Annual Fisheries Report 2017 to 2018

April 2019

We are the Environment Agency. We protect and improve the environment.

We help people and wildlife adapt to climate change and reduce its impacts, including flooding, drought, sea level rise and coastal erosion.

We improve the quality of our water, land and air by tackling pollution. We work with businesses to help them comply with environmental regulations. A healthy and diverse environment enhances people's lives and contributes to economic growth.

We can't do this alone. We work as part of the Defra group (Department for Environment, Food & Rural Affairs), with the rest of government, local councils, businesses, civil society groups and local communities to create a better place for people and wildlife.

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Foreword

What an exciting financial year 2017 to 2018 has been here at the Environment Agency. Having consulted with anglers we have listened to what you want and made the biggest changes to the fishing licence for decades. Anglers very clearly told us that they wanted a licence which lasted for a whole 12 months, irrespective of when it was bought, and this is what we have done. Now when you buy a fishing licence you can chose a start date up to 60 days in advance and it will run for a full 365 days rather than expiring on 31st March. Many anglers also told us that they wanted the option to fish with 3 rods where rules allow, but felt it was unfair to have to buy 2 licences to do that. We have now introduced a new 3 rod fishing licence and it has proved an incredibly popular option with over a hundred thousand anglers choosing this licence type this year. To encourage more youngsters into the sport we made junior licences free and this had a really positive effect on licence uptake in this age group. We have made it easier to buy licences online through gov.uk and this is now the most popular and efficient way to purchase or renew your fishing licence.

To ensure we can provide the investment needed to deliver the services for angling we increased the price of these new licences for the first time in 7 years. The cost of a standard coarse and trout fish licence rose by £3 from £27 to £30 and a full salmon fishing licence from £72 to £82. This wasn't a decision we took lightly and it comes with a guarantee that we won't raise prices again until at least 2020. Additional money generated in 2017 to 2018 was invested in fisheries improvements and you can read about examples of these projects in our 14 Area reports.

The money we raise from selling fishing licences is essential for us to deliver our fisheries service and this report will show you what we do and where, so you can see how your fishing licence money is spent. We have also worked hard with numerous partners and the other parts of the Environment Agency to maximise the benefits for fish stocks and in turn improve the opportunities for anglers. I hope you find this report both enjoyable and informative.

Kevin Austin Deputy Director Agriculture, Fisheries and Natural Environment - Environment Agency

1. Contents

1. Introduction

1.1 What this report is about

We are frequently asked by anglers ‘where does our fishing licence money go?’ and by other stakeholders ‘what are you doing for fisheries in England?’ It is vital that we maintain transparency and allow those who have interests in fisheries and those who buy fishing licences to understand how the Environment Agency works to protect and improve this valuable resource.

This report has been compiled to form a record of the broad range of our fisheries activity, partnership working and our expenditure for the 2017 to 2018 financial year. Our specific duties for fisheries are set out in Appendix1.

The report gives information on what we have done to achieve the outcomes outlined above for fish and fisheries in the 2017 to 2018 financial year and how fishing licence fees income has been used. Read about fisheries projects in your area here.

We, the Environment Agency, are a non-departmental government body. We are guided by the Department for Environment, Food and Rural Affairs (Defra) with responsibilities relating to the protection and enhancement of the environment in England.

The Environment Agency has been asked by government (Defra) to achieve 3 key fisheries objectives. These are:

