocks, using the best evidence and resources available to us.

Natural Resources Wales (NRW) undertakes annual assessments of the status of salmon and sea trout stocks in most Welsh rivers. These assessments are used to help ensure stocks are maintained at sustainable levels; and where this is not the case, to identify and implement management actions, aimed at restoring them to sustainable levels. In doing so, we have regard to the abundance of stocks, their genetic variability, resilience to environmental pressures, and their capacity to support exploitation by rod and net fishing.

NRW notes that:-

- The salmon fisheries of the Dee are iconic, renowned, and highly valued contributing significantly to the local economy and communities.
- The status of salmon stocks in the Dee contribute to assessment of the conservation status of the Dee Special Area of Conservation (SAC).
- We work towards the sustainable management of our wild fish resources – seeking to ensure that measures to regulate fisheries provide the necessary protection to vulnerable stocks.

## 1.3 Our statutory fisheries duties

NRW has a statutory duty to operate a licensing system for fishing under Section 25 of the Salmon and Freshwater Fisheries Act (1975).

1. Natural Resources Wales has a duty under Section 6(6) of the Environment Act 1995 “to maintain, improve and develop fisheries of salmon, trout, eels, lampreys, smelt and freshwater fish”.
2. Government guidance on this duty is:
  - to ensure the conservation and maintain the diversity of freshwater and migratory fish, and to conserve their aquatic environment;
  - to enhance the contribution migratory and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income;
  - to enhance the social value of fishing as a widely available and healthy form of recreation;
  - Our role for fisheries encompasses protection of fish stocks and their environment and a service to anglers paid for from the rod licence duty to manage fisheries.
3. 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 making of 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).

4. There are specific powers relating to licensing of angling by rod and line and netting of fish in Section 25 of the Salmon and Freshwater Fisheries Act 1975, which includes provisions for operating a licensing system for rods and nets and setting licence duties (fees) for them, and to authorising of other fishing methods in Section 27A.
5. The duties and powers are imposed on Natural Resources Wales in relation to regulation of freshwater and migratory fisheries in Wales.
6. Natural Resources Wales also has a duty under Section 6(1) of the Environment Act 1995 which requires us to promote the conservation and enhancement of the natural beauty and amenity of inland and coastal waters and of land associated with such waters; the conservation of flora and fauna which are dependent on an aquatic environment; and the use of such waters and land for recreational purposes.

## 1.4 National and international commitments

### 1.4.1 NASCO

The UK is a member of the North Atlantic Salmon Conservation Organisation (NASCO), an international organisation established by an inter-governmental convention in 1984. The objective of NASCO is to conserve, restore, enhance and rationally manage Atlantic salmon through international cooperation.

NASCO and its parties applies the precautionary approach to the management of Atlantic salmon resources and the environment in which they live.

The agreed approach requires that:-

“..... more caution is exercised when information is uncertain, unreliable or inadequate. The absence of adequate scientific information should not be used as a reason for postponing conservation and management measures.”

The Precautionary Approach requires *inter alia*:

- consideration of the needs of future generations;
- avoidance of changes that are not potentially reversible;
- prior identification of undesirable outcomes;
- initiation of corrective measures without delay;
- priority to be given to conserving the productive capacity of the resource;
- appropriate placement of the burden of proof.

[Read NASCO precautionary approach](#)

NASCO has also developed specific agreements in relation to:-

- management of fisheries;
- habitat protection and restoration;

- impacts of aquaculture, introductions and transfers and transgenics;
- stock rebuilding programmes;
- use of socio-economic factors in management decisions.

NRW, to which the fisheries duties and powers of Welsh Government are devolved, is obliged to follow the principles and guidance developed by NASCO in carrying out its statutory duties.

[Read 'Conserving and restoring wild Atlantic salmon' on the NASCO website](#)

## 1.4.2 The International Council for the Exploration of the Sea (ICES)

The ICES Working Group on North Atlantic salmon (WGNAS) provides scientific advice to NASCO on the status of stocks in the North Atlantic to inform management decisions and catch advice for mixed stock fisheries.

“ICES advises that when the ‘Maximum Sustainable Yield’ (MSY) approach is applied, fishing should only take place on salmon from rivers where stocks have been shown to be at full reproductive capacity (*Note: Conservation Limits (CL) in England & Wales are set using the MSY approach*). Furthermore, because of the different status of individual stocks within stock complexes, mixed-stock fisheries present particular threats. The management of a fishery should ideally be based on the individual status of all stocks exploited in the fishery.”

- The assessments include model forecasts for the southern stock complex and its constituent countries, including England and Wales (E&W), of maturing and non-maturing Pre-Fisheries Abundance (PFA), one-sea-winter (1SW) and multi-sea-winter (MSW), Lagged Eggs, and the proportion of PFA maturing from latest meeting (March 2024) and advice to NASCO.

Salmon stocks remain in a depleted state throughout much of the North Atlantic, with more southerly stocks in both North America and Europe generally being more severely affected.

Across southern Europe (which includes Welsh salmon stocks), 1SW and MSW return and spawner estimates in 2023 were the lowest and the second lowest in the time-series, respectively.

ICES is not asked to develop catch advice for specific home-water fisheries but has previously noted that while the abundance of stocks remains low, particular care should be taken to ensure that fisheries in home-waters are managed to protect stocks that are below their CLs.

- [Read ICES latest advice on fishing opportunities, catch, and effort](#) (generic ICES advice link)

### 1.4.3 The Conservation of Habitats and Species Regulations

Following the UK's withdrawal from the European Union (EU), we remain committed to the principles and objectives of the Habitats Directive as transposed into UK law. Welsh Government has said there will be "[no change to the level of environmental protection, nor to environmental standards in Wales](#)". Wales' Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) have the same protections they had when the UK was part of the EU. Amendments made to the Conservation of Habitats and Species Regulations 2017 (as amended by Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) involved transferring functions from the European Commission to the appropriate authorities in England and Wales. Because the legislative requirements in the 2017 Regulations as amended, are partly defined by reference to the terms of the Habitats and Birds Directives, the obligations of a competent authority for the protection of sites or species has not changed.

[Read the changes to the Habitats Regulations 2017](#)

The Atlantic salmon (*Salmo salar* L.) 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). This designation and associated obligations still apply under the 2017 Regulations, as amended.

The Directive 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".

We established the 2020 Baseline Evaluation project, to assess the quality of the protected sites evidence to help understand, where possible; the relative 'health' of the key species and habitats across the range of freshwater and terrestrial features in protected sites in Wales. [Natural Resources Wales / Protected sites baseline assessment 2020](#).

From a Welsh perspective, there are currently 6 rivers (or tributaries of rivers) designated as SAC's where salmon are a qualifying interest; these now form part of the UK National Sites Network:–

- Dee and Bala Lake [UK0030252](#)
- Wye [UK0012642](#)
- Usk [UK0013007](#)
- Teifi [UK0012670](#)
- Eden Cors Goch Trawsfynydd [UK0030075](#) \*
- Gwyrfai and Llyn Cwellyn [UK0030046](#)

\* Salmon is a primary reason for selection of each site except the Eden where it is present as a qualifying feature, but not a primary reason for site selection

In applying the Conservation of Habitats and Species Regulations as amended, consideration must be given to all the salmon populations, not just specifically these six rivers.

*“The conservation status of a species means the sum of the influences acting on the species concerned that may affect the long-term distribution and abundance of its populations within its territory. This conservation status will be taken as ‘favourable’ when:*

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats;
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future;
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis...”

The Conservation of Habitats and Species Regulations, as amended, specifically allows for provision to be made for management measures for salmon, if their conservation status warrants it; including the prohibition of certain means of capture or killing, whilst providing for the possibility of derogations on certain conditions.

Under the terms of the 2017 Regulations, as amended, every 6 years the appropriate bodies in the UK are obliged to submit a report detailing the conservation status of their salmon stocks. At the last report in 2019 the status of Atlantic salmon was reported as Unfavourable.

[Read the current England and Wales status assessment for Atlantic salmon](#)

Fishery management measures have been identified as instrumental in maintaining the number of spawning adult salmon over the long term, despite substantial reduction in marine survival.

The ‘Common standard monitoring guidance for freshwater fauna’ (JNCC, 2015) sets out the protocol for monitoring and assessing Atlantic salmon populations in sites designated as SACs and SSSIs.

The population distribution, juvenile density and adult run size for a SAC river is assessed using electrofishing surveys, rod catch returns and, where available, fish counter and trap data. Compliance with Conservation Limits, set as egg deposition targets, are used to assess the status of spawning stocks at whole catchment scales. These analyses in conjunction with an assessment of environmental attributes such as river flow, habitat and water quality (JNCC, 2016) are used to classify the Atlantic salmon feature as either “Favourable” or “Unfavourable” for each SAC river. The status of salmon as designated features of Dee SACs was ‘Unfavourable’ in the most recently published round of Condition Assessments, driven largely by poor adult runs.



## 1.4.4 Other international commitments for management of salmon and sea trout

Other international agreements and conventions are also of relevance for the management of salmon and their environment, and remain unchanged since the UK exit from the European Union:-

- The Convention on the Conservation of European Wildlife and Natural Habitats (the Bern Convention) (ETS No.104)

This convention, adopted in Bern Switzerland in 1979, came into force in 1982. The principal aims of the Convention are to ensure conservation and protection of wild plant and animal species and their natural habitats (listed in Appendices I and II of the Convention). To increase cooperation between contracting parties, and to regulate the exploitation of those species (including migratory species) listed in Appendix III. The Habitats Regulations 2017 (as amended) provide a legal framework to deliver the UK's obligations under the Bern convention.

[Read details of the Bern Convention](#)

- The Convention on the Conservation of Migratory Species of Wild Animals (the Bonn Convention, EC Decision 82/461/EEC of 24 June 1982).

This convention deals specifically with the conservation of migratory species of wild animals.

[Read details of the Bonn Convention](#)

- The OSPAR Convention (Convention for the Protection of the Marine Environment of the North-East Atlantic convention, 1992).

OSPAR is the mechanism by which 15 Governments and the EU cooperate to protect the marine environment of the North-East Atlantic.

[Read details of the OSPAR Convention](#)

- International Union for Conservation of Nature (IUCN) Assessment

The International Union for Conservation of Nature (IUCN) has a red list of threatened species that it describes as the “world’s most comprehensive information source on the global extinction risk status of animal, fungus and plant species” (IUCN 2023, IUCN 2023a).

In December 2023, the IUCN released an update of its red list at the COP28 climate conference (IUCN 2023b). In this update, Atlantic salmon were reclassified from ‘least concern’ to ‘endangered’ in Great Britain due to a 30–50% decline in British populations since 2006; with projections estimating a 50–80% decline between 2010 and 2025 (IUCN 2023b). Global populations of Atlantic salmon were also reclassified from ‘least concern’ to ‘near threatened’ due to a population decline of 23% since 2006. English chalk stream salmon and the Leven sub-population in Scotland were

given separate regional assessments and reclassified as 'vulnerable' and of 'least concern' respectively.

Focusing on the causes of population decline, the IUCN said that Atlantic salmon face multiple threats over the course of their migration. One threat which has been found to affect all stages of their lifecycle is climate change. The IUCN stated that it influences the development of young salmon, reduces prey availability and allows invasive alien species to expand their range. The IUCN also explained that dams and other barriers block access to spawning and feeding grounds. While, water pollution and sedimentation, mainly from logging and agriculture, leads to higher mortality of young salmon. In addition, escaped farmed salmon breeding with wild populations has been found to threaten and may weaken the Atlantic salmon's ability to adapt to climate change. Mortalities due to salmon lice from salmon farms is also of "great concern". A significant threat is also posed by the invasive Pacific pink salmon, which is "spreading rapidly" across northern Europe.

[Read IUCN \*Salmo salar\* \(Atlantic Salmon\) assessment](#)

## 1.5 Salmon and Sea trout Stocks in Wales

Salmon and trout are widely distributed around Wales. There are 23 rivers in Wales designated as 'principal salmon rivers' following a Ministerial Directive in 1998. This required the derivation and initiation of a precautionary stock management system, based on Conservation Limits and annual compliance assessment. The River Dee is designated as a 'principal salmon river'.

Many of these rivers, including the Dee, also support significant sea trout stocks and fisheries and are among 33 main (or 'principal') sea trout rivers and fisheries in Wales.

Each of the designated rivers have at some point in the past, supported flourishing fisheries of local and national significance and contributed significantly to the social and economic well-being of the areas in which they are located.

Across Wales, and indeed much of the North Atlantic region, salmon stocks are performing poorly. On all principal rivers in Wales, including the Dee, stocks are classified as 'At Risk' of failing to achieve their Management Objective: *i.e.* that they should meet or exceed the Conservation Limit 4 years out of 5 (or 80% of the time).

The poor status of salmon stocks in Wales mirrors a similar picture of decline, evident over the last two or three decades across the North Atlantic range. While this common picture of decline may be driven by large scale environmental factors resulting in less favourable conditions at sea; local constraints to the wellbeing of stocks also remain important and should not be overlooked.

Of particular concern is the very poor status of the one-sea-winter (1SW) salmon stock component (those fish that spend one winter at sea before returning to their natal river). These fish are commonly referred to as grilse and have tended to dominate returns on smaller rivers, including most rivers in Wales. However, grilse

numbers have declined markedly in the last decade. Larger salmon are typically two-sea-winter (2SW) fish (spending two winters at sea) with still older fish present in some rivers. In contrast to grilse, returns of multi sea winter (MSW) fish have been steady or even increasing on some rivers in recent years, but not to levels observed in the past, or to the extent that the conservation status of the salmon stock as a whole can be considered secure.

Sea trout stocks are also depleted on many of the principal rivers in Wales, including the Dee.

Following public consultation in 2017 and a local public inquiry in 2018/19, new byelaws were introduced in 2020 for all rivers wholly within Wales. These byelaws require the mandatory release of all salmon caught by net and rod fisheries, ensuring all salmon are returned immediately to the water with the least possible injury.

Similar measures were also introduced on the cross-border (Wales and England) rivers Wye, Severn and Dee.

These byelaws, which came into force on the 1<sup>st</sup> January 2020, are an integral component of a suite of measures to help conserve spawner numbers whilst other threats to their habitats are addressed. The byelaws are effective because they will reduce the intentional killing of fish, which maximizes the number of fish that survive to spawn each year:

- i. even relatively small numbers of fish are crucial in order to recover stocks in as short a time as possible;
- ii. there would be accumulated benefits over spawner numbers over time; and
- iii. there is a further imperative to preserve the fittest fish which have managed to survive natural mortality factors. It is therefore essential that spawning stocks are maximized if populations are to have the best chance of recovery.

## 2. Assessing and managing stocks of salmon and sea trout on the Dee

### 2.1 Monitoring stocks and fisheries in the Dee

Monitoring programmes for salmon and trout/sea trout, targeting various life stages, have been long established by NRW, the Environment Agency (EA) and predecessor organisations. On most rivers, these routine programmes, provide the main evidence base to help evaluate stock status and inform management decision making.

The following key monitoring activities are undertaken on all principal rivers, including the Dee:

- a) **The collection, collation and reporting of rod and net catch statistics:**  
These are available from at least 1975 on most rivers and in a few cases –

including the Dee - extend back to the 1900s or even earlier. Rod and net catches were recorded in more systematic ways from 1975 onward when regional licence-based catch return and reminder systems were introduced. These were replaced in the early 1990s with a single, national (England and Wales) rod licence and catch return system which has collected catch, catch and release, and fishing effort data in a broadly consistent way since that time.

- b) **Annual monitoring of the abundance and distribution of juvenile salmon and trout populations using electrofishing (EF) methods:** The frequency and extent of annual EF surveys were particularly variable on most rivers across Wales in the early part of the time-series (mid-1980s up to 2001); thereafter, more consistent spatial and temporal survey programmes were introduced nationally (see section 2.4 for further details).

In addition to the above, the Dee is one of a handful of 'index' monitored rivers for Atlantic salmon and sea trout in Europe or the wider North Atlantic area, and the only index river in Wales.

Index rivers are characterised by their intensive and long-term monitoring programmes collecting unique information on the key life-stages of these important fish species. Over time, this builds a picture of changes in abundance and biology which helps to improve understanding of complex population processes and the factors which influence them.

In turn, this detailed information is used to inform stock assessment, fisheries and environmental management in the widest sense: locally, nationally and internationally. The benefits of this type of intensive monitoring programme are not just confined to the index rivers.

The index river programme on the Dee, or 'Dee Stock Assessment Programme' (DSAP), began in 1991 with construction of a head-of-tide fish trap at Chester Weir.

This trap is designed to capture and sample upstream migrating adult fish, primarily to estimate their total return by tagging and recapture methods, but also to collect complementary biological details, including information on size, age, sex, etc.

Other elements of the Dee programme include:

- lower river downstream trapping programmes in spring to estimate the abundance and survival of out-migrating smolts;
- extensive (5-minute timed) electrofishing surveys in late summer to monitor the abundance and distribution of juvenile salmon and trout (fry and parr) at 80+ tributary and main river sites (supplementing the core national EF survey programme described above).
- Circulation of a fishing logbook to Dee anglers to collect detailed information on rod catch and fishing effort around the catchment, adding to the licence-based catch return and fostering support for the Dee programme including the reporting of tagged fish.

Further details of the Dee programme, including annual reports can be found at: [Natural Resources Wales / 'Index river' monitoring for salmon and sea trout on the Welsh Dee](#)

Data from the above sources are analysed and presented in sections 3 and 4.

## 2.2 Management of mixed species

Although most rivers in Wales support notable stocks and fisheries for both salmon and sea trout, on the Dee, migratory salmonid fishery interests have always been overwhelmingly dominated by salmon.

Current byelaws specific to the River Dee salmon rod fishery also include regulatory controls for sea trout. This reduces the risk of anglers misidentifying fish, leading to the inadvertent or deliberate killing of salmon.

## 2.3 Adult stock assessment procedures

### 2.3.1 Salmon

Following the advice of ICES and NASCO, Conservation Limits (CLs) and associated Management Targets have been used to assess the status of salmon stocks in England and Wales (E&W) since the early 1990s. This approach was enshrined in a Ministerial Direction in 1998 which, among a number of actions, required Conservation Limits to be set and used to assess stocks annually on 64 principal salmon rivers in England & Wales.

The Conservation Limits derived for all principal salmon rivers have been based on modelled stock and recruitment (SR) curves which relate spawner or egg numbers to smolt output (Figure 1). SR curves have been developed from river specific measures of the extent and quality of freshwater habitat. See Annex 2.

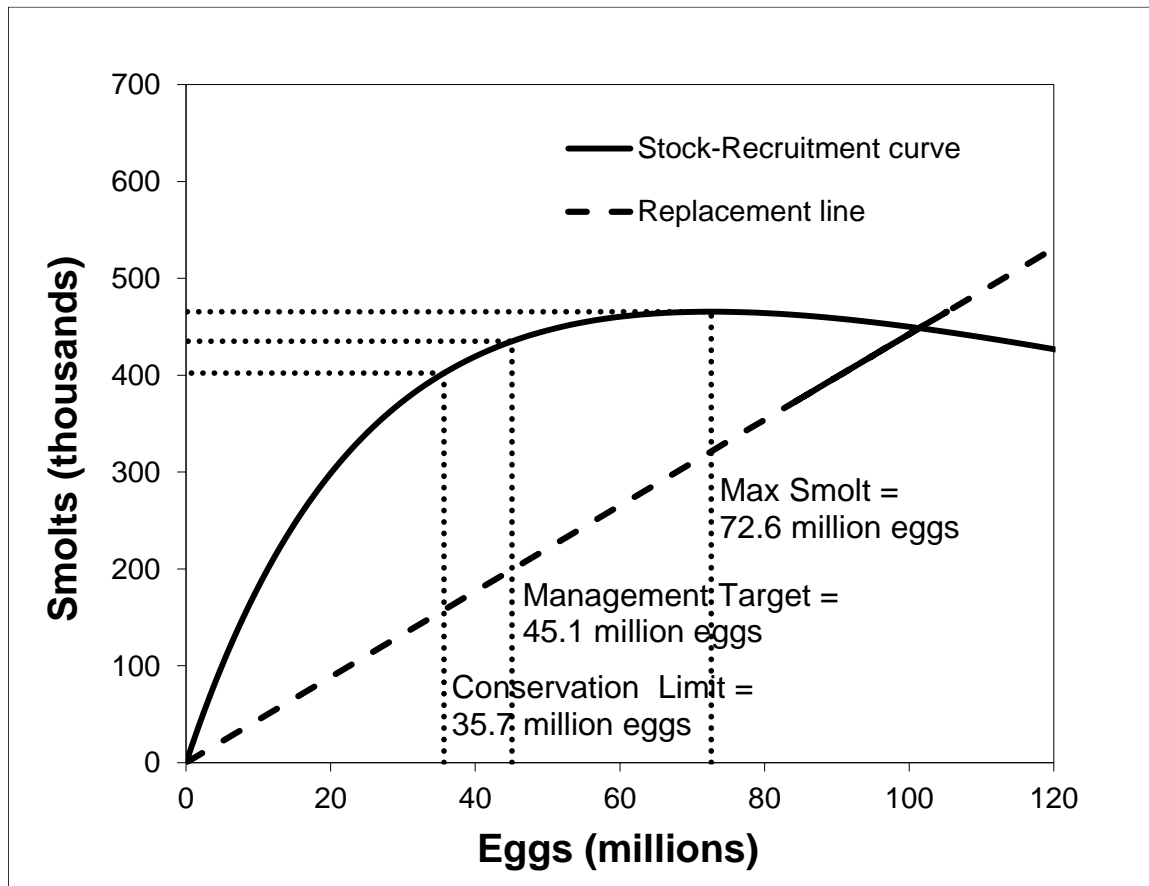
Additional information on sea survival (the 'replacement line' in Figure 1) and the average sea age and size composition of returning stocks is also required to set the CL (again based on observations from index monitored rivers as well as river specific data).