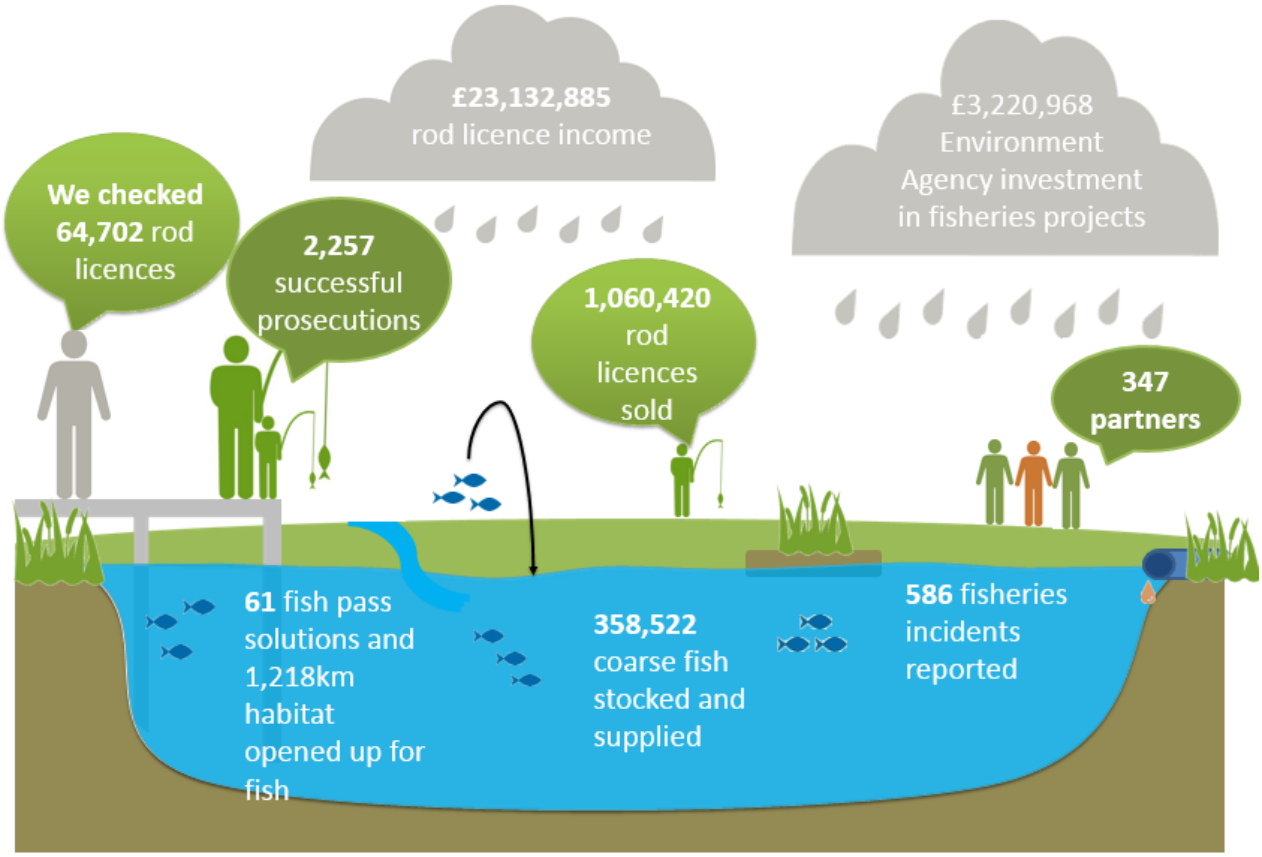
1. To ensure the conservation and maintain the diversity of freshwater fish, salmon, sea trout and eels and to conserve their aquatic environment
2. To enhance the contribution salmon and freshwater fisheries make to the economy, particularly in remote rural areas and in areas with low levels of income
3. To enhance the social value of fishing as a widely available and healthy form of recreation

In addition to this we prioritise putting customers at the centre of everything we do and strive to continuously improve to provide them with the service they require.

The outcomes can be summarised as:

- An improved environment and more fish
- More people fishing and more places to fish
- More satisfied customers

A summary of where our funding is used is outlined in the graphic below:



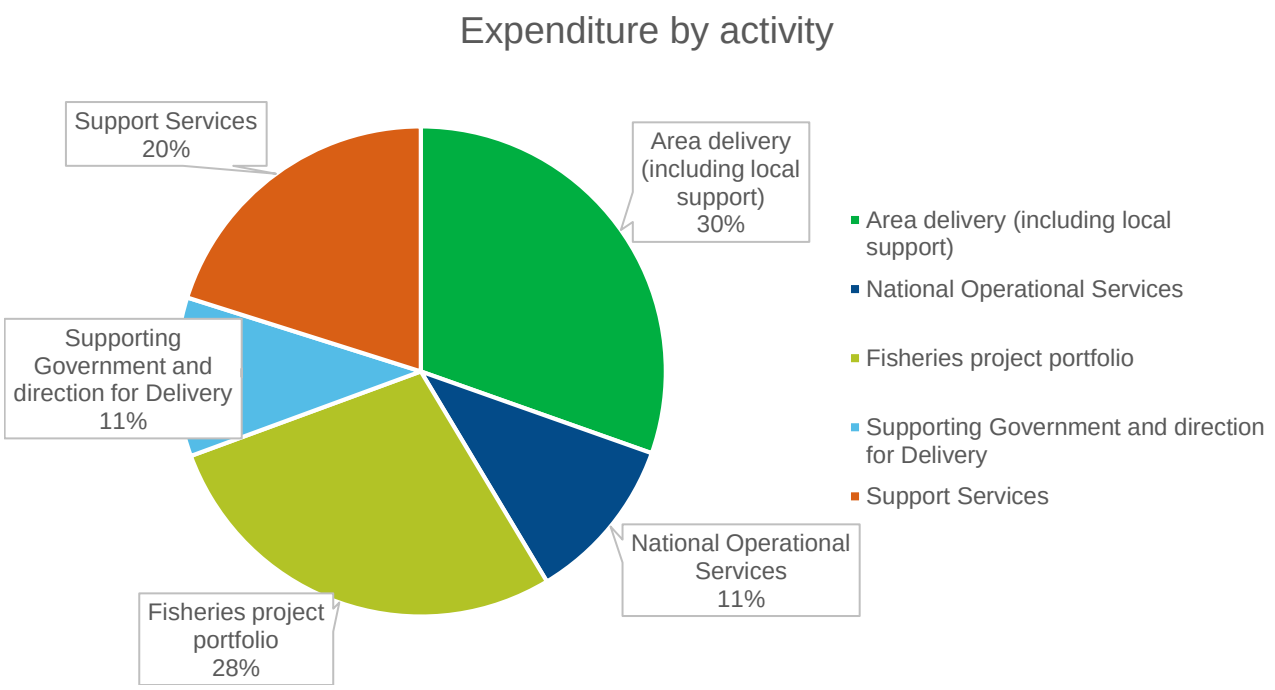
2. Where our funding comes from and how we spend it

2.1 Income

The fisheries service is funded by a combination of income from the sale of fishing licences, net licences and authorisations, recharges for work undertaken on behalf of the other parts of the Environment Agency and government Grant in Aid (GiA). The GiA we receive of circa £1.3 million is to cover our additional work to protect migratory fish species such as salmon, sea trout and eel.

The main component of our income is from fishing licence sales to anglers and this income is ring-fenced for expenditure on activities that benefit fisheries and angling. In the 2017 to 2018 financial year we planned for income of circa £22.2 million and in this year received some £23.1 million with the additional money being ploughed back into fisheries projects as part of the Fisheries Improvement Programme (FIP) described later in this report. Fishing licence sales in your part of England are shown in Appendix 2.

2.2 Expenditure



Expenditure by type and activity against planned 2017 to 2018 fishing licence income for England (£22.2 m) is shown above.

The activities listed in the figure above are taken from the standard Business Operating Model for the Environment Agency and show the contribution to this model from the forecast income received from fishing licences in the 2017 to 2018 financial year. The activities covered within these headings include:

Area Delivery includes the work undertaken by our fisheries teams across our 14 areas. A more detailed explanation of these activities is shown in the table below.

Support to Area Delivery describes the provision of essential resources required to allow our area and national teams to operate effectively. This includes our offices, IT equipment, vehicles and our legal and procurement services.

Operational Services describes a range of activities undertaken more efficiently nationally. These include the National Enforcement Service responsible for fishing licence administration, licence sales management, licence design/production, governing Enforcement Officers warrants and leading on Rod and Line prosecutions. our National Monitoring Services (which include the National Fisheries Laboratory providing a fish health and disease service and specialist technical advice service to our area staff on issues such as fish pass design and permitting). Operational Services also includes our National Customer Contact Centre which handles tens of thousands of telephone and e-mail queries relating to fishing licences, licence sales and fisheries.

Supporting Government and Direction for Delivery includes our head office fisheries team and also our fisheries evidence team, facing and advising government and setting the strategic direction for the organisation.

Fisheries Projects includes the planned national project portfolio of some £6.2 million in 2017 to 2018. This was used to fund the activities of our partners such as the Angling Trust,

Wild Trout Trust and Rivers Trusts to help deliver our objectives and provide match funding. This portfolio also provides an Angling Improvement Fund (AIF) and operational Fisheries Improvement Project (FIP) fund for delivering practical improvements with our numerous partners. It also funds our fishing licence marketing and communications activities including continuing development work for our new online fishing licence system on gov.uk introduced in 2017.