CLs serve as a 'limit' reference point below which further reductions in spawner numbers are likely to result in a significant fall-off in smolt production.

Compliance procedures are built around a 'Management Objective' which ensures there is a high probability that stocks are meeting their CL. This requires that spawning levels are at or above the CL four years out of five, in the long term, (*i.e.* 80% of the time) for a stock to formally 'pass' its Management Objective. The 'Management Target' (MT) is a 'target' reference point which indicates where stock levels need to be, on average, in order to achieve the Management Objective.

The CL and MT reference points are both indicated on the SR curve shown in Figure 1. A further reference point – 'Maximum Smolt' - is also shown to identify the maximum smolt output that may be expected from a catchment.

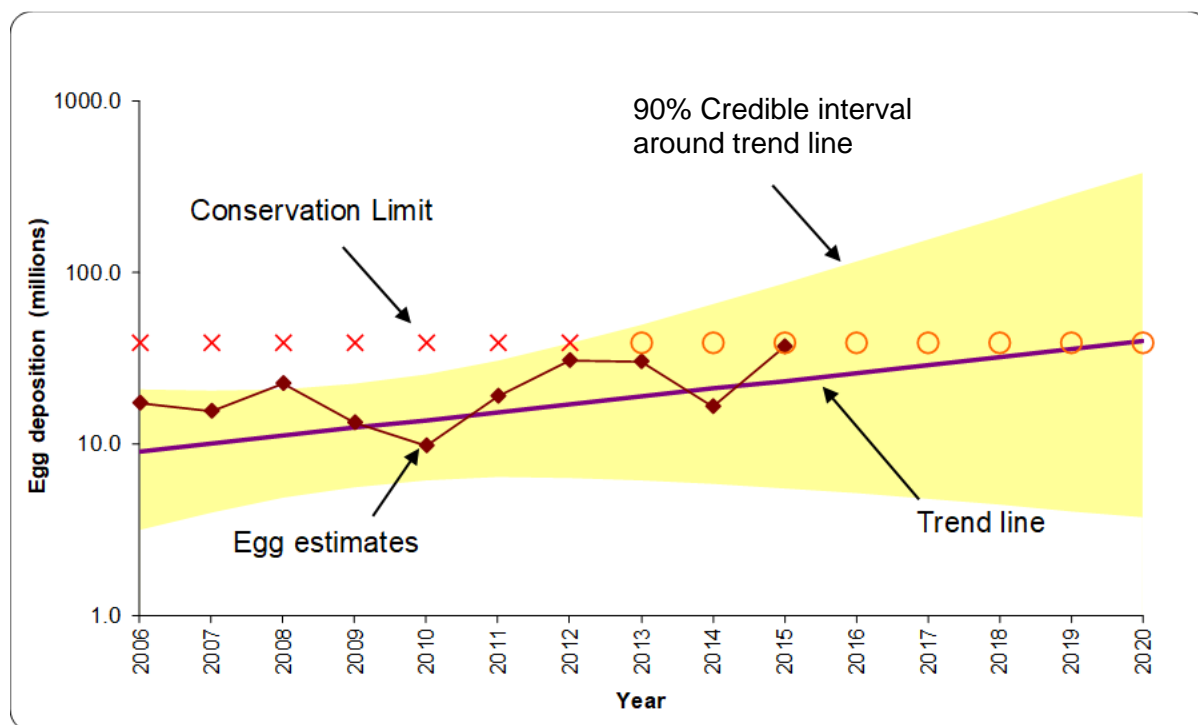
Figure 4 Conservation Limit and other reference points defined by the stock-recruitment curve and replacement line.



For each river stock of salmon, estimates of spawner numbers and egg deposition are produced annually. In most cases (except for rivers with counters or traps - like the Dee) these estimates are derived from rod catches and assumed angling exploitation rates (the latter based on observations from counted rivers). Other information, for example relating to the size and sea age composition of returning salmon, catch declaration rates and the egg contribution of rod-released fish is also built into the spawner/egg estimates.

Compliance with the Management Objective is tested each year using a statistical procedure which fits a trend line to the latest 10-year time-series of egg deposition estimates for each river and examines the position of that trend line (and the uncertainty band or 'credible interval' around that line) relative to the Conservation Limit. This procedure includes extrapolation of the trend line to assess the possible status of the stock in 5-years' time (Figure 2).

Figure 5 Compliance with Management Objective: Example graphical assessment for 2015



The resulting compliance status for each river is examined annually against a 'Decision Structure' (DS) (Annex 2) providing a standard and consistent decision framework; to identify management actions for the regulation of exploitation of stocks in both the rod and net fisheries. This recognises that exploitation control is the most immediate remedy to shortfalls in spawning stocks. However, longer term initiatives, for example the protection and restoration of river habitats, are also fundamental to the recovery and future health of our salmon populations.

Annex 2 provides further information on the derivation and use of Conservation Limits in salmon management in England & Wales – including additional details relating to compliance assessment and the application of the Decision Structure.

### 2.3.2 Sea Trout

Until recently no established methods of setting Conservation Limits or similar 'Biological Reference Points' (BRPs) for sea trout were available. This was rectified when a methodology based on that for salmon was introduced by NRW in its [Technical Case supporting the 'All Wales' byelaws](#). The new approach, which received positive feedback from key fisheries Non-Governmental Organisations (NGOs); is a stock-based assessment method utilising rod catch return data to derive run and egg deposition estimates for sea trout, in much the same way as that for salmon assessment. For example, it uses estimated rod exploitation rates and catch data to derive run estimates and adopts standard sex ratios and weight-fecundity relationships to generate egg deposition figures.

These data sets have been used to generate stock and recruitment relationships for individual river stocks of sea trout, deriving from these relationships Conservation Limits that are broadly equivalent to those used in the salmon assessment. Allowing use of the same trend-based statistical compliance procedures to assess the 'risk' status of the stock.

The details of this method are set out in Davidson *et al.* (2017) and in the Technical Case supporting the 'All Wales' byelaws. The procedures for estimating adult returns from rod catches, spawner numbers and levels of egg deposition are summarised in Annex 3.

## 2.4 Juvenile population assessments

Electrofishing (EF) surveys to assess the distribution and abundance of juvenile salmon and trout have been undertaken on most catchments in Wales; with the earliest data sets extending back to the mid-1980s.

The current EF monitoring programme comprises a temporal component, where a number of fixed sites are surveyed annually and a spatial component, where considerably more sites (spread across the whole catchment) are surveyed every 6 years. This provides a "snapshot" assessment of spatial variation of catchment fish populations. The number of sites in the temporal and spatial programmes vary between catchments and relate to the size of the catchment. The monitoring programmes were fully reviewed in 2001 and have remained largely consistent since then.

Data collected from the annual (temporal) programme are used to examine trends in salmonid fry and parr numbers. Long-term trends reflect a range of factors affecting juvenile populations, from spawner abundance to the quality of freshwater habitat. Trends are examined using a long-term time-series from the start of monitoring but are more usually assessed for the most recent ten-year period, which includes two salmon cohorts.

Spatial data are used to look at differences in fish populations within catchments in a single year. This helps to identify parts of the catchment where, for example fry numbers are lower than expected levels, and will help target investigative or remedial work.

The data collected in these surveys are used for various purposes, including Water Framework Directive (WFD) and other assessments which identify environmental constraints and prompt remedial measures.

The current status of juvenile salmon and trout stocks in the Dee are presented in section 4.2. This includes analysis of the 5-min timed EF survey data collected as part of the Dee index river programme,

## 2.5 Reporting our data

The data that we collect, and the assessments that we make on juvenile and adult salmonid stock status are reported on a local, national and international level.



## 2.5.1 Salmonid and freshwater fisheries statistics

Annual fisheries statistics reports for commercial and recreational fisheries in England and Wales, including declared catches for salmon and sea trout by rods, nets and other instruments are available from the .Gov website.

[Salmonid and freshwater fisheries statistics: 2023 - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/salmonid-and-freshwater-fisheries-statistics-2023)

New annual reports are generally published in July of each year.

## 2.5.2 Salmon stock status report

In addition, annual reports by Cefas, EA and NRW on the status of salmon stocks and fisheries in England and Wales have been produced since 1997. These reports present a preliminary assessment for the latest year to assist ICES in providing scientific advice to NASCO and to provide early feedback to fishery managers and anglers. These are also available from the .Gov website.

- [Salmon Stocks and Fisheries in England and Wales in 2023](#)
- [Assessment of Salmon Stocks and Fisheries in England and Wales – Background Report 2023](#)

## 2.5.3 NASCO Implementation Plans and Annual Progress Reports

Following the departure of the UK from the European Union in 2020, the UK became a full member of NASCO and is required to adopt all of its measures and agreements.

In 2005 NASCO committed to the development of 'Implementation Plans' ([CNL\(05\)49 - Strategic Approach for NASCO's 'Next Steps'](#)). These are required to detail committed measures, to be addressed over the five-year plan, in relation to three areas of concern:

- [Management of salmon fisheries](#);
- [Protection and restoration of Atlantic salmon habitat](#); and
- [Management of aquaculture, introductions and transfers and transgenics](#).

Implementation Plans and their associated Annual Progress Reports provide a succinct, transparent, fair and balanced approach for reporting on the implementation of NASCO's Resolutions, Agreements and Guidelines by the Parties.

The Implementation Plans are the key documents in the third and current NASCO reporting cycle. They are focused around the three theme areas and emphasise:-

- the actions to be taken over the period of the Implementation Plan (2019 – 2024);
- clearly identifiable measurable outcomes and timescales; and
- appropriate monitoring to evaluate the effectiveness of the measures taken.

Annual reports on progress against these plans provide detail on actions taken by each jurisdiction; including those on habitat protection and restoration, and the minimisation of adverse impacts of aquaculture, introductions and transfers.

The primary purposes of the annual progress reports are to provide details of:

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

The reports can be found on the NASCO web site.

[Read the NASCO Implementation Plans and Annual Progress Reports](#)

[NASCO “Implementation Plan” for 2019-24](#)

[CNL2426 Annual-Progress-Report UK-England-and-Wales](#)

## 3. Fisheries on the Dee

Conservation limits (CLs) and Management Targets (MTs) have been set for all principal salmon rivers (including the Dee) and are used to assess the status of stocks, against a common framework, and to indicate the requirement for intervention measures to improve stocks (section 2). Management action includes the control of fishing to maximise spawning escapement, but should also include other initiatives such as river water quality and habitat improvement.

The Dee is also one of the 33 sea trout rivers in Wales where stocks are assessed each year (although the sea trout fishery on the Dee is relatively small in comparison to other rivers in Wales). Historically the catch of sea trout in the Dee net fishery has been small, circa 30 per year, however, the river does support a small rod fishery.

### 3.1 Dee net fishery

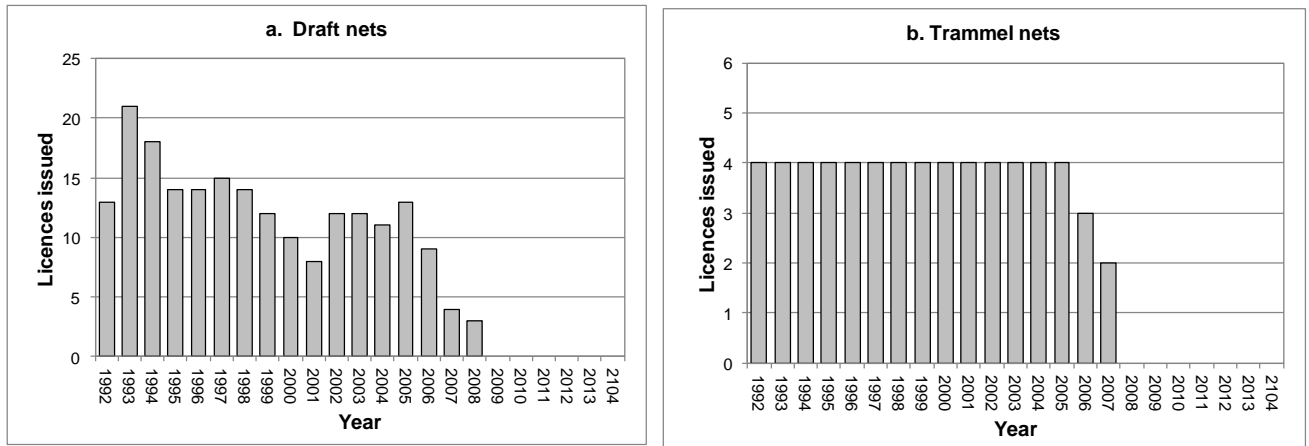
In 2005, a reducing Net Limitation Order (NLO) of zero was introduced on the Dee on salmon conservation grounds. At that time, 13 draft net and 4 trammel net licences were operating on the fishery.

The Dee NLO was reviewed again 10-years later in 2015. The same ‘zero’ NLO was retained, to continue protecting a failing salmon stock, but by that time no nets were operating on the fishery.

This reduction in net fishing activity to zero occurred in 2008 on the trammel net fishery and 2009 on the draft net fishery. It was largely facilitated by a full buy-out of the fishery negotiated and funded by Dee Salmon Fishery Association. Licences issued on the draft and trammel net fisheries between 1992 and 2014 are shown in

Figure 3. No licences have been issued since 2009 under the conditions of the previous (2005) and current (2015) NLO. The poor status of salmon (and sea trout) stocks on the Dee remains a significant concern (see section 4).

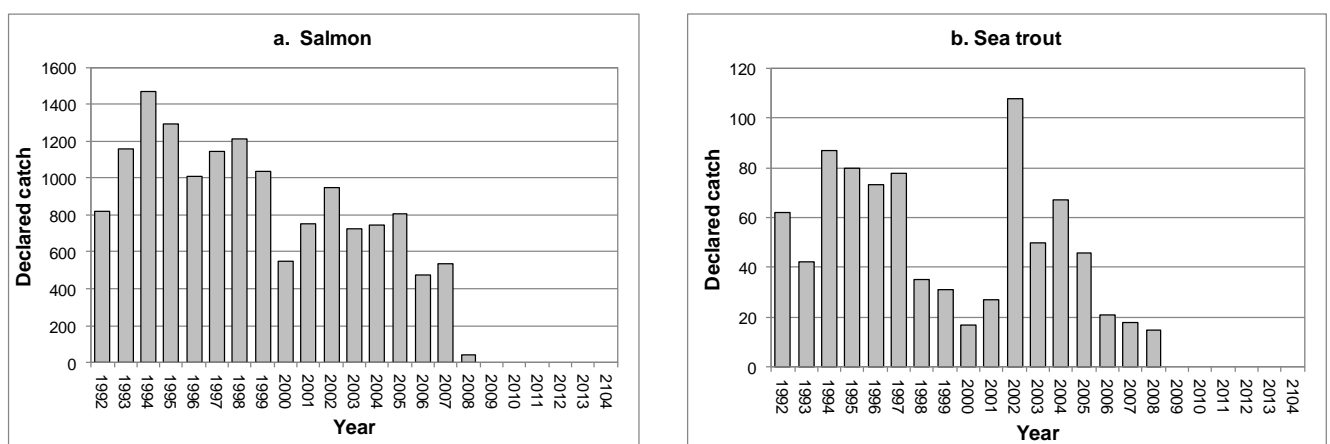
Figure 3 Draft and trammel net licences issued on the River Dee, 1992-2014



Historic declared catches of salmon and sea trout on the draft and trammel net fisheries are shown in Figure 4 for the years 1992-2014. For the five-year period prior to the start of the buy-out in 2006, average declared salmon catches by the draft nets, trammel nets and both gears combined were 389, 405 and 794 respectively. For sea trout the equivalent figures were 31, 29 and 60.

Nominal extant net exploitation rates (the proportion of the annual pre-net run caught based on the declared catch and post-net run estimates at Chester Weir) averaged 12% for salmon in the 5 year period 2001-2005, and 3% for large sea trout (sea age greater than .0+). Smaller 'whitling' sea trout (sea age .0+) mainly avoided capture because they were small enough to pass through the meshes of both draft and trammel nets.

Figure 4 Combined draft and trammel net catches for salmon and sea trout; River Dee 1992 -2014



## 3.2 Dee rod fishery

### 3.2.1 Catch returns

A national rod licence, catch return and reminder system for salmon and migratory trout has been in place in Wales and England since 1994 – providing one of the most consistent and comprehensive catch recording systems in Europe. The rod licence sales and administration service in Wales is managed on behalf of Natural Resources Wales by the Environment Agency under a formal agreement.

The national catch recording system provides information on each fish caught as well as the activity of fishermen. This includes:

- weight of individual fish;
- whether killed or released (note that this data is only available from 1993);
- date and river of capture;
- method of capture (fly/spin/bait);
- total number of days fished each season (pre and post 16<sup>th</sup> June).

Declared rod catches of salmon and sea trout on the Dee (including catch per unit effort data from licence and logbook returns) are shown from 1951 onwards in Figures 5 and 6, respectively.

Over the last ~70 years, declared salmon rod catches have (with some year to year variation) shown a clear declining trend, from a peak of ~1,900 fish in 1967 to a low of just 148 salmon in 2022. In contrast, the declared sea trout rod catch has been increasing in recent years from returns consistently below 100 fish up to the early 1980s to a peak of close to 700 fish in 2014 (followed by a sharp decline since).