Support Services include Finance, Corporate Services, IT and Human Resources etc.

2.3 Area fisheries activities and description of work

Activity	Description of activity
Monitoring	Fisheries monitoring allows us to make an assessment of the health of fish stocks. The data is used to make fisheries management decisions, fulfil reporting requirements, and to demonstrate that we are delivering our fisheries duties.
Media and communications	This may be through traditional channels or social media. It may also be in the form of angling club meetings and presentations, bank side advice and regular newsletters.
Create and manage habitats and fish passes	Undertake fisheries improvement projects to create habitat, improve fish passage and increase opportunities for angling participation. This work also contributes to our aims under the Water Framework Directive.
Work to deliver fisheries partnerships	Working with fisheries partners we are able to make our money go further. For example working with local angling clubs or national fisheries and conservation organisations to deliver shared objectives or projects.
Provide fisheries advice	Providing specialist advice to our customers. This may be in the form of advisory visits to fisheries or holding workshops for fisheries consultative. We also provide advice through online material and local campaigns.
Fisheries permitting, planning and compliance	Monitoring the activities of others via permits or planning to protect fisheries.
Fisheries enforcement	Governance of fisheries and their licence compliances, fishing licence checking and also intelligence led fisheries enforcement work to protect fish and the environment. Where potential offences are detected we seek to prosecute those involved.
Strategic planning and reporting	We are required to report on specific aspects of the environment, for example the progress of priority salmon actions in our plans.
Prepare for and respond to incidents	We respond, investigate and act on incidents impacting on fish, fisheries and angling. This may be connected to issues with water quality, fishery enforcement, invasive species, or fish disease.

3. Our partnerships

3.1 Working together to make fisheries and angling better

Working with our fisheries partners is now an established practice that enables us to make the best use of our available resources and maximise the fisheries outcomes. There are three delivery strands through which money from fishing licence sales is used:

Core regulatory work: our priority is to protect fish and their habitats. This includes fisheries authorisations, enforcement, managing incidents and providing advice internally to ensure conformity with fisheries and environmental legislation.

Commissioned partnerships: promotion of angling and increased participation is undertaken under contract by others who are better placed to deliver and can secure additional funding.

Added value partnerships: working with others on fisheries improvements, where doing so provides benefits, enhances co-operation and match funding and represents best value investment of licence income.

A good example of how we have strengthened our links with other organisations and created an environment where we have open and honest conversations is the England Fisheries Group (EFG). Membership includes Defra, Angling Trust, Rivers Trust, Canal and River Trust, Atlantic Salmon Trust, Salmon and Trout Conservation UK, Wild Trout Trust and Institute of Fisheries Management.

EFG meets quarterly to discuss important fisheries issues, and has the common goal of “Sustainable, thriving fisheries that are a valued part of England’s biodiversity and natural capital, enjoyed by anglers and more people than ever before benefiting rural and urban communities.”

Some of the issues considered during 2017 to 2018 have been: the implementation of the new licencing arrangements; the economic evaluation of angling study and the initial review into the coarse fish close season. Often solutions and the way forward are best achieved by working together, a ‘Team England’ approach through identifying common interests.

It has been estimated that we regularly work with at least 150 partner organisations across the country each year. In the 2017 to 2018 financial year these included angling clubs, fisheries consultatives, local rivers trusts, wildlife groups, drainage boards, water companies, local authorities, educational establishments, landowners and farmers. There are good examples of our joined up approach with other Defra organisations such as Natural England and the Forestry Commission to work on projects shaped by the 25 year Environment Plan.

We have several formal partnership arrangements with other organisations enabling improvements to fisheries habitats and stocks. Our partners are often able to apply for additional funds and sometimes their 3rd sector approach may be more efficient. We have Memoranda of Understanding or collaborative agreements with these partners which set out the benefits and ensures our fishing licence money goes further and delivers more.

In subsequent sections we detail the work of our partners, the Angling Trust, the Rivers Trust, the Wild Trout Trust, the Riverfly partnership and the Institute of Fisheries Management. We also summarise the work of our local teams through the Fisheries Improvement Programme (FIP). Fuller details of the projects undertaken in each of our 14 Areas are summarised in local reports.