Figure 5 Dee salmon rod catch and catch per unit effort, 1951 onward

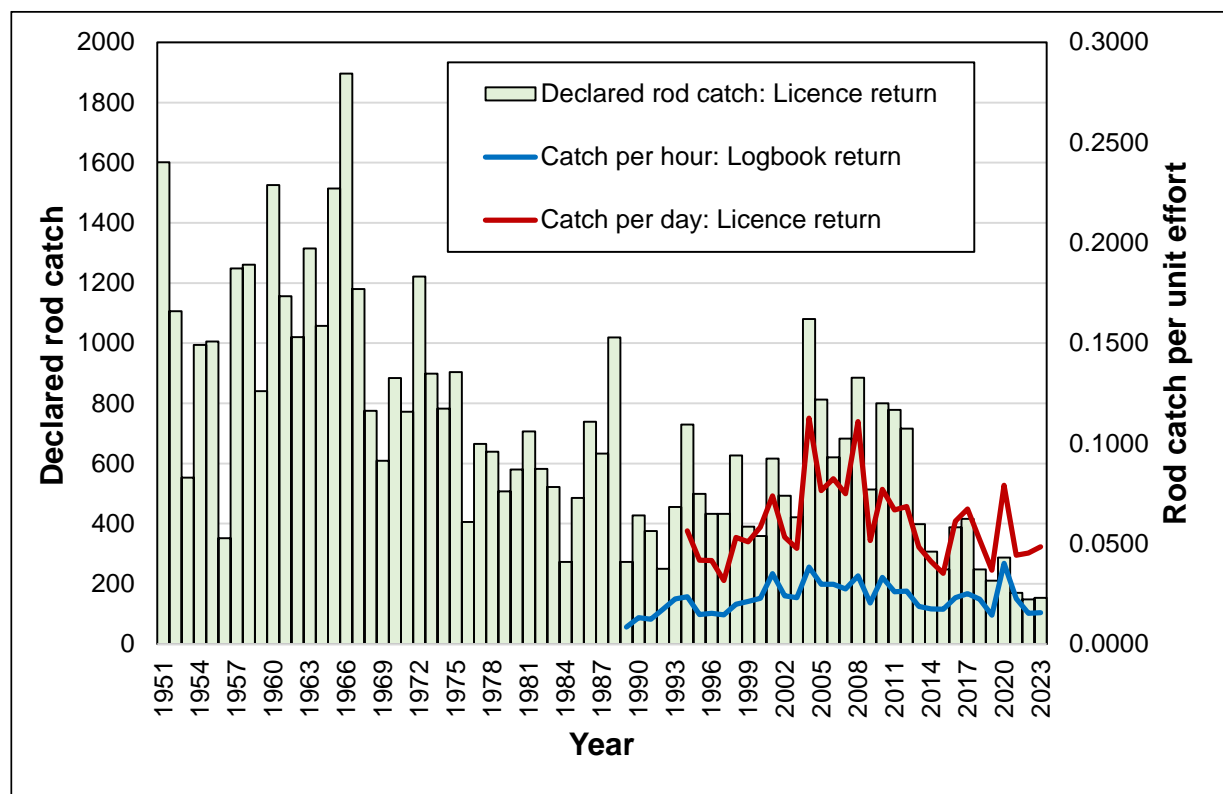
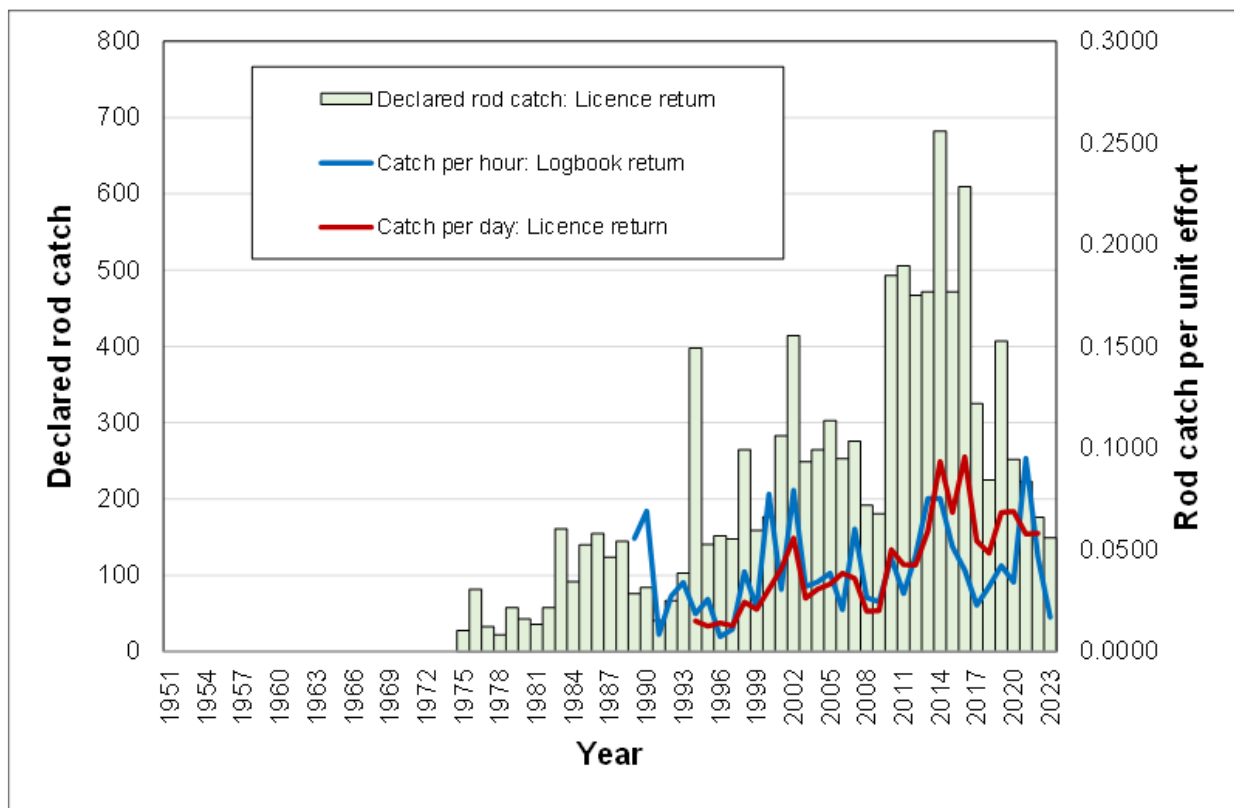


Figure 6 Dee sea trout rod catch and catch per unit effort, 1951 onward



Catch returns from rod (and net) fisheries are a key data source on all principal rivers - providing information on the number of fish killed (or released); also other details including the size composition of the stock, fishing effort, fishing methods, etc. These data are essential for the effective monitoring of fishing activity but also provide important information required to evaluate the performance of individual river stocks of salmon and sea trout. For example, on the great majority of rivers, adult return, spawner and egg deposition estimates for salmon and sea trout are derived from rod catch data. Even on the few rivers with counters and/or traps, including the Dee, where return estimates can be obtained by more direct means, catch data plays some role in stock assessment procedures.

### 3.2.2 Current restrictions on the rod fishing on the Dee

The River Dee currently has byelaws to control overfishing that require catch-and-release fishing, together with certain method controls. During the current Dee NLO (2015-2025), mandatory catch-and-release has been introduced on the River Dee to further protect salmon and sea trout stocks. Namely:

As of 1<sup>st</sup> January 2020, under the 2017 'All Wales' byelaws, catch and release (C&R) applies to all salmon caught on the Dee, and to any sea trout above 60cm in length at any time in the season.

## 4. Current status of Dee salmon and sea trout stocks

### 4.1 Adult stock status

The use of river specific Conservation Limits to assess the status of adult salmon and sea trout stocks has been described in section 2 and Annexes 2 and 3.

- Results for the latest assessment year: 2023 are used in this report to examine the status of salmon and sea trout stocks on the Dee.

They are referred to in the following reports:

Assessment report: [Salmon Report-2023-summary](#)

Background report: [Salmon Report-2023-background](#)

Run estimates for adult salmon and sea trout at Chester Weir, obtained over the last ~30 years, using tagging and recapture methods, are shown in Figures 7 and 8. These include run estimates for the stock as a whole as well as for the separate sea age components: one sea winter (1SW) and multi-sea winter (MSW) fish in the case of salmon; and zero sea winter (0SW) and one sea winter and over (>0SW) fish in the case of sea trout.

These sea age specific return estimates along with information on the size and sex composition of the stock, estimates of fishery and other losses prior to spawning are used to derive annual egg deposition estimates; for comparison with Conservation Limits (CLs). The latest (2023) CL compliance assessments for both salmon and sea trout are examined below.

Figure 7 Annual run estimates for Dee salmon at Chester Weir, 1992-2023 (error bars indicate 95% confidence intervals)

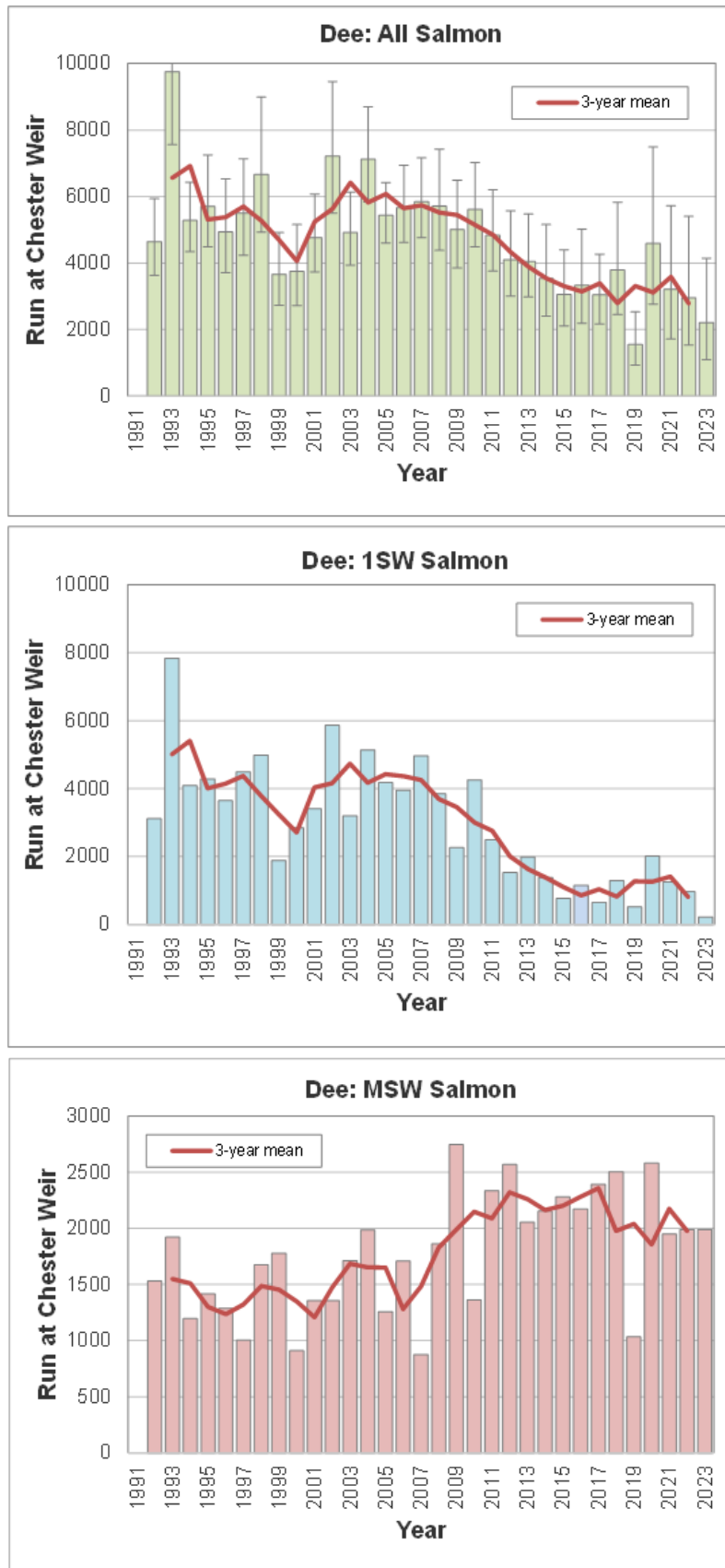
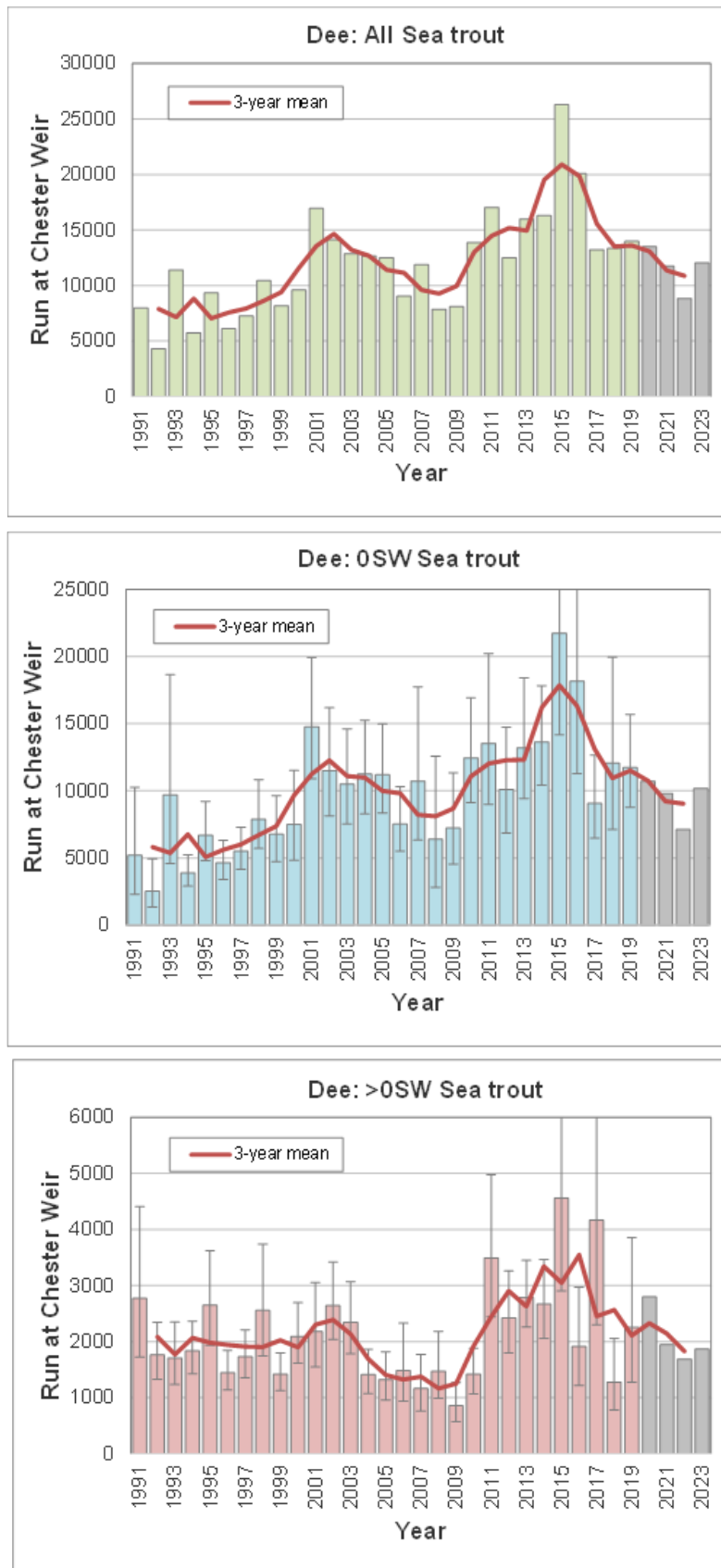


Figure 8 Annual run estimates for Dee sea trout at Chester Weir, 1991-2023 (error bars indicate 95% confidence intervals)





### 4.1.1 Salmon assessment

Table 1 and Figure 9 show the latest (2023) provisional assessment results.

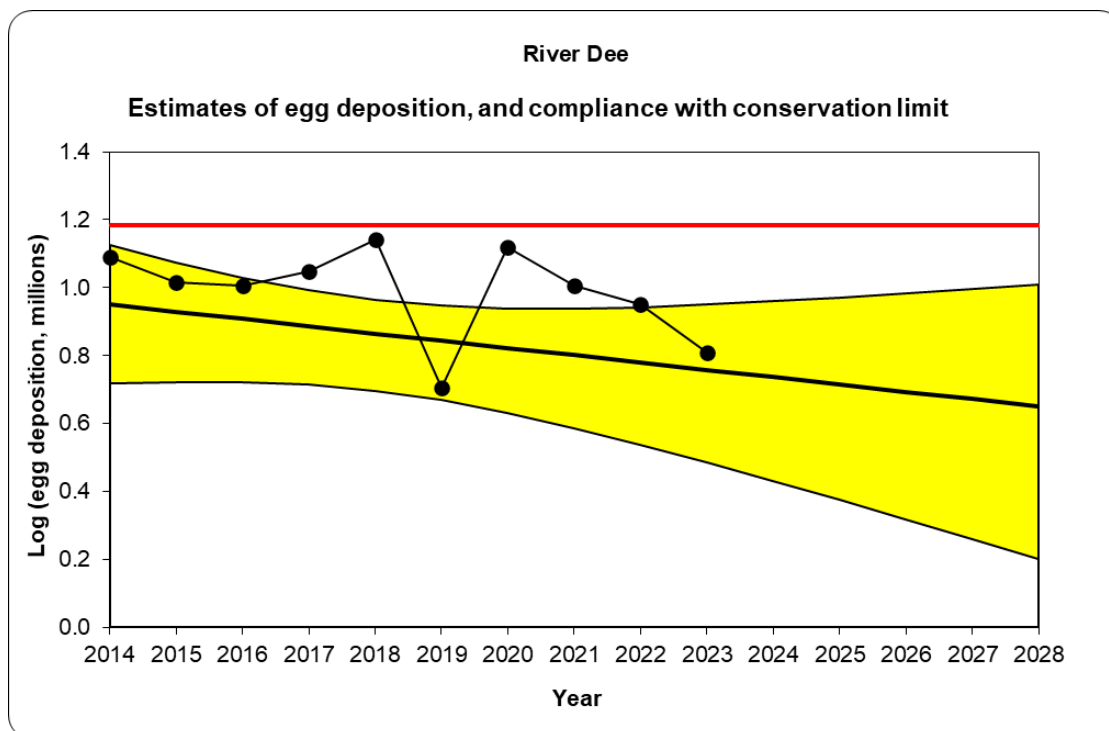
Three measures of performance are examined for each river stock:

- 'risk' status against the CL in the latest year (2023) and in 5 years' time (2028).
- the trend in egg deposition estimates over the latest 10-year period (the method by which 'risk' status is projected in 5-years' time).
- estimates of the egg shortfall/surplus against the Management Target based on the most recent (5-year average) levels of spawning escapement.

The current (2023) assessment for salmon on the Dee classifies the stock as 'At Risk' (AR) of failing to achieve the Management Objective both in 2023 and projected to 2028 (Figure 9 and Table 1).

The Dee has been classed as 'At Risk' in every assessment since 2014, either in the current year, in the 5-year projected year, or in both.

*Figure 9 River Dee salmon stock compliance with the Management Objective: 2023 assessment year (for explanation of the graph see section 2.3 and Annex 2).*



*Table 1 Summary of salmon stock status on the River Dee: provisional assessment results for 2023.*

Current compliance status (2023)	At Risk
Projected (+5yr) compliance status (2028)	At Risk
Trend*	Declining (--) 0.15
Conservation Limit	15.30 million eggs
Management Target	17.63 million eggs
Egg deficit on MT**	-9.35million eggs
Spawner deficit***	-3,117 adults

*\* Probability of a declining trend from regression analysis applied to the 10-year time-series of egg deposition estimates: 2014-2023. Declining trend: Slight (-); Moderate(--); Steep (---)*