3.2 Our commissioned partners - The Angling Trust

2017 to 2018 was the third year of our National Angling Strategic Services (NASS) contract. The Angling Trust was awarded the contract to deliver the work following a competitive tender exercise in 2015. The contract initially ran until 31 March 2017 at which point the option to extend for a further 2 years was taken. The contract covers a range of different delivery areas as part of the overall service, the priority activities we funded were:

- Growing participation in angling
- Providing a means of engaging with the angling community
- Giving advice on priority issues affecting fisheries (predation, invasive species and litter)
- Administrating the Angling Improvement Fund
- Co-ordinating the Voluntary Bailiff Scheme, and
- Increasing lawfulness in the angling community (especially addressing the needs of migrant anglers)

3.2.1. Growing angling

Junior anglers fishing

The third year of NASS funded angling participation activity continued to build on the achievements made throughout 2015 to 2016. In 2017 a restructured Angling Trust Participation Team and some changes in their roles helped further refine its offer to both the angling and non-angling communities that the organisation connects with.

Experience gained in both on-the-ground delivery and communications support for hundreds of fishing events and their thousands of newcomer angler attendees resulted in a 2% uplift in people given the opportunity to go fishing. This was all made possible by reinvesting fishing licence income to help fund 37,000 fishing lessons.

Case study: What they said: Feedback from Get Fishing events

Angling Trust surveyed participants at this year's Environment Agency funded angling events. 93% of attendees said they enjoyed the event, 84% said they wanted to take up fishing as a result and 93% said they would recommend the event to a friend. Here's some of the feedback received:

- 'An excellent all-round experience'
- 'Great day out, got my daughter interested in fishing and we have had some lovely times together since'
- 'The coaches were amazing. They took their time with our son and us. We since have gone back, my husband and son more often than me'
- 'It was just brilliant! Fishing is the best way to relax and forget your worries'
- 'Would have never thought my children would sit still long enough to go fishing but they are completely enthralled by it now and can't get enough'

In response to a growth in interaction with its social media accounts and www.getfishing.org.uk as well as interest from non-angling networks, this year the participation team's 'Get Fishing' campaign was given a refreshed look and feel. An updated logo and newsletters and a greater focus on a single offer to all potential anglers regardless of their experience, ability, age or gender helped the campaign gain momentum.

For example, one highlight of the year was Get Fishing's connection with "This Girl Can", Sport England's celebration of active women that aims to inspire women and girls to exercise. Angling gained a position alongside football, golf, tennis, rugby, cricket and other well-known sports on the homepage of www.thisgirlcan.co.uk. As a result, more people learned that fishing can involve a whole range of low, medium and high intensity physical activity and that it's a great way to de-stress, develop coordination, strength and even a competitive streak.

Kate Dale, Sport England's Campaign Lead for This Girl Can commented that "…the fantastic thing about angling is that you can take it at so many different levels, so you can really adapt it to be as active as you want. We are really happy to support Angling at This Girl Can, it's a great outdoor activity that is accessible for girls and women of all ages."

A greater brand awareness about Get Fishing in the mainstream market meant that it was essential to develop more infrastructure to support the associated growth in event delivery. The Angling Trust recognised that without enough coaches and volunteers the demand to

learn how to fish might soon outstrip the ability to provide safe and quality assured angling experiences.

For this reason, the Environment Agency helped fund training for 198 Level 1 coaches, 58 Level 2 coaches and 4 Club Welfare Officers at nationwide courses organised by the Angling Trust's Approved Coaching Centre staff. This boost to the country's angling workforce supported 59 special "Get Into Angling" courses delivered through schools and colleges. The resulting purchase of 1,307 fishing licences by novice anglers provided evidence of the immediate success of this approach.

Junior angler with Angling Trust coach

Awareness of the funding available via the Angling Trust Participation Team's programme grew among prospective delivery partners too. Great progress was made in communicating to clubs and fisheries the NASS participation strategy and the importance of contacting newcomer anglers after they attend events with support to help come fishing again. Potential delivery partners were told how getting new anglers into Get Fishing's communication cycle allowed the Angling Trust to explain to families how angling is an easy, inexpensive activity which fits in with modern lifestyles, can be enjoyed at venues close to home and has significant benefits to health and wellbeing. Clubs and fisheries now started to enquire about how they could get involved with Get Fishing and post their events on www.getfishing.org.uk.