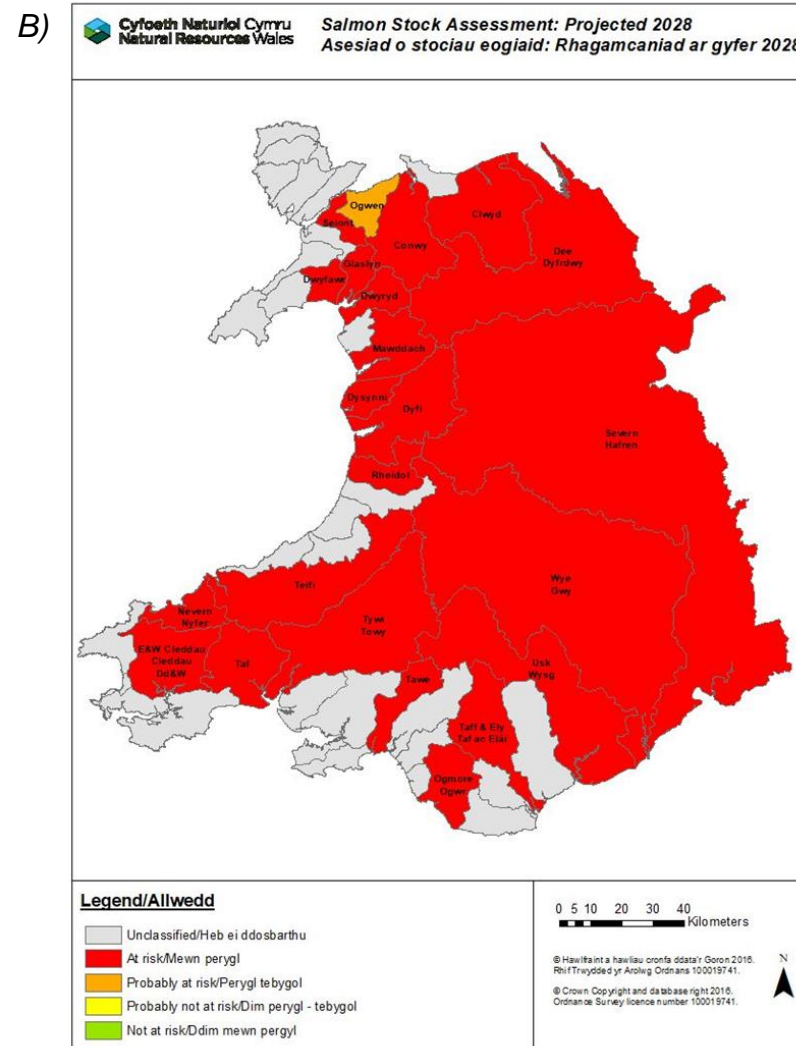
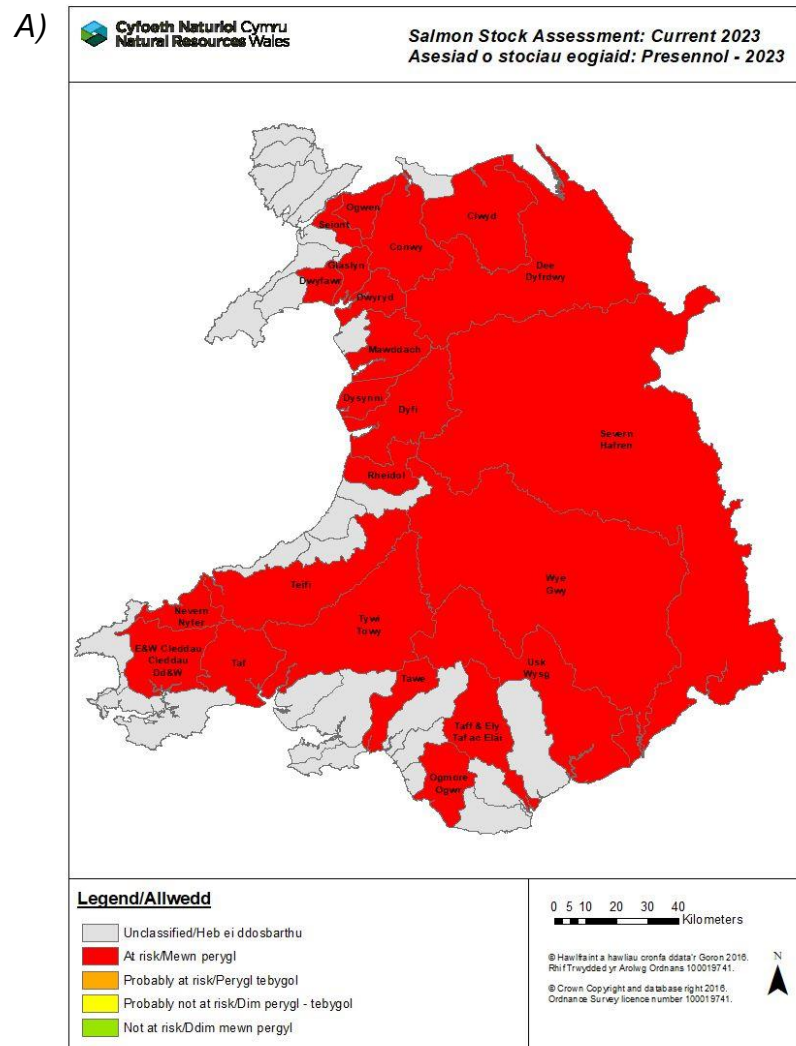
*\*\* Egg deficit based on 5-year mean 2019-2023*

*\*\*\* Spawner deficit expressed as 8lb fish equivalents; where average fecundity = 3,000 eggs per fish*

Based on average egg deposition levels estimated for Dee salmon over the last 5 years (2019-2023), a deficit of 9.35 million eggs has been calculated against an indicative Management Target of 17.63 million eggs. This deficit approximates to 3,117 spawners as 8lb fish equivalents.

The poor status of the salmon stock on the Dee is not unique. Salmon stocks across Wales and England are facing challenging times with assessment results for 2023 indicating 60 out of 64 principal river stocks projected to be 'At Risk' or 'Probably At Risk' of failing to achieve their Management Objective in 2028. Salmon assessment results for 2023 for all principal rivers in Wales are shown by catchment in Figure 10 for the latest year (2023) and projected 5-years into the future (2028)

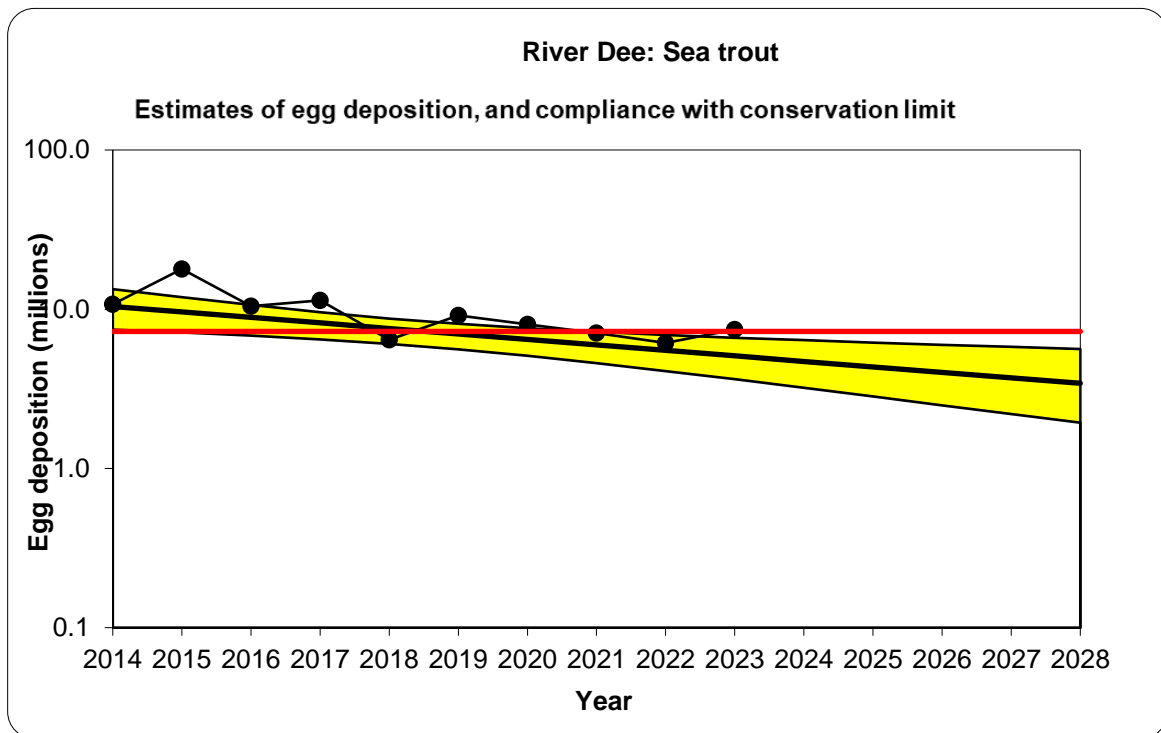
Figure 10 'Risk' status for the principal salmon rivers in Wales: in the latest assessment year (2023) (A) and projected 5-years into the future (2028) (B).



## 4.1.2 Sea trout assessment

Figure 11 and Table 2 show the latest (2023) assessment for sea trout – equivalent to those given for salmon above. The current (2023) assessment for sea trout on the Dee classifies the stock as 'At Risk' (AR) of failing to achieve the Management Objective both in 2023 and projected to 2028.

*Figure 11 River Dee sea trout stock compliance with the Management Objective: 2023 assessment year (for explanation of the graph see section 2.3 and Annex 3).*



*Table 2 Summary of sea trout stock status on the River Dee: provisional assessment results for 2023.*

Current compliance status (2023)	At Risk
Projected (+5yr) compliance status (2028)	At Risk
Trend*	Declining (---) 0.011
Conservation Limit	7.25 million eggs
Management Target	10.19 million eggs
Egg deficit on MT**	-2.68 million eggs
Spawner deficit***	1,339 adults

\* Probability of a declining trend from regression analysis applied to the 10-year time-series of egg deposition estimates: 2014-2023. Declining trend: Slight (-); Moderate(--); Steep (---)

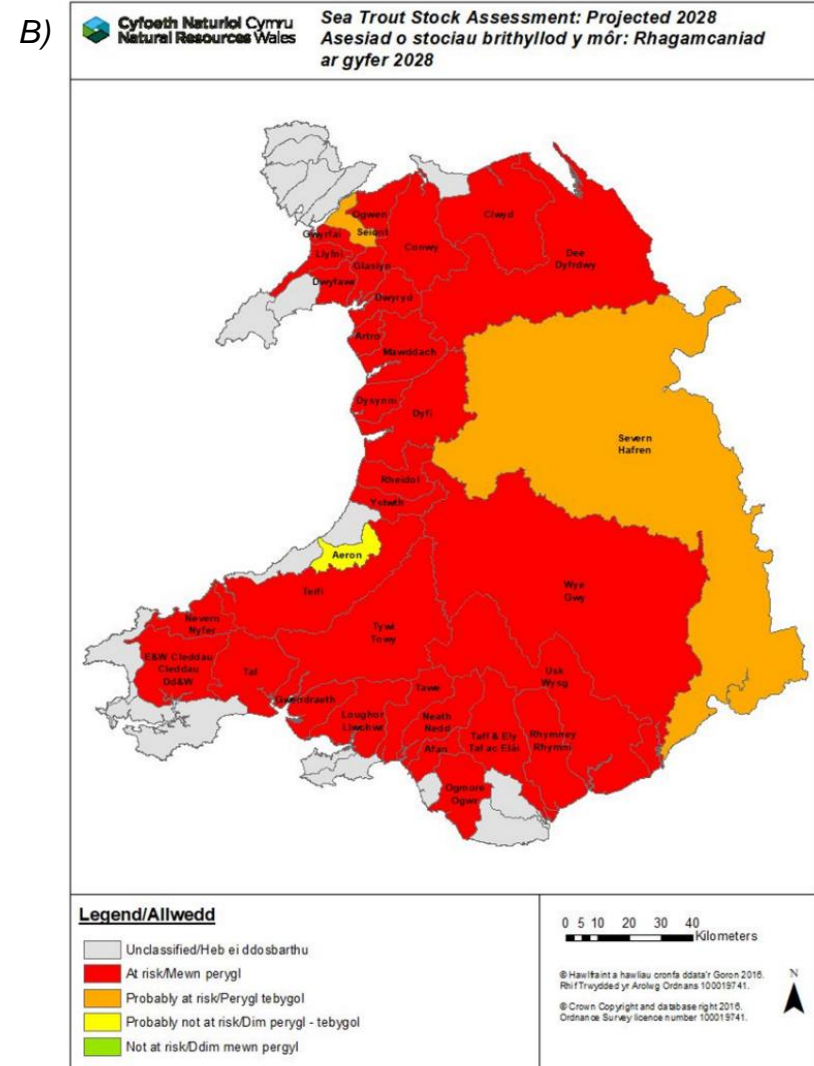
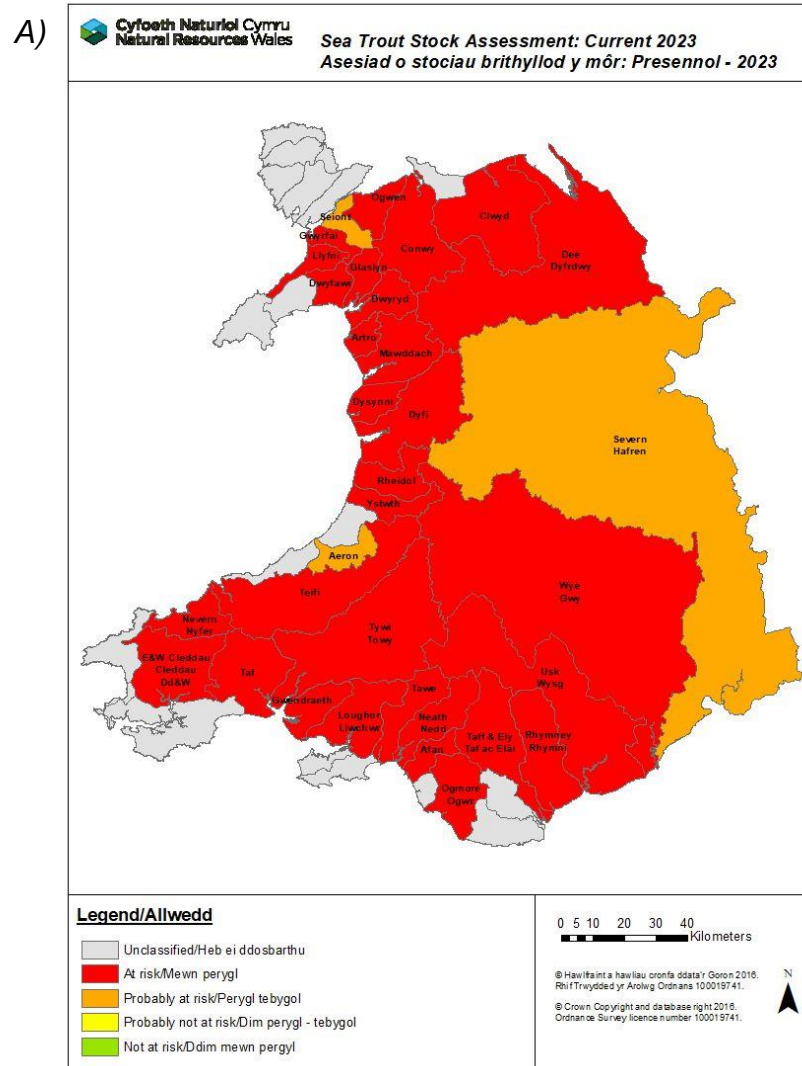
\*\* Egg deficit based on 5-year mean 2019-2023

\*\*\* Spawner deficit expressed as 3lb fish equivalents; where average fecundity = 2,000 eggs per fish

Based on average egg deposition levels estimated for River Dee sea trout over the last 5-years (2019-2023), a deficit of 2.68 million eggs has been calculated against an indicative Management Target of 10.19 million eggs. This deficit approximates to 1,339 spawners as 3lb fish equivalents.

As noted with salmon, this current poor status of the sea trout stock on the Dee is not unique, with most of the 33 principal sea trout rivers in Wales classified in the 2023 assessment as either Probably At Risk (PAR) or At Risk (AR) of failing to achieve their Management Objectives both in the latest year (2023) or projected 5-years into the future (2028) (Figure 12).

Figure 12 'Risk' status for the Main sea trout rivers in Wales: in the latest assessment year (2023) (A) and projected 5-years into the future (2028) (B).



## 4.2 Juvenile salmon and trout stock status

Two electrofishing (EF) survey programmes for juvenile salmonids are carried out on the Dee annually – one as part of the national programme and one as a component of the Dee index river programme.

The **national programme** consists of ‘temporal’ and ‘spatial’ surveys targeting a series of fixed sites. The former aims to sample the same 13 sites on the Dee year-on-year specifically to examine changes in abundance through time. The latter to sample a larger number of sites every 6 years, to provide a more complete picture of the distribution and abundance, of juvenile salmon and trout around the catchment.

Data collected by this programme are applied at various scales (e.g. site, reach and catchment) to assess the status of the resource and inform fisheries and environmental management. This includes evaluation of the Ecological Status of Waterbodies carried out to meet the requirements of the Water Environment (WFD) Regulations; and Condition Assessment on SAC rivers, undertaken as part of the Conservation of Habitats and Species Regulations e.g. where Atlantic salmon are a named feature (as on the Dee).

Electrofishing survey methods for the national programme involve single run ‘semi-quantitative’ sampling of un-netted sites, usually around 30m long and ~1m to 10m wide. Sampling is confined to wadable reaches (~thigh deep) largely comprising riffle, run and shallow pool habitats favoured by juvenile salmonids.

Results from this programme are provided annually in a Catchment Summary (‘Know-Your-River’ reports).

[Know your Rivers - salmon and sea trout catchment summaries](#)

Temporal EF survey results for the Dee in 2023 are given in Table 3 below.

It is evident from these results that abundances were highly variable between sites. For salmon fry, no sites were classified as ‘excellent’ in 2023 and only 2 out of the 9 sites fished were classified as ‘good’. Close to half the sites sampled (4 out of 9) recorded salmon fry densities in the lower 40% of the national distribution.

In contrast, for trout fry, densities at 7 out of the 9 sites sampled were classified as ‘excellent’. Densities in the remaining two sites were below average, including one site (Worthenbury Brook - site 152) where juvenile salmon and trout were absent altogether.

A comparison of average abundances across all sites over the last 9 years indicates that densities of salmon fry in 2023 were the poorest recorded; in contrast, those for trout fry were above average (Figure 13).

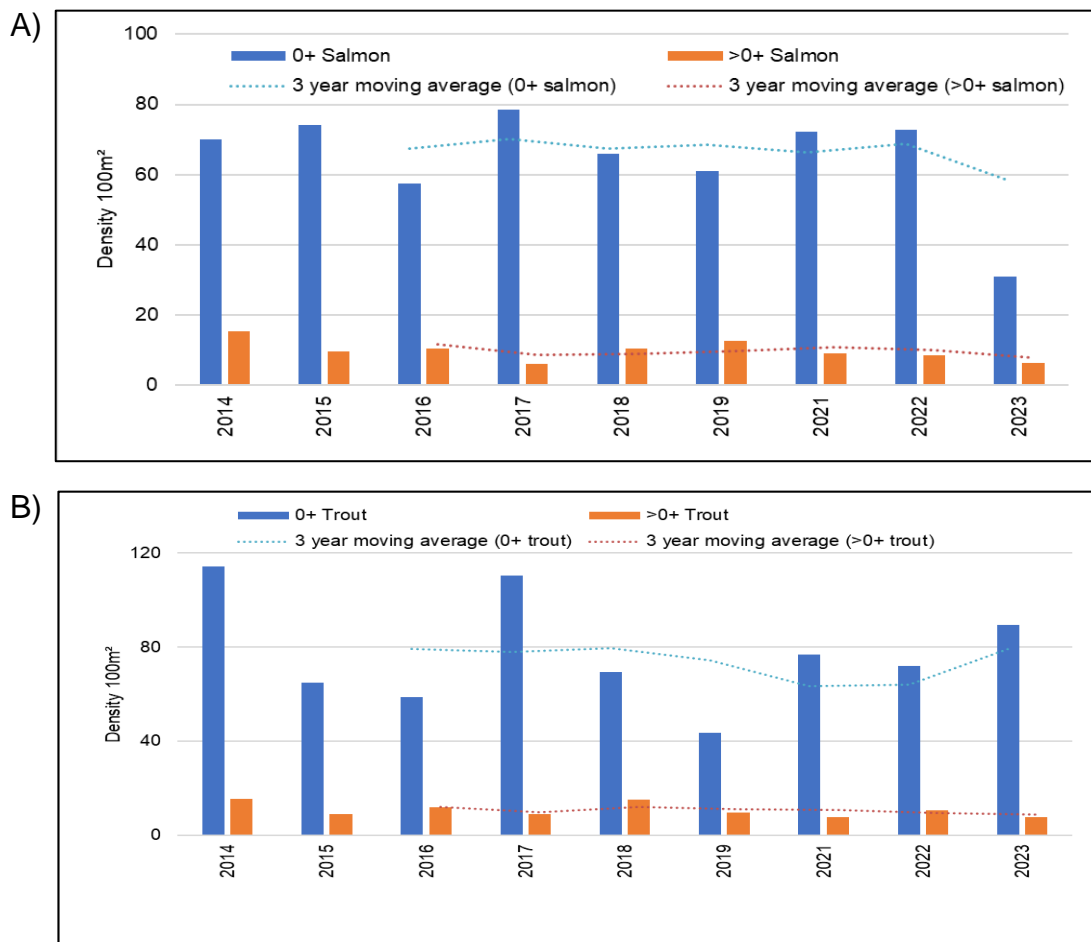
*Table 3 Dee temporal EF survey results for juvenile salmon and trout in 2023: expressed as density grades assigned using the (E&W) National Fisheries Classification Scheme*

Catchment	Site code	Year	Salmon fry grade	Salmon parr grade	Trout fry grade	Trout parr grade
Little Dee	DE3	2023	F	E	A	C
Merddwr	DE13	2023	C	D	A	C
Ceidiog	DE17	2023	B	B	A	B
Meloch	DE33	2023	D	C	A	D
Abbey Brook	DE34	2023	C	D	A	F
Mynach	DE40	2023	B	C	A	C
Morwynion	DE54	2023	E	F	A	C
Worthenbury Brook	DE152	2023	F	F	F	F
Ceirw	DE283	2023	C	C	D	F

Grade	Descriptor	Interpretation
A	Excellent	Densities in the top 80+% of national sites
B	Good	Densities in the top 60-80% of national sites
C	Fair	Densities in the middle 40-60% of national sites
D	Fair	Densities in the bottom 20-40% of national sites
E	Poor	Densities in the bottom 20% of national sites
F	Fishless	No fish of this type present



Figure 13 Average densities of juvenile salmon (A) and trout (B) (fry and parr) recorded at Dee temporal EF sites, 2014-2023. (Note: no sampling undertaken in 2020 due to the COVID pandemic).

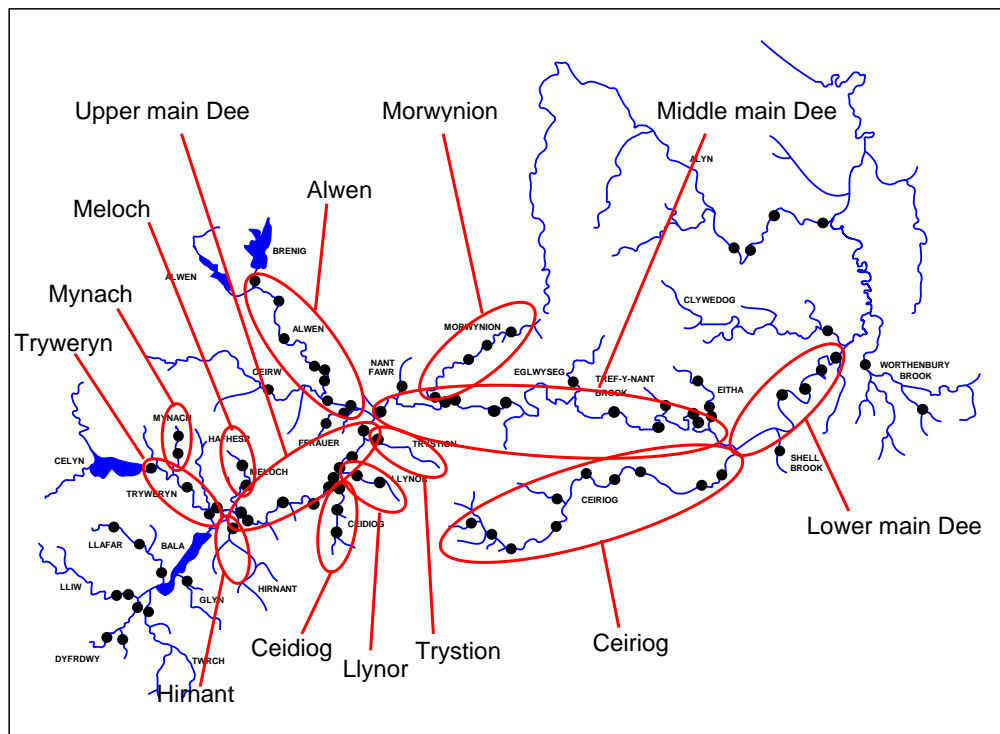


Juvenile electrofishing surveys carried out as part of the **Dee index programme** use a low-effort 5-minute timed survey technique. This is applied in shallow reach sites dominated by riffle and run habitats and generally favoured by salmon fry (but also containing trout fry, and parr of both species). The programme began in 1992 and targets 80+ sites annually (Figure 14). Sites are spread throughout the catchment and involve bank-to-bank sampling on smaller streams as well as partial sampling of wider channels on the main Dee or larger tributaries (e.g. Alwen and Tryweryn).

Survey results from this ~30-year programme have been summarised for some of the most productive tributaries and sections of the main Dee in:

[Dee Stock Assessment Programme - Angler Report 2023](#)

Figure 14 Dee 5-minute timed electrofishing survey sites: main salmon producing reaches indicated



Annual indices of total fry production for the entire Dee catchment have been generated for salmon and trout; from the sum of reach-specific abundance estimates (where a reach equates to a whole or part sub-catchment unit or main river section). Within each reach, average observed densities have been adjusted by estimates of EF catch-efficiency (which tends to decrease with channel width) and multiplied by reach wetted areas.

Figure 15 shows these annual ('year class') indices of total fry production as measures of 'recruitment', plotted against salmon and sea trout egg deposition estimates (as measures of 'stock'); the latter (as the parent fish) giving rise to the former (as the progeny). Ricker stock-recruitment (S-R) curves have been fitted to the data sets in Figure 15. From these curves, Biological Reference Points (BRPs) derived that equate to 'Maximum Recruitment' or 'RMax' (*i.e.* identified at the peak of the S-R curves).

Figure 16 shows the time-series of salmon and trout fry production indices along with their respective Rmax reference points (as described above) to provide an indication of juvenile stock performance at the catchment scale.

On this basis, indices of salmon fry production in recent years have been among the lowest recorded in the ~30 year time-series and well below the RMax reference point – an assessment in-keeping with the current 'At Risk' status assigned to the returning adult stock (see section 4.1.1).

Figure 15 Ricker stock-recruitment curves fitted to salmon and sea trout egg deposition estimates and associated fry abundance indices (the latter derived from 5-minute timed EF survey data).

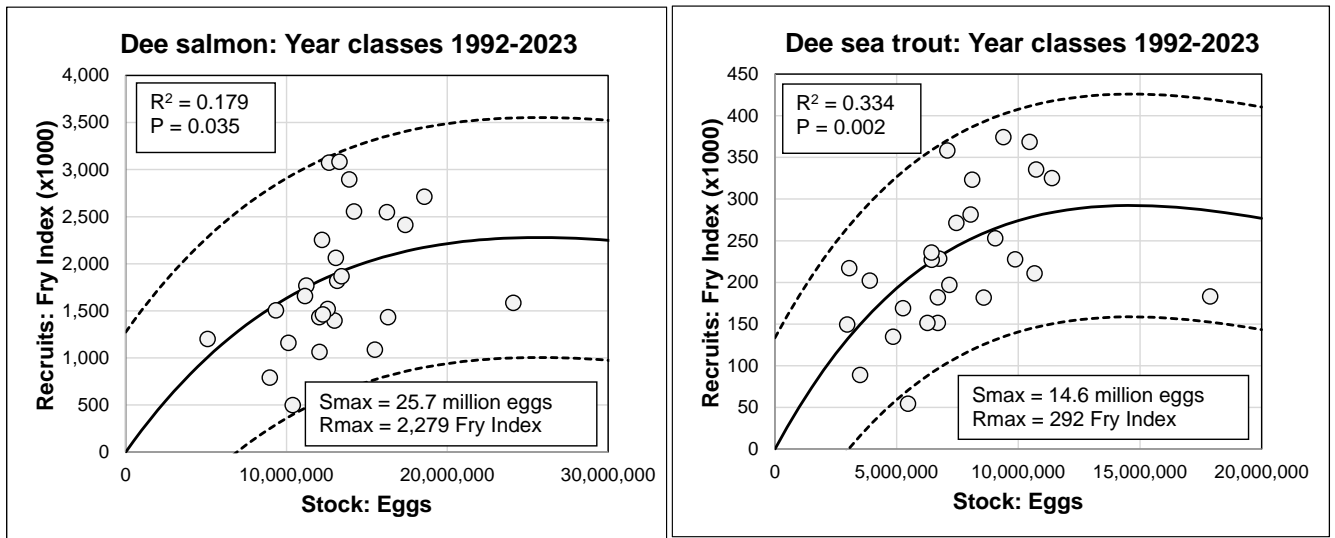
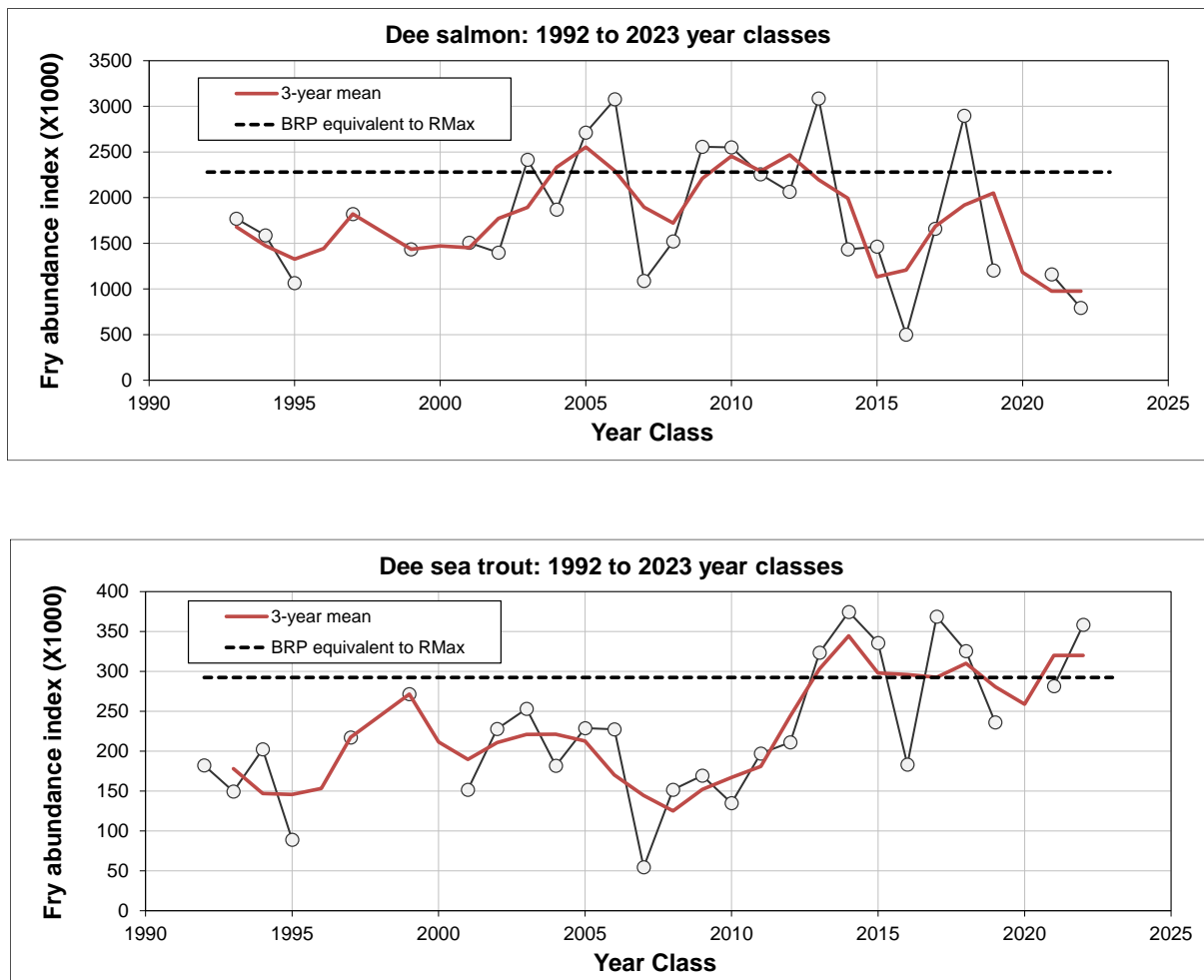


Figure 16 Dee catchment-scale salmon and trout fry production indices compared to Rmax (maximum recruitment) reference points.



For trout fry, production indices suggest that this life-stage is currently in a healthy state – meeting the RMax reference point (Figure 16). This is in contrast to the ‘At Risk’ status of adult sea trout. However, the latter trend-based assessment is influenced by the recent progressive decline in spawner and egg deposition levels, from an all-time high estimated in 2015, and is a projection of the stock status five-years into the future (2028 for the latest 2023 assessment – see section 4.1.2).

While the signs look encouraging in terms of recruitment as trout fry from the eggs deposited in recent years; recruitment as maiden adult spawners will take a further 1 to 3 years to complete (e.g. fry of the 2023 year class will not return fully as maiden adults until 2026 – although most should return by 2025).

The adult sea trout assessment methodology is designed to anticipate the possible future status of the stock. This approach aligns with that for salmon and the NASCO guidelines (section 1.4) on the assessment and management of salmon stocks and application of the ‘precautionary principle’.

One further consideration when interpreting the relationship between sea trout egg deposition and trout fry recruitment is that the latter is likely to include an unknown proportion of fish which are the progeny of river-resident brown trout parents.

## **5.Challenges to stocks: Plan of Action for Salmon and Sea Trout**

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 (Milner and Garcia de Leaniz, 2023), but recently a sharp decline in Welsh sea trout stocks has also occurred.

Our response to these declines has included two decades of investment in habitat restoration, access to spawning areas and working in partnership with the rivers trusts that have emerged in this time. This has been localised and constrained by availability of resources. There is much still to do.

In the past, stocks were more resilient to environmental challenges and able to sustain a harvestable surplus in both rod and net fisheries. However, the range and intensity of pressures has increased and new challenges have emerged. The survival of fish in both the marine and freshwater environments are being threatened. The overall status of stocks has progressively declined and are continuing to decline; the future of our fish populations are vulnerable as never before.

In confirming the new protective byelaws for salmon and sea trout in 2020, the Minister for Environment, Energy and Rural Affairs required NRW to:

“...take the lead on a Welsh specific Plan of Action for the protection of Salmon and Sea Trout, working with stakeholders.”

The purpose of the Plan of Action is to address the pressures on salmon and sea trout stocks, where it is in our direct capacity to do so; and influence actions on those pressures that are outside our immediate jurisdiction, but threaten our stocks. The Plan pulled together all current work being taken forward by all the relevant parties and identified gaps and actions to address these. We need to be prepared to adapt our Plan and strategies as pressures on our salmon and sea trout stocks change and novel issues emerge.

Together with our stakeholders, we identified and reviewed the isolated and cumulative pressures damaging our stocks. The Plan summarises the ongoing and new actions needed to address the pressures affecting our fish populations. The wellbeing of our stocks depends on favourable conditions both at sea and in our rivers. It is very clear that there is much to be done.

We need to transform river quality so that it is optimised for fish production and survival. Fish saved by new fishing regulations must have the best chance of successful breeding and their progeny must survive to maximise smolt output from the rivers. It is important to note that successful optimisation, will deliver multiple benefits such as ecosystem resilience, improved condition status of Natura 2000 features and WFD target outcomes.

[Natural Resources Wales / Salmon and Sea trout Plan of Action for Wales 2020: overview](#)

The pressures on our water environments are also considered in other, non-fisheries specific, work that NRW does.

- **River Basin Management Plans**

These plans are produced as a requirement of the Water Environment (Water Framework Directive) (England & Wales) Regulations 2017. Our rivers, lakes, wetlands, ground waters, estuaries and coastal waters, including those in protected areas all fall under these plans. They are updated on a six yearly cycle and are prepared in consultation with a wide range of organisations and individuals.

The approved river basin management plans and supporting documents are available on our website.

[Natural Resources Wales / Dee and Western Wales river basin management plans 2021-2027](#)

- **SoNaR**

NRW has compiled and published two reports on the 'State of the Natural Resources of Wales' (SoNaR). The reports have assessed the extent to which natural resources in Wales are being sustainably managed and recommended proactive approaches to building resilience. For the first time, the reports link the resilience of Welsh natural resources to the well-being of the people of Wales. The reports consider how pressures on Wales' natural resources are resulting in risks and threats to long-term

social, cultural, environmental and economic well-being, as set out in recent legislation.

[Read the 2020 State of Natural Resources Report \(SoNaRR\) for Wales](#)

- **Area Statements**

NRW has developed a series of Area Statements which use an integrated approach, working through the Public Service Boards (PSBs) with partners. These identify, the key challenges facing a particular locality, how we meet those challenges and better manage our natural resources for the benefit of future generations. The River Dee falls into the Area Statements for both North East and North West Wales.

[Read the latest Area Statements](#) (all Wales)

[Natural Resources Wales / North East Wales Area Statement](#)

[Natural Resources Wales / North West Wales Area Statement](#)

- **LIFE Dee River**

LIFE Dee River is a £6.8m project to transform the River Dee and its catchment, by restoring the river and its surroundings back to their natural state. This will benefit salmon, lamprey and freshwater pearl mussels, helping them to become more sustainable in future.

The project aims include:

Removing constraints to fish migration and improving the wider ecological connectivity of the river; partially or fully removing five weirs and installing fish passage solutions at a further six.

Restoring or improving the natural riverine physical processes, features and habitats in at least 55km of river; including replacing thousands of tonnes of gravel, boulders and adding woody material.

Improving agricultural and forestry land management practices to reduce the input of nutrients and sediments entering the river; including improving culverts, river crossings and riparian buffer zones.

Outcomes of the project include; restoration of natural riverine processes and morphology, habitats and species moved towards favourable conservation status, reduction in pollution of the river with biodiversity and drinking water benefits and improved salmon and other fish populations.

Further information can be found on the [LIFE Dee River](#) web pages.

## 6. Managing the Dee net fishery to sustain and restore stocks

### 6.1 Analysing stock status and the need for additional regulations

The measure of stock status has been used to rank individual river stocks of salmon and sea trout according to their status and therefore their need for additional protective regulatory measures (Figures 17 and 18).

For both species this ranking process (based on the 2023 assessment) takes account of three measures of stock status, applied as follows:

1. Ranking on the basis of projected 'risk' status (in 5-years' time assessment).
2. Ranking on the basis of the latest 10-year trend in egg deposition estimates (*i.e.* a measure of whether the stock is showing any strong tendency toward recovery or decline).
3. Ranking on the basis of the (most recent 5-year) average (%) egg shortfall/surplus against the Management Target (*i.e.* a measure of the average performance of the stock in recent years).

Fisheries operating on river stocks falling into the following categories are considered to require additional protective regulatory measures:

1. River stocks classified as 'At Risk' and 'Probably At Risk' in 5 years' time (2028) *i.e.* in line with the management response identified in the Decision Structure (sections 2.3 and 4.1, Annexes 2 and 3).
2. River stocks classified as 'Probably Not At Risk' but with a downward or weak ('+' or '++') upward trend and where the (most recent 5-year) average egg deposition has been below the Management Target.

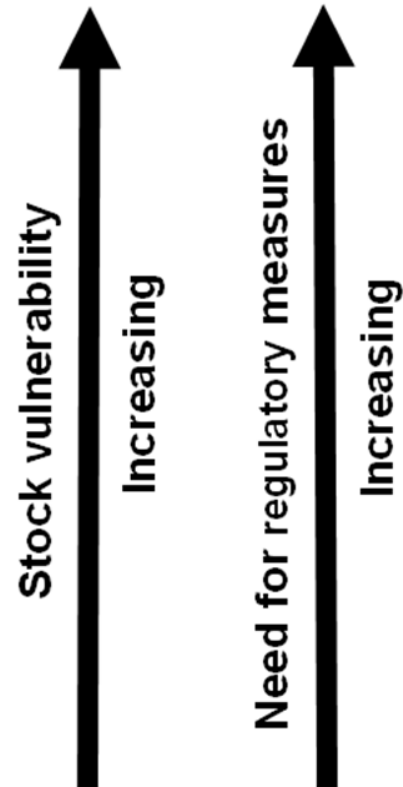
This analysis of stock assessment results places the Dee 'At Risk' (number 1 above), for both salmon and sea trout.

The Decision Structure guides us to "Identify a range of options to ensure sufficient spawning escapement to move to <50% probability of failure (of meeting the management objective) within five years ('Probably Not At Risk' category) while looking to maintain socio-economic benefits where possible"

It is clear therefore that net regulations are required on the river Dee to continue to maximise spawning escapement.

Figure 17 Overview of salmon stock status and requirement for additional regulatory measures: 2023 assessment.