This boost in interest made possible a second "Spring Into Fishing" campaign. This ran over each weekend in March to deliver six nationwide family fishing events. Despite the "Beast from the East" doing its best to spoil things, the initiative and its supporting communication messages proved immensely successful resulting with 682 people registering despite the weather.

Case study: Fishing for positive mental health helps overcome anxiety

Zac and Samantha

“Fishing for positive mental health” project aims to use fishing as a safe and peaceful environment, a distraction from participating anglers health issues. 'Get Fishing' supported this event by covering part of the cost, Environment Agency provided a worthy cause fishing licence and event promotion. These sessions have been a success the effect fishing has had on those that came along has been huge. Amongst the participants was 22-year-old Zac. After a coaching session Zac soon caught his first fish, three hours later he’d caught so many he had lost track of how many he'd actual caught. Zac said, "I enjoyed the whole experience. It was very calm and relaxing, and I’d really like to do it again.” Samantha, Zac's counsellor said, "It was such a positive day for Zac, I can’t begin to explain how many anxieties he got over and the progress he made as a result. The idea couldn't be simpler, but the benefits can't be overstated. It’s a wonderful way for those with a wide range of mental health issues to re-engage with people and the outside world in a calming and beautiful setting. The whole experience couldn't have been more positive.” Another participant said “I had a great day. I talked openly and honestly with no judgement from any one. I was shaking like a leaf when I got there my mind was put at rest. That was such a launch-pad for me and the good news is I’m now back on my feet again and in full-time work! Thanks so much.”

3.2.2 Engaging with anglers - it's good to talk

We consider it is vital that there is good on-going communication between fishing licence holders, fishery owners, angling clubs and other key groups who influence the management of freshwater fisheries. To ensure that this communication is effective the Angling Trust organise fisheries forums all over the country and have active effective regional social media channels.

Fisheries Forums – These free meetings are open to all and provide an opportunity for a 4 way discussion between us, the Angling Trust, the angling community and other organisations involved in catchment management (such as the Rivers Trusts, Wild Trout Trust and Wildlife Trusts). Meetings are always attended by both Angling Trust and our own

staff. This means that anglers around the country have an opportunity to raise issues, share ideas and make their opinions known directly to Environment Agency staff.

During 2017 to 2018 the Angling Trust held 34 forums in different locations attracting up to 98 attendees. A popular debate at many of the fora was the future of the coarse fish close season and the views expressed by anglers and angling club officials helped to inform the Environment Agency-led coarse fish close season review group.

Feedback from these events is positive and the angling community find them extremely useful.

Social media - For anglers that can't attend, the Angling Trust ensure that the key messages and information is available via the Angling Trust Regional Facebook pages, Freshwater Team Twitter feed and Lines on the Water blog. This also allows anglers to feedback and raise areas of concern or opportunities for improvement.

3.2.3 Angling advice

As part of the NASS contract, the Angling Trust helps clubs and fisheries with:

- Predation from birds and mammals and removal of seals in freshwater fisheries
- Invasive non-native species (INNS) and good bio-security practice
- Tackling related incidents affecting other wildlife (in particular preventing swan injuries and deaths)

The service provides a clear point of contact for fishery owners and anglers. It raises awareness of the roles and responsibilities of those involved and provides high quality and consistent advice. On our behalf, the Angling Trust actively works with other organisations to resolve issues and, where necessary, liaises between the angling community and other parties. In doing so, it uses new and innovate ways to engage.

There has been good progress with all these issues, information is available electronically via the Angling Trust web site leaflets and posters have been extensively circulated.

Fish-eating birds and mammals in freshwater fisheries

We have continued to fund two fisheries management advisors employed by the Trust to give site specific advice to fisheries on predation caused by fish eating birds and advice on non-lethal deterrents. They also advise on lethal control and encourage clubs and fisheries to work together to get the best results. There are now nearly 20 area based licences for cormorant control successfully operating across the country; these enable a number of sites, in a given catchment, to co-ordinate shooting under a single Natural England licence.

Otter fence installed in Lancashire

Working with the Angling Trust's Angling Improvement Fund team they have been advising fisheries on their applications for funding for both otter fencing and projects to deter fish eating bird predation. In all they have conducted 120 individual site visits this year and numerous advice by telephone and email. A 'state of the art' night-time viewing scope has enabled them to better assess otter presence and impacts. Both advisors are licenced to trap and relocate animals caught within fenced fisheries.