River		Risk' status: 2028	Trend	*Egg deficit/surplus on Management Target (%)
Rheidol		At risk	---	-95.6
Tawe		At risk	---	-94.9
Taff & Ely		At risk	---	-94.1
Ogmore		At risk	---	-93.1
Glaslyn	#	At risk	---	-91.0
Taf	#	At risk	---	-88.6
Nevern	#	At risk	---	-84.6
E&W Cleddau	#	At risk	---	-84.0
Severn	##	At risk	---	-77.0
Usk		At risk	---	-68.0
Teifi	#	At risk	---	-75.5
Wye		At risk	---	-71.3
Conwy	#	At risk	---	-61.3
Mawddach	#	At risk	---	-36.5
Dwyfawr		At risk	--	-90.8
Clwyd		At risk	--	-89.2
Dwryrd	#	At risk	--	-78.4
Tywi	#	At risk	--	-68.8
Dee	#	At risk	--	-53.0
Dysinni	#	At risk	-	-92.0
Seiont		At risk	-	-83.2
Dyfi	#	At risk	+	-72.5
Ogwen		Prob at risk	--	-64.7



Probability (p) of upward trend:	
p ≤ 0.05	---
0.05 < p ≤ 0.10	--
0.10 < p ≤ 0.30	-
0.30 < p ≤ 0.50	.
0.50 < p < 0.70	+
0.70 ≤ p < 0.90	++
0.90 ≤ p < 0.95	+++
p ≥ 0.95	+++

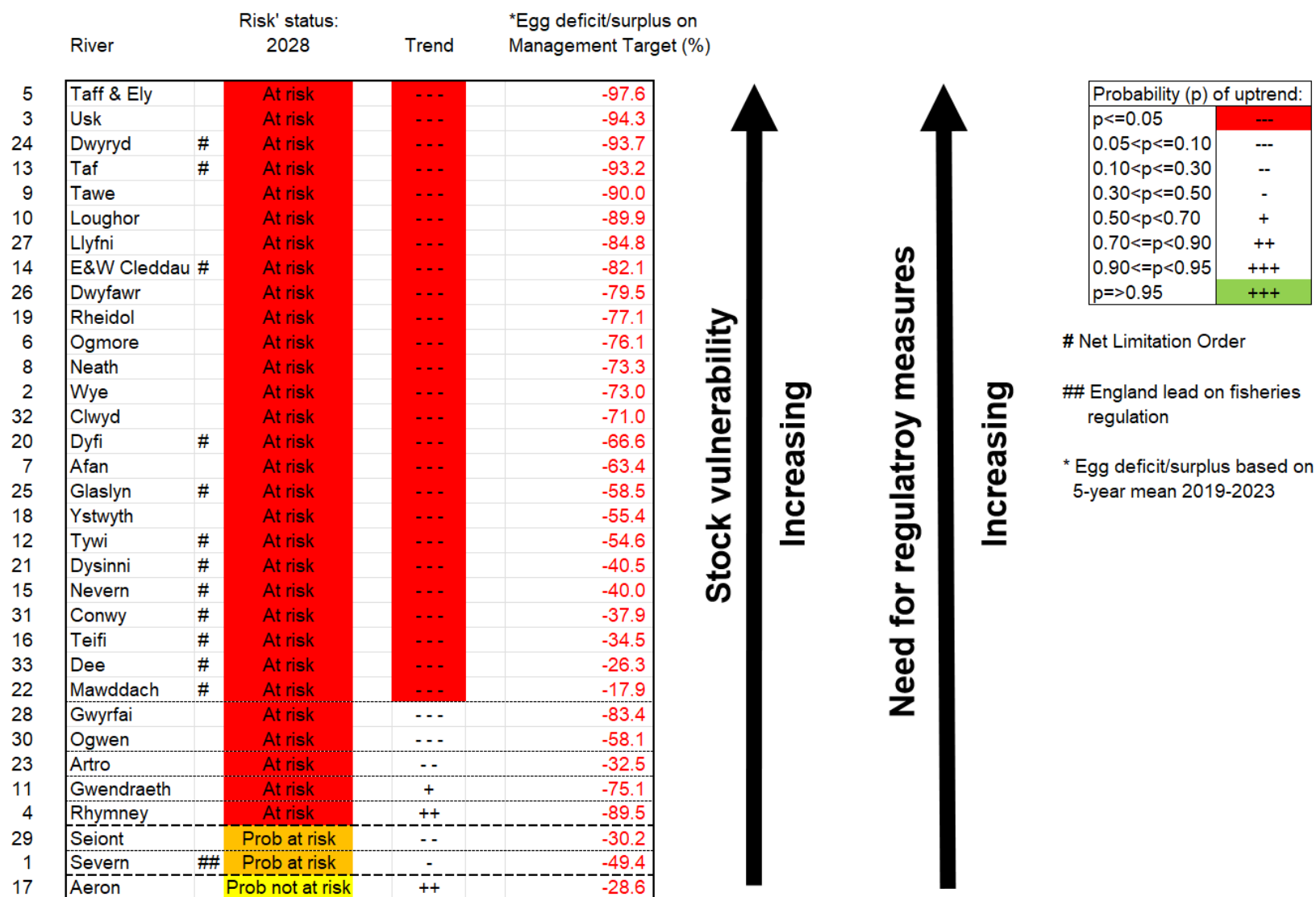
# Net Limitation Order

## England lead on fisheries regulation

\* Egg deficit/surplus based on 5-year mean 2019-2023



Figure 186 Overview of sea trout stock status and requirement for additional regulatory measures: 2023 assessment.



## 6.2 Options for the Dee salmon and sea trout net fishery

NRW have identified three options for the management of the salmon and sea trout net fishery on the River Dee:

- Option 1 – Do Nothing (re-open fishery)
- Option 2 – Renew Zero Dee NLO for 10 years.
- Option 3 – Close fishery (Byelaws)

The advantages and disadvantages of these three proposals are summarised below.

### **Option 1 – Do nothing – Allow NLO to lapse**

By not determining a new NLO by June 2025, we would essentially be re-opening the fishery on the Dee, with a potentially unlimited number of licences available. Although current byelaws would protect salmon from being taken, it would represent a net increase in pressure on salmon and sea trout stocks.

There is clear and consistent evidence on the poor current and projected status of salmon and sea trout stocks on the Dee (section 4). Having an open net fishery, would reduce the protection for salmon and sea trout and put both populations at further risk. It would not comply with our national and international duties and our organisational guidance, approach and Decision Structure.

Given the protection afforded by the All Wales byelaws, the only conceivable reason to open a net fishery at present would be to allow limited harvest of sea trout. As has been established, however, sea trout were never a significant feature of the Dee net fisheries. Moreover, the current status of sea trout stocks on the Dee show that there is no sustainable harvestable surplus.

A lapsed NLO therefore is not considered as a viable option.

### **Option 2 – Renew Zero NLO for further 10 years**

Maintains the current approach with a Zero NLO for a further 10 years. It would ensure current restrictions remain in place, with no harvest from 2025 until 2035.

Arguably this aligns with the NRW corporate wellbeing plan objective that 'Nature is Recovering', supports our Salmon and Sea trout Plan of Action and NASCO obligations. It also maintains existing protections for salmon and sea trout stocks, while retaining the opportunity to reopen the net fishery; if salmon and sea trout stocks ever recover.

It does not, however, address the long-term uncertainties faced by salmon and sea trout populations. It leaves open the option to review and potentially reopen the fishery in 10 years' time.

The fishery has been effectively closed for 15 years. The long term decline of salmon stocks in the face of climate change pressures, means we are unlikely to see stocks return to harvestable levels in our lifetime. Maintaining a zero NLO therefore can be viewed as a missed opportunity to close the fishery for good and secure protection for these stocks into the future.

The option therefore is viable, but represents the minimum level of protection that could be afforded to the vulnerable stocks.

### **Option 3 – Close fishery (Byelaws)**

Initially this option appears to provide no more protection than option 2, as both would see the fishery remaining closed for another 10 years. However, by 2035 (if not sooner), there would need to be another NLO review to determine whether the fishery should re-open.

Given the current and projected status of salmon stocks, and the ongoing climate emergency, the likelihood of a recovery to harvestable levels seem extremely unlikely. Closing the fishery permanently, provides greater security and longer-term protection of the stocks of salmon and sea trout in the Dee.

It clearly aligns to the NRW corporate plan wellbeing objective that 'Nature is Recovering', supports our Salmon and Sea trout Plan of Action and NASCO obligations.

It is a management action that provides greater protection for the future uncertainties faced by salmon and sea trout stocks. It avoids the requirement for future NLO reviews and reduces the resource required for future administration and compliance.

The closure of the fishery would also honour the intent of the 2009 net buy-out.

It should be noted, however, that if salmon and sea trout stocks were ever to recover to a harvestable surplus, there remains the option to reopen the fishery should there be sufficient and balanced socio economic value in doing so.

**The preferred option proposed is Option 3 – close the net fishery with Byelaws.**

River Dee – Do Nothing (allow the NLO to lapse)

Advantages	Disadvantages	Accept or Reject?
<p>No additional work required for NLO review (see below).</p> <p>Potential new net licence income (ca £7k) (though this probably would not cover administration and compliance, it likely there would be a net cost to NRW).</p>	<p>An unlimited number of licences would theoretically be available until a new NLO is implemented.</p> <p>New licence applications would require administrative and compliance checking resource (unlikely to be covered by income).</p> <p>Individual licences would require HRA (Habitats Regulation Assessment), and even a catch and release fishery for salmon would represent increased pressure on salmon.</p> <p>Fail to protect stocks and national (ministerial) and international (NASCO) obligations to protect vulnerable stocks.</p> <p>Contravenes the Decision structure.</p> <p>Reputational Risk – especially from stakeholders that financed the net buy-out. Highly likely there would be complaints.</p> <p>Sea trout exploitation increased.</p> <p>Increased pressure on salmon.</p>	<p><b>Reject</b></p> <p>Salmon and sea trout are vulnerable with no harvestable surplus.</p> <p>Contrary to our duty to protect our stocks.</p> <p>Puts salmon and sea trout stocks more at risk.</p> <p>Additional resource required for compliance and administration.</p> <p>Would adversely impact on the Dee SACs.</p>

River Dee – Renew Zero NLO for 10 years

Advantages	Disadvantages	Accept or Reject?
<p>Secures zero harvest from net fisheries for 10 years.</p> <p>Aligns with our 2030 Corporate Plan 'Nature is Recovering' wellbeing objective and supports our approach to our Salmon and Sea trout Plan of Action and NASCO obligations.</p> <p>Low risk of stakeholder objections based on previous NLO.</p> <p>Maintains the option to reopen the fishery should stocks recover.</p>	<p>Meets minimum angler stakeholder expectation.</p> <p>Additional future resource required to review and re-establish Dee NLO.</p> <p>Process can take up to 12 months.</p> <p>Future resource and costs associated with legal process.</p> <p>Only provides security of stock protection up to 10 years.</p>	<p><b>Reject</b></p> <p>Salmon and sea trout are vulnerable with no harvestable surplus.</p> <p>Salmon unlikely to recover to 'sustainable levels' within 10 years.</p> <p>Populations are 'At Risk' and projected to continue declining.</p> <p>Only provides medium term security to protect stocks (two cohorts).</p> <p>Continued review and renewal of the Zero NLO, requires resource to review and re-establish.</p> <p>Delivers our national and international obligations for the medium term.</p>

## River Dee – Close fishery (Byelaws)

Advantages	Disadvantages	Accept or Reject?
<p>Fishery permanently closed – secures no harvest from net fisheries as a long-term management action.</p> <p>Aligns with our 2030 Corporate Plan 'Nature is Recovering' wellbeing objective and supports our approach to our Salmon and Sea trout Plan of Action and NASCO obligations.</p> <p>Meets angling stakeholder expectation following the buy-out.</p> <p>No resource required for future NLO reviews.</p> <p>Reduced ongoing resource requirements for promotion, administration and compliance of NLO.</p> <p>Clear cut long term management of stocks that are 'At Risk' and projected to continue to decline over the next 5 years.</p> <p>Demonstrates long term commitment to our national and international obligations, and sets a precedent for other NLOs.</p> <p>Resource can be used for delivery of improvements for the fishery and addressing other pressures on stocks.</p> <p>One off costs for legal processes and review (unless byelaws repealed if stocks in future allow).</p> <p>Clarity of position for stakeholders.</p> <p>Stocks protected from exploitation for beyond the medium term.</p>	<p>Fishery permanently closed – potential loss of developing net fishery in future. (Unlikely with current stock status and trends).</p> <p>Risk of challenge to fishery closure byelaws.</p>	<p><b>Accept</b></p> <p>There is no harvestable surplus of salmon and sea trout stocks.</p> <p>Provides long term security to protect vulnerable Dee stocks, that are 'At Risk' and projected to continue declining.</p> <p>Delivers on our national and international obligations over the longer term.</p> <p>Clear cut management that will involve less resource in the future for the administration and compliance.</p> <p>Greater opportunity to protect salmon and sea trout stocks from future uncertainties.</p> <p>Could be revoked in the future if stocks ever recover to harvestable levels.</p>

## 6.3 Socio-economic impacts

The cultural traditions and practices associated with salmon and sea trout netting are high, and where these fisheries close there will be a loss to that community. Many licensees are fifth or sixth generation fishermen. However, on the Dee there has been no net fishery since 2009 when the last draft net was bought out by Dee angling interests.

The net fishery relies on salmon and sea trout and there can be no fishery where there are no salmon or sea trout populations to support it. We are at a critical point for the survival of our Welsh Dee stocks and we recognise that the closure of the net fishery on the Dee could be deeply felt, but to ensure the longer-term survival of our salmon and sea trout populations we have proposed these measures.

With no net fishery in existence for the last 15 years, there has been no socio-economic benefit to the local communities from this activity and the closure of the fishery will not change this. The benefits of the proposed measures will contribute to the preservation of Welsh Dee salmon and sea trout stocks.

It is difficult to link these measures to a clear metric for environmental benefit, however, the introduction of the byelaws is intended to prevent further decline and allow salmon and sea trout stocks time to recover. It also provides the opportunity to address some of the other pressures on the fish stocks within our rivers at the same time.

These measures are intended to improve the numbers and resilience of the stocks so that fishing uptake will increase in the future. This would have a direct effect, increasing the socio-economic benefits from Welsh Fisheries.

## 7. Engagement and liaison with stakeholders

NRW has sought the views and advice of our local fisheries stakeholders as part of the decision-making process, for management of fisheries. At the North Local Fisheries Advisory Group (LFAG) on 14<sup>th</sup> February 2023 and Wales Fisheries Forum (WFF) on the 26<sup>th</sup> March 2024 we sought comments and proposals on how members felt that the salmon and sea trout fisheries on their rivers fish might be managed, taking into account the status of the supporting stocks.

The three options discussed were:

- Option 1 – Do Nothing (allow the NLO to lapse, open net fishery)
- Option 2 – Renew Zero Dee NLO for 10 years
- Option 3 – Close fishery (Byelaws)

There was widespread support from both the North LFAG and the WFF to close the net fishery through byelaws. There was no support to Renew the Zero NLO or let

the existing NLO lapse, without measures in place to ensure no further exploitation of salmon or sea trout.

NRWs final proposals have been developed taking these views into account, whilst adopting a rational, reasonable and responsible approach to regulation of the fisheries.

## 8. The Natural Resources Body for Wales - *Vires* for action

In order to progress with proposals for any statutory regulation of fishing, it is necessary to establish the legal basis to do so. The *vires* for regulation of fishing are set out below:

### 1. Relevant Enabling Powers

The proposed byelaws find statutory authority in Section 210 of the Water Resources Act 1991 ("the 1991 Act"). That Section gives effect to Schedule 25 to the 1991 Act which confers on the Natural Resources Body for Wales ("**NRW**") powers to 'make byelaws for purposes connected with the carrying out of its functions'.

### 2. Byelaw-making power

2.1 Paragraph 6 of Schedule 25 provides NRW with byelaw making powers for the purposes of its fisheries functions. Paragraph 6(1) reads:

[NRW] shall have power, in relation to the whole or any part or parts of the area in relation to which it carries out its functions relating to fisheries under Part V of this Act, to make byelaws generally for the purposes of -

- (a) the better execution of the Salmon and Freshwater Fisheries Act 1975; and
- (b) the better protection, preservation and improvement of any fisheries of fish to which this paragraph applies.

2.2 Paragraph 6(1A) states that the whole of paragraph 6 of Schedule 25 applies to:

- (a) salmon, trout, eels, lampreys, smelt, shad and freshwater fish; and
- (b) fish of such other description as may be specified for the purposes of this paragraph by order under Section 40A of the Salmon and Freshwater Fisheries Act 1975.

### 3. Lawful purpose of Byelaw making power

3.1 In addition to the general purposes set down in paragraph 6(1), paragraph 6(2) of Schedule 25 sets out the more specific purposes for which NRW may make byelaws under paragraph 6(1). These include a power:

"in relation to the whole or any part or parts of the area mentioned in sub-paragraph (1) above to make byelaws for any of the following purposes .

3.2 Accordingly, NRW rely on Section 210 of, and paragraph 6(1)(b) of Schedule 25 to the 1991 Act in order to make these byelaws.



#### 4. Geographical scope of byelaw making power

4.1 Paragraph 6(1) of Schedule 25 specifies that the 'area' over which the power to make byelaws is that in respect of which NRW carries out fisheries functions under Part V of the 1991 Act'. Section 114 of the 1991 which set down the fisheries functions has been repealed and NRW's functions are now set down in Section 6(6) of the Environment Act 1995. This reads:

It shall be the duty of [NRW] to maintain, improve and develop fisheries of:

- (a) salmon, trout, eels, lampreys, smelt and freshwater fish, and
- (b) fish of such other description as may be specified for the purposes of this subsection by order under Section 40A of the Salmon and Freshwater Fisheries Act 1975.

4.2 Section 6(7) of that Act identifies the area over which NRW should exercise these functions as being the whole of Wales, together with such parts of the territorial sea adjacent to Wales as extends for six miles from the baselines from which the breadth of that sea is measured ("the Area").

4.3 Accordingly, it is this Area, to which the byelaw making power in Section 210 of the 1991 Act applies.

## 9. Conclusions

This Technical case document, and associated annexes, represents the evidence base, options, and proposals for fishing controls on the River Dee net fishery.

We are mindful that the existing NLO comes to an end on the 30<sup>th</sup> June 2025. If new controls (either Zero NLO or byelaws) are not put in place, there is a risk that there will be reduced protection of the vulnerable salmon and sea trout stocks in this river.

The salmon and sea trout net fishery on the Dee has been closed for 15 years, following a 'buy-out' of the Netsmen by Dee Angling interests.

NRW has paid careful attention to the legislation requiring all public sector bodies to focus on the sustainable management of natural resources.

The resource (salmon and sea trout stocks) is shared across different sectors of society, including those who target the fish for commercial or recreational fishing and also those who consider the existence of healthy stocks a vital component of our wild natural resources. This societal existence value is reflected in the designation of habitats and species for their fundamental nature conservation value, and specifically in the SAC designation of the River Dee.

NRW's objective is the sustainable management of Wales' natural resources of salmon and sea trout, including their exploitation where stocks allow. This document sets out the current status and the actions that are required to sustain these stocks on the River Dee.

The nature and extent of the decline in salmon stocks is severe. Salmon and sea trout stocks on the Dee are falling below their management targets and are deemed unsustainable. There is a risk of ongoing decline to increasingly unsafe stock levels. Salmon stocks in particular are at an historic low.

There are a range of factors contributing to the decline of stocks, but climate change is an increasingly dominant factor. It is recognised that currently active fisheries in Wales are not the primary cause, but given the current status of stocks, it is clear the harvest and killing of fish is not sustainable.

NRW's solution to address the numerous and complex causes of the problem, includes a broad range of measures, ensuring that land and water are managed sustainably (see [Natural Resources Wales / Salmon and sea trout plan of action for Wales 2020: overview](#)).

NRW are required to review the Dee NLO by June 2025. In doing so we have identified the three regulatory options that may replace the current NLO. One of these options (1) increases risk to these vulnerable stocks. Two options (2 & 3) will continue to provide current levels of protection to salmon and sea trout on the Dee; albeit we are recommending option 3, to close the net fishery by byelaws, as the most appropriate and protective long term measure.

NRW therefore submits that the proposed byelaws (to close the net fishery) is necessary, proportionate and reasonable.

We have engaged with stakeholders throughout the process of gathering and assessing evidence; with informal liaison and discussions with stakeholder groups, including the Local Fisheries Group and the Wales Fisheries Forum. NRW takes the management lead for diadromous fish stock management on the River Dee. The EA have responsibility for ensuring regulations are applied in England. There is agreement that NRW and the EA will seek a single integrated approach to fishery regulation. Equivalent byelaws will be applied on the English and Welsh parts of the river.

If new restrictions are not put in place after the 30<sup>th</sup> of June 2025, there is the risk that there will be less protection of highly vulnerable salmon and sea trout stocks in the River Dee.

The proposed closure of the net fishery represents the most sustainable long term protection for the Dee. NRW will continue to progress complementary, habitat and regulatory measures to promote stock recovery in the catchment.

### **What are we consulting on?**

This consultation is on our proposals for a new byelaws that will affect the salmon and sea trout net fisheries on the River Dee (in Wales).

The measures will, if approved, run in perpetuity or until they were repealed.

The proposals are: to seek confirmation of new byelaws for net fishing in The River Dee and Dee Estuary effectively closing the existing fishery.

Our proposal (Byelaws)

## River Dee

### **The Salmon and Sea Trout (Prohibitions of Net Fishing) (River Dee) (Wales) Byelaws (2025)**

Byelaw 4 – Prohibition of Net Fishing for Salmon or Sea Trout on the River Dee.