They ensure that the information given on the Angling Trust web site with regard to all predation issues reflects lessons learned around the world.

Non-native invasive species

An invasive non-native species (INNS) is any non-native animal or plant that has the ability to spread causing damage to the environment, the economy, our health and the way we live. Certain INNS can have a significant impact on fish stocks and the fisheries we enjoy for them. Recent examples that affect the sport of angling include the killer shrimp, the topmouth gudgeon and floating pennywort all of which can wreak havoc at fisheries and threaten the wider environment. Anglers can help play their part in reducing the spread of these species and other harmful pathogens and the Angling Trust have been helping us to deliver these messages.

Awareness

The Angling Trust continues to promote good biosecurity amongst anglers and fisheries through the Check, Clean, Dry (CCD) messaging; 1,600 sets of leaflets & stickers were sent out to clubs, 5,000 CCD/ Weils Disease cards were distributed and 330 aluminium CCD signs were installed at fisheries.

Together, we, other government departments and stakeholders and the Angling Trust supported a very successful Invasive Species Week at the end of this year.

Angling Trust's PhD student Emily Smith has been working on angling pathways between England and Europe to identify risks; this year she identified 13 more high risk species in the Netherlands that we do not yet have here. This work has helped inform GB Non-Native Species Secretariat's work with a border poster campaign in the summer at eight ports connecting to Belgium, France and the Netherlands and will also help to inform government direction in this area.

Tidy anglers litter campaign

The Angling Trust has been promoting the Take 5 message on social media. The aim is for all anglers to take collect and dispose of 5 pieces of litter during their fishing session or spend 5 minutes picking litter when they have finished. They have reached over 20,000 anglers.

3.2.4 Investing fishing licence income through the Angling Improvement Fund

Part of the NASS contract requires the Angling Trust to manage the Angling Improvement Fund (AIF) to improve angling facilities.

Criteria for the selection of successful projects include that applicants are required to provide 50% match funding towards the overall costs of their project and they must promote the project to make it widely available to other anglers. Bids are evaluated against robust selection criteria, and following the allocation of funds, projects are monitored to ensure delivery against agreed specifications and that outcomes are well promoted.

In total we invested £695,055 of fishing licence money to 177 angling improvement projects, matched by £1,478,346 from other sources'. 2017 to 2018 themes for projects included:-

Colour	Funding Round	Theme
Red	Round 1 17-18	Access to Rivers
Green	Round 1 17-18	Council Waters
Blue	Round 1 17-18	Predation
Pink	Round 2 17-18	Health and Wellbeing
Grey	Round 2 17-18	Predation
Orange	Round 2 17-18	Spring Maintenance

Council owned waters

£100,000 of funding was made available to support facilities and infrastructure improvements on such waters e.g. park ponds but also included stretches of rivers. The fund looked to support these 'Community Waters' as they can offer unsurpassed opportunities for people (especially children) to go and have a go at fishing in a safe environment with other facilities on hand. The fund worked in partnership with the councils who applied to look at new ways of managing park amenities and often also in partnership with the club or community organisation holding the fishing agreement (supporting the creation and protection and best use of fished park ponds and other community waters is a priority theme of the National Angling Strategy 'Fishing for Life'). 13 projects were approved with a value of up to £5,000 each and attracted £150,000 of additional match funding.

Access to rivers

To continue to support the rejuvenation of interest in river angling and to improve anglers' access to sometimes challenging terrain (steep banks, overgrowth of trees and vegetation), this new theme of funding was added.

Organisations could bid for up to £5,000 and the fund distributed just over £46,000 of fishing licence money to 23 such projects.

Case study: Rowley & Fenemere Angling Association

This newly formed club wanted to improve the access to a stretch of the River Severn just upstream of Shrewsbury. Working with the estate landowner, new pathways and car parking facilities have been created thus allowing visiting anglers, of all ages and ability, to once again fish this 2-mile length of prime river fishing. Previous access was almost non-existent due to the overgrowth that had built up over recent years.

The work was carried out using a combination of volunteers from the club's membership, other volunteers and a contractor approved by the estate. The relationship the club has with the estate improved significantly as the project progressed with them seeing that they were making a real improvement to the estate.