Note: NRW is working with the Environment Agency on the technical case and net fishing byelaws for the Dee and is seeking to ensure commensurate byelaws for the Dee in England, thereby ensuring a consistent catchment approach for the cross-border river.

## 10. Next steps

This document supports a public consultation exercise that seeks views from stakeholders into the future management of salmon and sea trout net fisheries on the River Dee.

We have set out options for both species, and we have provided background to enable people to consider the issue and their preference for future fishing controls after June 30<sup>th</sup> 2025.

The consultation will run for a period of 12 weeks from the date of publication.

We will review responses and, as far as is practicable, we will respond to each one. Subject to the outcome of this we will make our case for any required legislative change to the Welsh Government Deputy First Minister and Cabinet Secretary for Climate Change and Rural Affairs.

# GLOSSARY

**2017 Regulations** – see Conservation of Habitats and Species Regulations 2017 (as amended).

**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 one sea winter (1SW); two sea winter ( 2SW) etc.).

**‘All Wales’ byelaws** – byelaws introduced on all rivers in Wales. Following public consultation in 2017 and a local public Inquiry in 2018/19, new byelaws were introduced for rivers wholly within Wales in 2020; requiring all salmon caught by net and rod fisheries to adopt statutory catch and release fishing. Release of all sea trout larger than 60cm, and any sea trout caught before the 1<sup>st</sup> May in designated vulnerable rivers was also mandated. Method controls, including hook types, sizes and bait used, were introduced to improve post release survival rates.

**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).

**‘At Risk’ (AR)** – When river stocks are statistically failing to meet their management objective.

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

**By-catch** -The capture of non-targeted fish.

**Catch and Release** – a method of angling where some or all the fish caught are released after capture.

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

**Condition assessment** – Under the Conservation of Habitats and Species Regulations 2017 (as amended); each country in the UK assesses the condition of features, of each Special Area of Conservation (SAC), as to whether they are in ‘Favourable’ or ‘Unfavourable’ condition.

**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.

**Conservation of Habitats and Species Regulations 2017 (as amended) -** Amendments made to the 2017 Regulations (as amended by Conservation of Habitats and Species (Amendment) (EU Exit) Regulations 2019) involved transferring functions from the European Commission to the appropriate authorities

in England and Wales. This applies to the Habitats Directive in the UK post the EU Exit.

**CPUE** - Catch per unit effort.

**‘Cross Border’ byelaws** - byelaws introduced in 2020 on the rivers Wye and Dee in Wales, requiring the Dee to adopt statutory catch and release fishing for salmon (already in place on the Wye) and release of all sea trout larger than 60cm, and any sea trout caught before the 1<sup>st</sup> May. Method controls, including hook types, sizes and bait used, were introduced for both rivers to improve post release survival rates.

**Decision Structure** - The Decision Structure (Annex 2) 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’).

**Diadromous Fishes** - Diadromous is a general category describing fish that spend portions of their life cycles partially in fresh water and partially in salt water. These represent both anadromous and catadromous fish.

**Ecosystem** - A community of organisms and their physical environment interacting as an ecological unit.

**Egg shortfall or deficit** – The difference in the number of eggs required to meet conservation limit and what is calculated to be produced.

**Escapement** - Fish that survive to spawn after exploitation of the stock.

**EU Directive** - A European Union legal instruction, binding on Member States, but which must be implemented through national legislation within a prescribed timescale.

**Exploitation** - Removal of fish from a stock by fishing.

**Fishery** - The area where it is, or may be, lawful to fish and where the resource is exploitable.

**Fry** - Young salmon or trout that have hatched out in the current year, normally in May; independent of the yolk sac as their primary source of nutrition, up to dispersal from spawning areas (redds). Referred to as 0+ when caught in the summer months, prior to their first winter in freshwater.

**Good ecological status** - A key target under the Water Environment (Water Framework Directive (WFD)) (England & Wales) Regulations 2017. Water bodies of ‘good ecological status’ should have the biological and chemical characteristics expected under sustainable conditions. Practicality and the cost to society must be considered in achieving this and this principle is also inherent in the WFD.

**Grilse** - An adult salmon that has spent only one winter feeding at sea (one sea winter (1SW) salmon) before returning to freshwater to spawn; normally only applied to salmon in homewaters.

**Heritage fishery** – A fishery which uses a method that is considered to have an aspect of worth or importance attached by people to qualities of places, communal or historical value. e.g. coracle fishing.

**International Council for the Exploration of the Sea (ICES)** – An international organisation, established in 1902, that develops science and advice to evaluate the status of various fish stocks (including Atlantic salmon) and support their sustainable exploitation. The UK is a member country. ICES consists of a network of more than 4000 scientists from over 350 institutes in 20 member countries.

**International Union for Conservation of Nature's Red List of Threatened Species (IUCN)** - Established in 1964, the International Union for Conservation of Nature's Red List of Threatened Species has evolved to become the world's most comprehensive information source on the global extinction risk status of animal, fungus and plant species.

**Juvenile** - Young fish including fry and parr, mostly similar in form to adults but not yet sexually mature. In some cases, refers to a stage unlike the adult in appearance.

**Main Sea Trout Rivers** - Sea trout distribution is more widespread and they are generally more abundant than salmon in Welsh rivers. There are 33 sea trout fisheries that are assessed each year include : Severn\*, Wye\*, Usk, Rhymney, Taff, Ogmere, Afan, Neath, Tawe, Loughor, Gwendraeth Fawr & Fach, Tywi, Taf, Eastern & Western Cleddau, Nevern, Teifi, Aeron, Ystwyth, Rheidol, Dyfi, Dysynni, Mawddach & Wnion, Artro, Dwyrhyd, Glaslyn, Dwyfach & Dwyfawr, Llyfni, Gwyrfai, Seiont, Ogwen, Conwy, Clwyd, Dee\*. (\* indicates cross-border rivers)

Assessment is based on compliance with Conservation Limits using methods equivalent or identical to those used on salmon in England and Wales. Such methods were first applied to sea trout in 2016.

**Management Objective (MO)** - Compliance procedures require that spawning levels are above the Conservation Limit in four years out of five, (*i.e.* 80% of the time) in order for a stock to formally 'pass' its Conservation Limit. This is the 'Management Objective' and the associated 'Management Target' (a 'target' reference point) defines the average stock level required to achieve this. The compliance procedure ensures there is a high probability that stocks are exceeding their Conservation Limit – a precautionary approach in-line with the recommendations of ICES and NASCO, and in-keeping with methods applied by other jurisdictions.

**Management target (MT)** - A spawning stock level for managers to aim at, 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.

**UK National Sites Network** – Network created by the 2017 Regulations including existing SACs and Special Protected Areas (SPAs) (created under the Habitats Directive), and any new SACs and SPAs designated under these Regulations. Previously part of the EU's Natura 2000 ecological network.

**North Atlantic Salmon Conservation Organisation (NASCO)** – An organisation established in 1984 following calls for international co-operation on the management of salmon stocks. Its objective is to conserve, restore, enhance, and rationally manage Atlantic salmon through co-operation taking account of the best available scientific information. The Contracting Parties to the NASCO Convention are currently: Canada, Denmark (in respect of the Faroe Islands and Greenland), European Union, Iceland, Norway, the Russian Federation, United Kingdom, and the USA.

**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 public fishery. Each order limits the number of licences for fishing with nets that may be issued in any specific fishery for up to 10 years

**No Adverse Impact (NAI)** – Requirement of the Habitats Regulation Assessment (HRA), to show no adverse impact from the proposal on the feature status of the SAC.

**'Not At Risk' (NAR)** – When river stocks are statistically meeting their management objective.

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

**Parr** - Juvenile salmon or trout in the stage following fry until its migration as a smolt (in salmon or sea trout). Parr are typically <16 cm long. Referred to as >0+ when caught in the summer months, after their first winter in freshwater. Salmon parr may spend between 1 and 3 years in the river before migrating to sea.

**Principal Salmon River** – Rivers nominated in the 1998 Ministerial Directive - Rivers which on average had a catch of over 50 salmon per year and or a net fishery. Set spawning targets and review and report annually against these.

These include the 23 rivers in Wales: Severn\*, Wye\*, Usk, Taff & Ely, Ogmores, Tawe, Tywi, Taf, E&W Cleddau, Teifi, Rheidol, Nevern, Dyfi, Dysinni, Mawddach, Dwyryd, Glaslyn, Dwyfawr, Seiont, Ogwen, Conwy, Clwyd, Dee\* (\* indicates cross-border rivers)

**'Probably At Risk' (PAR)** – When the likelihood of river stocks passing their management objective is less than 50%.

**'Probably Not At Risk' (PNAR)** – When the likelihood of river stocks passing their management objective is greater than 50%.

**Quantitative Survey** - Quantitative surveys use a catch depletion method, which gives a population estimate. Electric fishing is carried out for a measured length of the watercourse, which is netted at either end to ensure a closed population. This area is fished three times successively or until a good depletion is obtained. The fish are then identified, measured and counted.

**Recruits** - The abundance of fish measured at a particular point in the life cycle, e.g. at the juvenile stages, the smolt stage, prior to the first fishery (recruitment to the fishery), or as returning spawners.

**Run** - The number of adult salmon or sea trout 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 and sea trout in the spring summer and early autumn.

**Salmonid** - A fish belonging to the family *Salmonidae*, which includes the Atlantic salmon (*Salmo salar*), brown trout / sea trout (*Salmo trutta*), char (*Salvelinus alpinus*) and rainbow trout (*Oncorhynchus mykiss*).

**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.

**Semi-Quantitative Survey** - Electric fishing is carried out for a measured length of the watercourse. The fish are then identified, measured and counted. Unlike the quantitative method this method does not rely on a depletion so a probability of capture (P value) can be applied to calculate and estimate what a quantitative method would have produced.

**Smolt** - The stage in the life cycle of a salmon or a sea trout when the parr undergo physiological changes, become silver in appearance and migrate to sea. Salmon smolts are typically 12–16 cm long, either one or two years old and migrate to sea in spring. Sea trout will generally migrate to sea when they are between 1 and 3 years old and around 13 to 18cm long,

**Smolt Output** – A general term that refers to the numbers of salmon or sea trout smolts produced by a river system – usually on an annual basis. The capacity of a system to produce smolts (and earlier life stages) is largely dependent on the extent and quality of the freshwater environment. This capacity is also referred to as the 'carrying capacity' and signifies that there are limits to the numbers of fish any one river can produce. Poor survival at sea is currently a major and universal constraint on the numbers of adults returning to our rivers, but an area where we have little control. Hence, ensuring that as many fish as possible survive to spawn and maintaining and improving the quality of the freshwater environment to maximise smolt output are key management objectives.



**Spatial Survey** – Surveys that are completed once every 6 years on a rolling programme and consist of a greater number of sites which cover the entire catchment. These surveys aim to show spread of species rather than trends over time (see temporal surveys).

**Spawning stock** - The part of a stock which is mature and breeding, the number or biomass of all fish beyond the age or size class in which 50% of the individuals are mature.

**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 or sea trout 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’).

**Stock recruitment models** - Fishery models that predict the amount of juvenile recruitment as a function of the parent stock.

**Stocking** - The intentional release of fish into an ecosystem.

**Sustainable management of natural resources (SMNR)** - Using natural resources in a way and at a rate that maintains and enhances the resilience of ecosystems and the benefits they provide. Allowing them to meet the needs of current and future generations, without compromising their needs. Contributing to the achievement of the well-being goals set out in the Well-being of Future Generations (Wales) Act 2015. Also referred to as sustainable management.

**Sustainable use** - The use of a biological resource, in a way and at a rate that does not lead to the long-term decline of its potential to meet the needs and aspirations of present and future generations. Sustainable use does not imply that abundance is constant.

**Temporal Survey** – Surveys that are completed once a year to show population trends over time.

**Vires** – The legal power to carry out statutory duty.

**Water Framework Directive (WFD)** – An EU directive that commits European Union Member States to achieve good status for all water bodies (including marine waters up to one nautical mile from shore) by 2015. Transposed into The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017, following UK departure from EU.

# ABBREVIATIONS

**1SW** – One sea winter

**AR** – ‘At Risk’

**C&R** – Catch and Release

**CEFAS** – Centre for fisheries management, environmental protection and aquaculture

**CL** - Conservation Limit

**CPUE** – Catch per Unit of Effort

**DEFRA** – Department for environment, food and rural affairs

**DS** – Decision structure.

**E&W** – England and Wales

**EA** – Environment Agency

**EC** – European Commission

**EU** - European Union

**HRA** – Habitats Regulations Assessment

**ICES** - International Council for the Exploration of the Sea

**IUCN** - International Union for Conservation of Nature’s Red List of Threatened Species

**JNCC** – Joint Nature Conservation Committee

**LFG** – Local Fisheries Group

**MSW** – Multi sea winter

**MSY** – Maximum Sustainable Yield

**MO** – Management Objective

**MT** – Management Target

**NAR** – ‘Not At Risk’

**NASCO** - North Atlantic Salmon Conservation Organization

**NE** – Natural England

**NEAC** – North-East Atlantic Commission

**NAI** – No Adverse Impact (HRA)

**NLO** – Net Limitation Order

**NRW** – Natural Resources Wales

**OSPAR** – Mechanism by which 15 Governments and the EU cooperate to protect the marine environment of the North-East Atlantic (OS –Oslo, PAR – Paris Agreement)

**PFA** – Pre-fisheries abundance

**PAR** – ‘Probably At Risk’

**PNAR** – ‘Probably Not At Risk’

**SACs** - Special Areas of Conservation

**SER** – Spawner Escapement Reserve

**SMNR** – Sustainable Management of Natural Resources

**SONAR** – State of Natural Resources Report

**SPAs** – Special Protected Areas

**SR** – Stock recruitment

**SSSI** – Site of Special Scientific Interest

**WG** – Welsh Government

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Milner, N. & Garcia de Leaniz, C. (2023). [The identification and characterisation of small salmon populations to support their conservation and management. \(naturalresources.wales\)](#). NRW Evidence Report No: 674 .

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# ANNEXES

## Annex 1: Dee Net Limitation Order 2015

### THE NATURAL RESOURCES BODY FOR WALES AND THE ENVIRONMENT AGENCY

#### SALMON AND FRESHWATER FISHERIES ACT 1975

#### THE NATURAL RESOURCES BODY FOR WALES AND ENVIRONMENT AGENCY (LIMITATION OF DEE ESTUARY SEINE AND TRAMMEL NET FISHING LICENCES) ORDER 2015

The Natural Resources Body for Wales and the Environment Agency, in exercise of powers vested in them by section 26(1) of the Salmon and Freshwater Fisheries Act 1975 make the following Order:

#### Citation, commencement and application

1. This Order –
  - (a) may be cited as the Natural Resources Body for Wales and Environment Agency (Limitation of Dee Estuary Seine and Trammel Net Fishing Licences) Order 2015;
  - (b) comes into force on the date it is confirmed by the Welsh Minister for Natural Resources and the Secretary of State for Environment, Food and Rural Affairs, and;
  - (c) applies to the area described in Column (1) of the Schedule.

#### Interpretation

2. In this Order-

“Natural Resources Wales ” means the Natural Resources Body for Wales;

“licence” means a fishing licence issued by Natural Resources Wales or the Environment Agency for the use of a net for fishing for salmon and migratory trout other than rainbow trout.

#### Limitation of licences

3. The number and type of licences in each year for the area specified in Column (1) of the Schedule shall be limited to zero as specified in Column (2) of the Schedule.

#### Expiry

4. (1) This Order expires on the date 10 years after the date it came into force unless revoked earlier.

(2) The following Order is hereby revoked: The Environment Agency and the Natural Resources Body for Wales (River Dee) (Limitation of Salmon and Sea Trout) Order 2004.

SCHEDULE

Article 3

(1) Description of Area	(2) Number and type of licences
This Order shall apply to that part of the River Dee which lies between an imaginary line drawn due south across the river from a point known locally as Curzon Railway Bridge at NGR SJ 39656588 and the Queensferry Bypass Bridge, and that part of the River Dee which lies between the Queensferry Bypass Bridge and an imaginary line drawn straight from the Red Rocks at Hoylake in the Wirral in the County of Merseyside to the Point of Ayr in the County of Flintshire.	Seine and Trammel Nets – Zero licences

IN WITNESS WHEREOF  
THE COMMON SEAL OF  
THE NATURAL RESOURCES BODY FOR WALES  
was hereunto affixed on the  
21<sup>st</sup> day of 01 / 2015 in the presence of:-

**David Cavell**  
Solicitor and Head of Legal Services



Authorised Signatory

IN WITNESS WHEREOF  
THE COMMON SEAL OF  
THE ENVIRONMENT AGENCY  
was hereunto affixed on the  
22 day of Dec. 2015 in the presence of:-

**Jonathan Robinson**  
Executive Director of Resources and  
Legal Services



Authorised Signatory

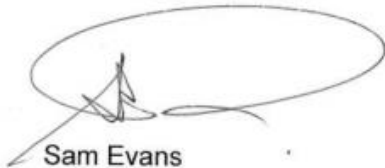
The Natural Resources Body For Wales (NRW) has applied to the Welsh Ministers and the Secretary of State for Environment, Food and Rural Affairs ("the Secretary of State") for confirmation of The Natural Resources Body for Wales and Environment Agency (Limitation of Dee Estuary Seine and Trammel Net Fishing Licences) Order 2015 made by NRW on 21 January 2015.

The Secretary of State acting in relation to England and the Welsh Ministers acting in relation to Wales have decided to confirm The Natural Resources Body for Wales and Environment Agency (Limitation of Dee Estuary Seine and Trammel Net Fishing Licences) Order 2015 in exercise of the powers vested in them by section 26(1) of the Salmon and Freshwater Fisheries Act 1975.

The Secretary of State and the Welsh Ministers hereby confirm the said Order.

The Order will come into force after the second signature is affixed below.

A senior Civil Servant for and on behalf of the Secretary of State for Environment, Food and Rural Affairs

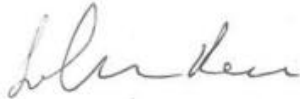
A handwritten signature in black ink, appearing to read 'Sam Evans', enclosed within a large, hand-drawn oval.

Sam Evans

23 June 2015

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Signed by Graham Rees, Head of Marine and Fisheries Division, under authority of the Minister for Natural Resources, one of the Welsh Ministers

A handwritten signature in black ink, appearing to read 'Graham Rees', written in a cursive style.

30 June 2015

## Annex 2: Salmon stock management system: conservation limits (CLs), Management Targets (MTs) and ‘The decision structure’

### Setting conservation limits

The use of conservation limits (CLs) in England and Wales has developed in line with the requirement of ICES and NASCO; to set criteria against which to give advice on stock status and the need to manage and conserve individual river stocks. CLs indicate the minimum desirable spawning stock levels, below which stocks should not be allowed to fall. The CL is set at a stock size 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.

Two relationships are required to derive the CLs:

- (i) a **stock-recruitment curve** – defining, for the freshwater phase of the life cycle, the relationship between the number of eggs produced by spawning adults (stock) and the number of smolts resulting from those eggs (recruits).
- (ii) a **replacement line** – converting the smolts emigrating from freshwater to surviving adults (or their egg equivalents) as they enter marine homewaters. This relationship requires an estimate of the survival rate at sea.

The model used to derive a stock-recruitment curve for each river assumes that juvenile production is at a ‘pristine’ level for that river type (*i.e.* is not affected by adverse water quality, degraded physical habitat, etc.).

Similarly, in deriving the replacement line, marine survival rates for most river stocks were assumed to be equivalent to the rates estimated on UK monitored rivers (such as the North Esk) in the 1960s and 1970s. Default survival values recommended for this purpose were 25% for 1SW salmon and 15% for MSW fish (Environment Agency, 1998). However, that period is thought to be one of high sea survival, and new default values of 11% for 1SW salmon and 5% for MSW fish, which are more representative of sea survival over the last 20-30 years, were introduced by the Environment Agency in April 2003 (Environment Agency, 2003b).

These rates have now been applied in calculating CLs for all the 64 principal salmon rivers in England and Wales. Since 2003, the CLs for all principal salmon rivers for which egg deposition estimates are assessed annually, have incorporated the lower marine survival estimates. The net effect of these changes was to reduce the CLs: the scale varied from river to river, but resulted in a 26% reduction, on average, in England and Wales from values used prior to 2003.

Introducing marine survival rates which are intended to be closer to those currently experienced by UK salmon stocks will reduce the effect of high mortality at sea as a cause of failing CLs. This will help managers focus on other issues over which they have more control (*e.g.* poor environmental quality in-river, over-exploitation by net and rod fisheries, etc.) when compliance failure occurs. The reduction in CLs means, however, that lower levels of spawning escapement are accepted before the stock is



considered to be threatened. Natural Resources Wales and the Environment Agency also uses the 'management objective' for each river (e.g. in reviewing management actions and regulations) that the stock should be meeting or exceeding its CL in at least four years out of five (*i.e.* at least 80% of the time). This management objective is built into statistical procedures for assessing compliance with CLs (below).

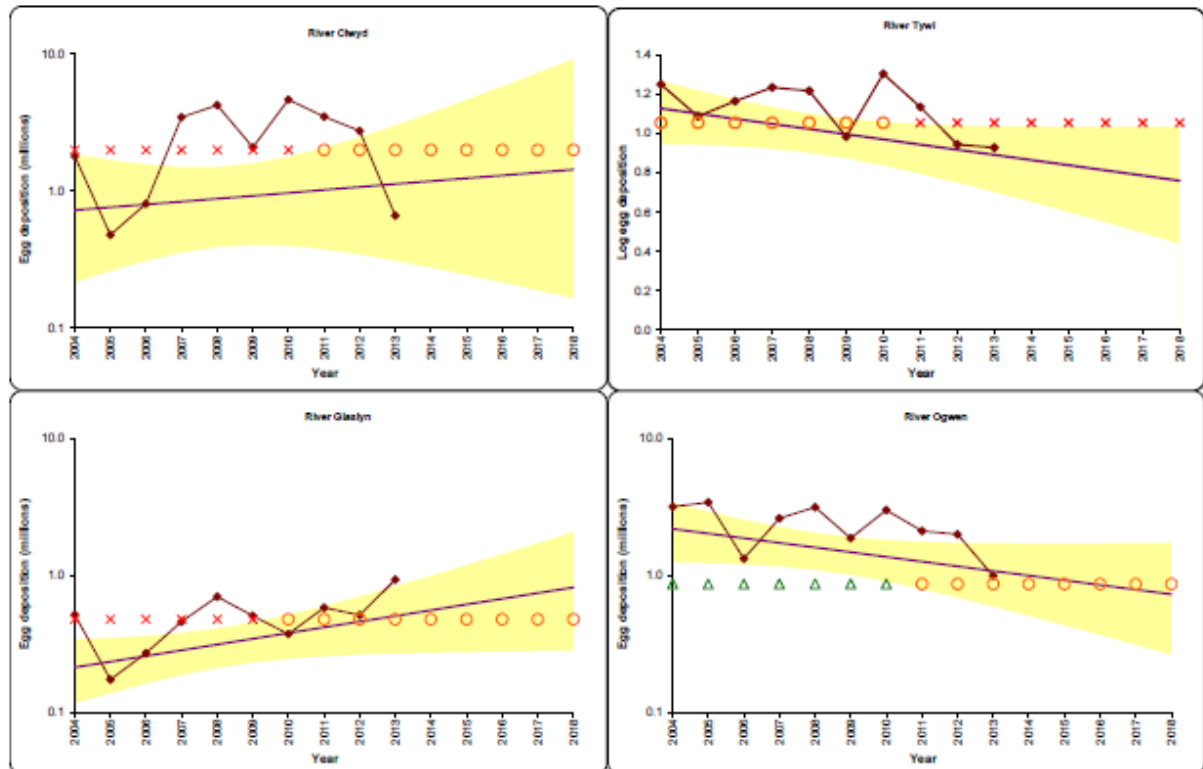
## Estimating spawner/egg numbers

Annual compliance with the CL is assessed using egg deposition estimates. On rivers with counters or traps (for example the Dee, Teifi and Taff in Wales), these estimates are derived from direct measures of the returning stock. However, on the great majority of rivers, the usual procedures for estimating egg deposition involve derivation of run size from rod catch using estimates of exploitation rate (*i.e.* the proportion of the run caught). Other information is also used in estimating egg numbers, for example, the sea age and size composition of the stock and the contribution of rod released fish to the spawning population.

## Compliance assessment

The performance of salmon stocks in England and Wales is assessed using a compliance scheme designed to give an early warning that a river has fallen below its CL. An approach introduced in 2004 provides a way of summarising the performance of a river's salmon stock over the last 10 years (including the current year), in relation to its CL. Bayesian regression analyses are applied to egg deposition estimates from the last 10 years, on the assumption that there might be an underlying linear trend over the period. The method fits a 20-percentile regression line to the data and calculates the probability that this regression line is above the CL, and thus that the CL will be exceeded four years out of five (the management objective). If there is a low probability (<5%) that the 20-percentile regression line is above the CL, the river fails to comply (*i.e.* is regarded 'At Risk'). If the probability is high (>95%), the river complies in that year (*i.e.* is 'Not At Risk'), whereas between these probability values we cannot be certain of the stock status (the river is assessed as either 'Probably At Risk' ( $5\% < p < 50\%$ ) or 'Probably Not At Risk' ( $50\% \leq p < 95\%$ ). The results are in broad agreement with the compliance scheme used prior to 2004. The current scheme also allows the 20-percentile regression line to be extrapolated beyond the current year in order to project the likely future performance of the stock relative to its CL, and so assess the likely effect of recent management intervention and the need for additional measures.

The compliance plots for the rivers Clwyd, Tywi, Glaslyn and Ogwen for the years 2004-2013 are shown below as examples. These include individual egg deposition estimates (red diamonds on the graphs) for these years, the 20-percentile regression lines and (shaded) 90% Bayesian Credible Intervals (BCIs), and the CL (represented by up to three symbols: X, O and  $\Delta$ ).



When the upper bound (95 percentile) of the regression line BCI is below the CL line, the river is judged to be failing its CL (*i.e.* there is a  $\geq 95\%$  probability of failure or the river is 'At Risk'). For example, this is the case on the Tywi from 2011 to 2018; the Clwyd from 2004 to 2010 and the Glaslyn from 2004 to 2009, and is indicated by the X symbol on the CL line. When the lower bound (5 percentile) of the regression line BCI is above the CL line the river is judged to be passing its CL (*i.e.* there is a  $\leq 5\%$  probability of failure and the river is 'Not At Risk'). This is the case on the Ogwen from 2004 to 2010 and is indicated by the  $\Delta$  symbol on the CL line. For all other years on these rivers, the shaded BCI of the regression line overlaps the CL line and so the status of the river is judged as 'uncertain' (*i.e.* the probability of failure is  $>5\%$  but  $<95\%$ , and the river is either 'Probably At Risk' or 'Probably Not At Risk'). In these cases, for the years when the O symbol is present and the regression line is above the CL line, the river is classed as 'Probably Not At Risk'; similarly, when the opposite applies – *i.e.* the regression line is below CL line, then the river is classed as 'Probably At Risk'.

Egg deposition estimates for a river may be consistently above the CL but status may still be uncertain. This is the case on the Ogwen from 2011 onward (O symbol on the CL line). In part, this reflects the marked year-to-year variation in egg deposition estimates on these rivers, which produces broad BCIs around the regression lines, but also arises because of the slope of the trend line and the increasing uncertainty associated with all regressions once extrapolated beyond the data set.

As well as providing an assessment of the status of a river in relation to its CL, the direction of the trend in the 10-year time-series of egg deposition estimates and its statistical significance may also serve as an important indicator of the need to take

management action and of the degree of intervention required. Thus, a clear negative trend would give additional cause for concern.

The MT for each river is a spawning stock level for managers to aim at, to ensure that the objective of exceeding the CL is met at least four years out of five in the long run (*i.e.* at least 80% of the time). The value of the MT has been estimated using the standard deviation (SD) of egg deposition estimates for the last 10 years, where:  $MT = CL + 0.842 * SD$ . The constant 0.842 is taken from probability tables for the standard normal distribution, such that the CL forms the 20-percentile of a distribution, the median (50-percentile) of which equates to the MT.

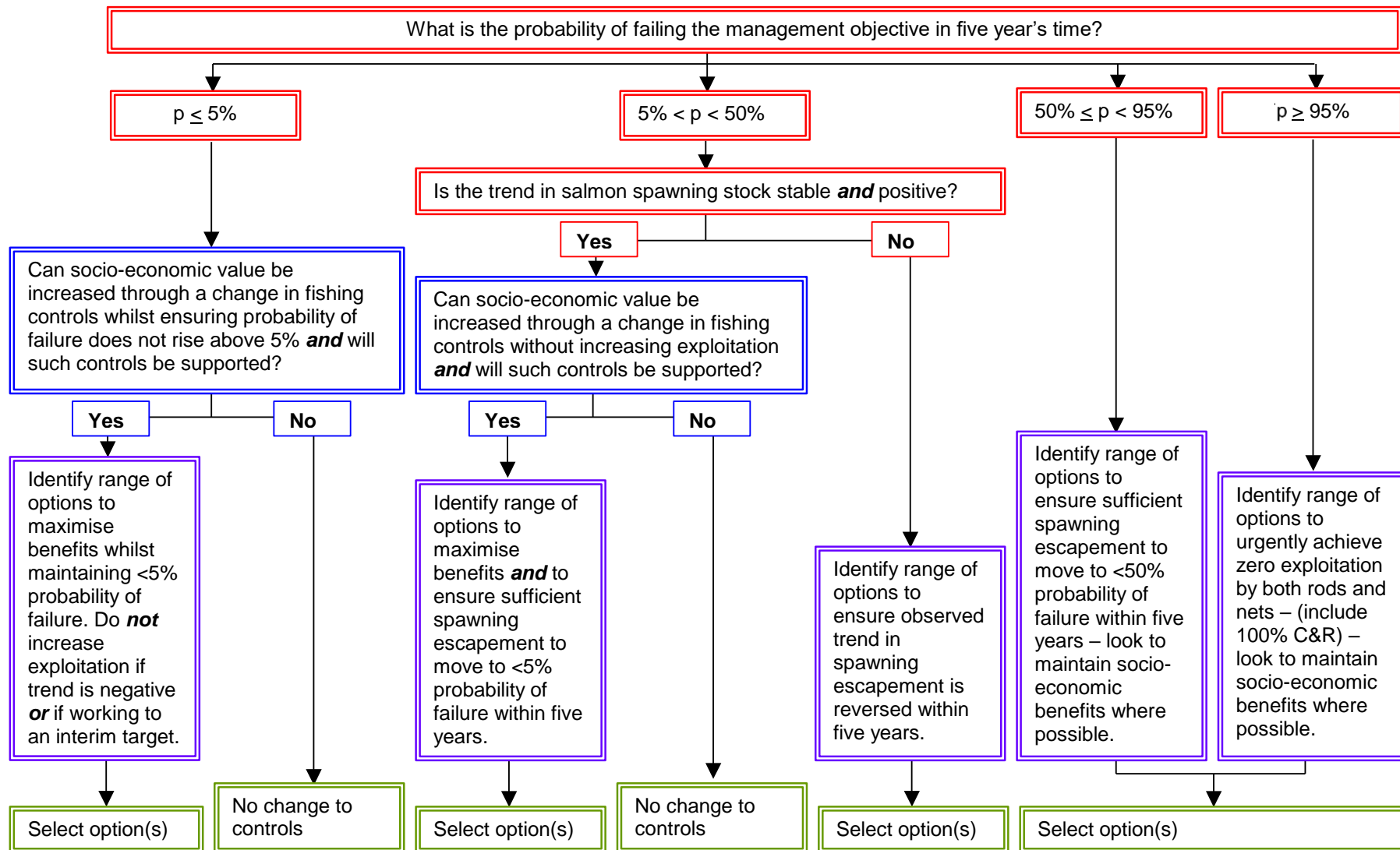
CLs and MTs form only one part of the assessment of the status of a stock, and management decisions are never based simply on a compliance result alone. Because stocks are naturally variable, the fact that a stock is currently exceeding its CL does not mean that there will be no need for any management action. Similarly, the fact that a stock may fall below its CL for a small proportion of the time may not mean there is a long-lasting problem. Thus, other indicators of stock performance are also taken into account, particularly the structure of the stock and any evidence concerning the status of particular stock components, such as tributary populations or age groups, based for example on patterns of run timing and the production of juveniles in the river sub-catchments. These data are provided by a programme of river catchment monitoring.

Conservation Limit procedures used for assessing salmon stocks in E&W, along with the associated compliance scheme and Decision Structure (below), are currently under review - as defined in the NASCO Implementation Plan 2019-2024.

## **The Decision Structure for developing fishing controls in England and Wales**

The compliance assessment approach described above for determining the performance of each salmon river is also incorporated into a national (E&W) 'Decision Structure' for guiding decisions on the need for fishery regulations. The Decision Structure is shown in the schematic flow chart below, together with explanatory notes for its use.

## The Decision Structure – Developing fishing controls for salmon fisheries in England and Wales

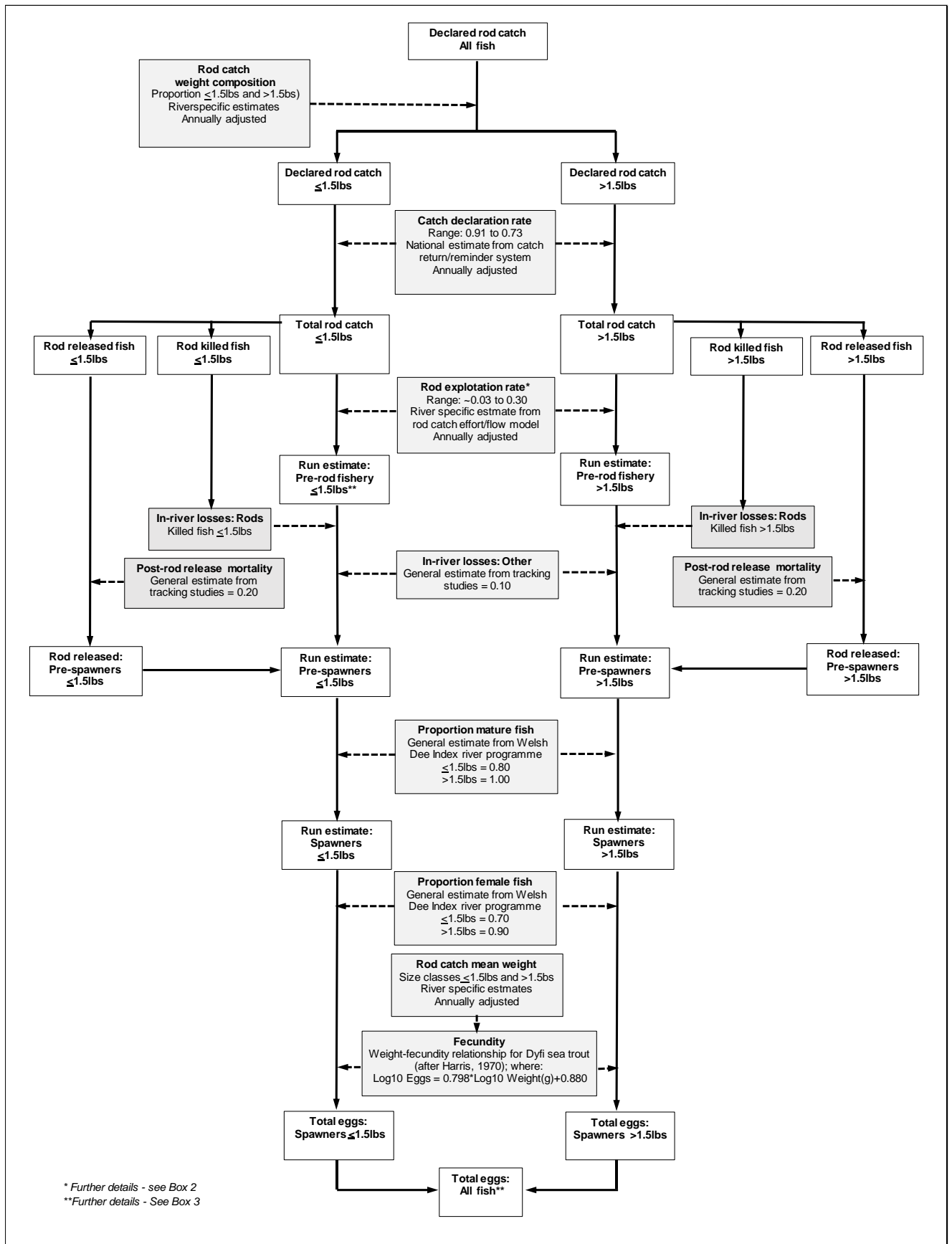


## **Annex 3: Sea trout stock recruitment (SR) based assessment**

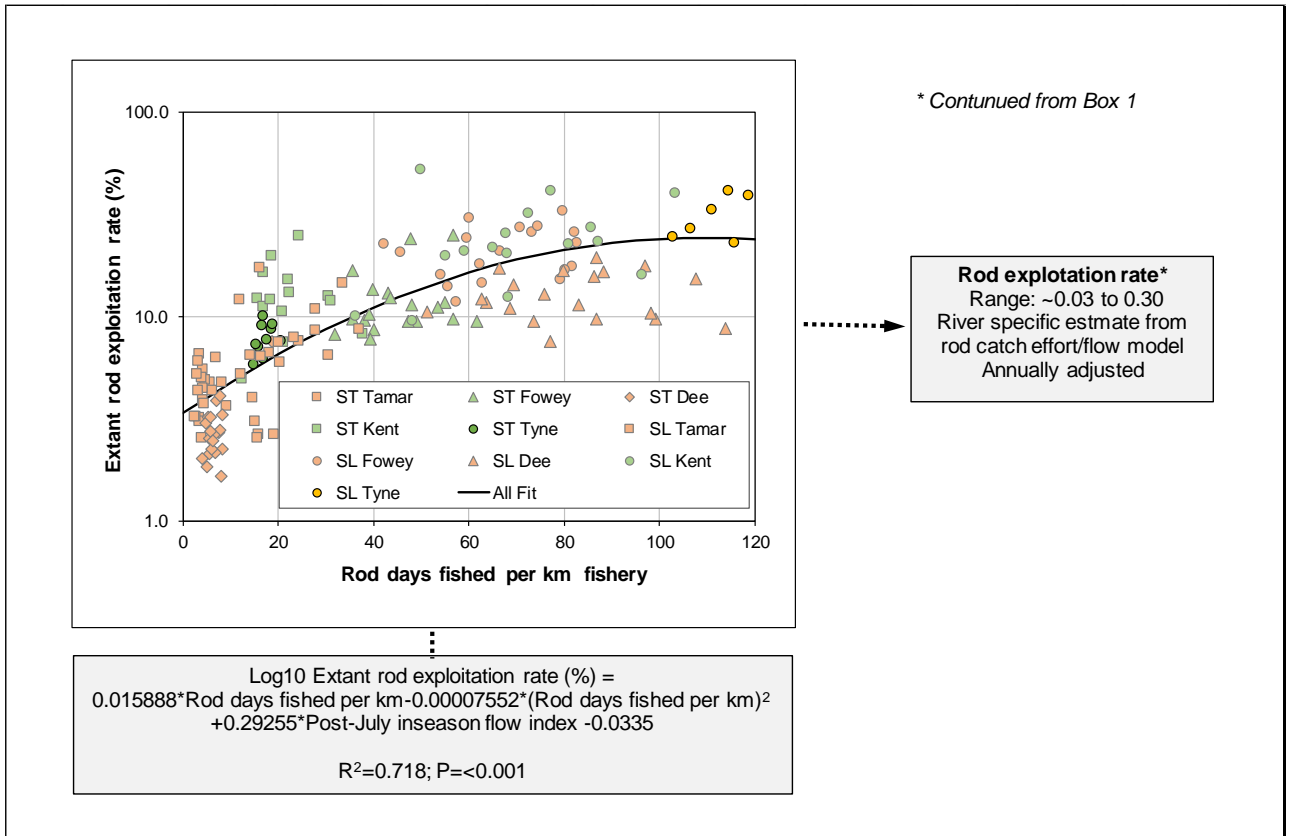
Summary of procedures used to:-

- (i) generate river specific run and egg deposition estimates from rod catch and
- (ii) derive SR curves and associated reference points from these data.

### Box 1: Procedures to generate run and egg deposition estimates from rod catch



Box 2. Rod exploitation rate model – based on exploitation rate estimates from counted rivers and utilising angling effort and flow as ‘predictor’ variables.



Box 3. Application of 'whitling' run (fish  $\leq 1.5$ lbs) and egg deposition estimates (all fish) to derive SR relationships and assess CL compliance (Teifi example shown).