The AIF grant of just under £5,000 allowed the club to purchase various materials including 20 tonnes of stone and other items to create the access to the river bank. The club have already reported

Case Study: Lambeth Borough Council

An AIF grant of £4,885, together with more than £7,000 of match funding, has allowed Lambeth Borough Council to replace and widen the swims, and forms part of its commitment to make Clapham Common an 'access for all' flagship site for the whole community. Lambeth Council hopes to increase the number of visits by disabled anglers from a current level of 500 to at least 1000 per year and will be working with Disability Advice Service Lambeth and colleagues at Lambeth Sports Development to promote the new facilities.

Angling coach training bursaries

Each year the fund features a theme focused on angling participation and development. Clubs, fisheries and other organisations were invited to apply for up to £2,500 to enable their anglers and volunteers to take accredited Level 1 and Level 2 coaching qualifications, so removing the financial barrier to becoming a coach. Priority was given to organisations able to support the Angling Trust's 'Let's Go Family Fishing', 'Get Back into Angling' initiatives and part of the award or 'bursary' could be used for equipment and other costs involved in running participation events. Over £48,000 was allocated to 32 projects, enough to help train and deploy more than 140 new coaches and over 550 new events were being planned on the back of these awards. This is another major boost for angling's infrastructure that will help attract new people to our sport and should pay dividends for years to come.

Tackling predation

AIF also supports the non-lethal protection of fish stocks where expert advice shows that this is needed to tackle the problem. Priority is given to organisations that have sought expert advice on how best to tackle the problem. £284,000 of fishing licence income was distributed to 51 projects, 39 of these projects helped pay for the costs of installing otter-proof fencing. These projects attracted over £532,000 of additional match funding.

Supporting fishery development

During the year, five Club and Fishery Development Roadshows were organised around the country these replaced the grant-writing skills workshops which had previously been organised and delivered by the Angling Trust. The aim of these new larger events was to help clubs and fisheries to retain and increase membership, be sustainable, make better use of social media and generate more fishing opportunities.

87 people attended the events representing clubs and commercial fisheries from around England. The events were highly rated with an overall score of 4.5 out of 5 marks for content, presentation and information learnt. During the forthcoming year it is planned to hold another 8 events.

Getting fisheries ready for spring

From 92 applications we awarded over £227,000 to 56 projects and with partnership contribution this totalled £400,000. These improvements varied from upgrading swims, replacing fencing and gates, repairs to footpaths, creating new parking areas and access roads, installing toilet and washing facilities, tree work and improvements to notice boards all in order to appeal to the visiting anglers. These are small-scale, relatively quick-to-deliver maintenance and repair projects that were finished ahead of the main fishing season. These projects will generate over 34,000 new angling opportunities in the coming year.

3.2.5 Protecting our fisheries

Poaching and fish theft concerns many anglers. The Voluntary Bailiff Service (VBS) which was launched as a pilot in 2012 is a volunteer service designed to increase our eyes and ears on the bankside, increase our intelligence base and allow us to target our resources and enforcement capabilities in an efficient way. An enhanced phase of the service involves specially trained volunteers who are able to check fishing licences on the bankside.

The Angling Trust commenced the roll out VBS This involved the recruitment and training of additional volunteers and also the creation of a number of co-ordinator posts.

A series of fisheries enforcement workshops were run to raise awareness of how fishery owners and clubs can help themselves and better work with law enforcement agencies to counter illegal fishing activities.

The Angling Trust plays a vital role in engaging with partner organisations, fishery owners and anglers to raise awareness of the impacts of fisheries offences using their website,

social media, conferences and other events. The Angling Trust continue to publish a list of rod and line prosecutions.

Migrant anglers including those from Eastern Europe are also recruited into VBS and to manage the Building Bridges Project, which included making multi-lingual education material on fishing legally more widely available.

Examples of Building Bridges projects

3.3 Greater results with projects in partnership

We are committed to investing the fishing licence income we receive to benefit fisheries and anglers. We can make best use of this money by delivering projects with a range of partners. Some of these outcomes in the 2017 to 2018 are described in the following sections and in detail in the individual area reports.

3.3.1 Fisheries Improvement Programme (FIP)

We provide funds for our local fisheries teams to target fisheries improvements to both rivers and stillwaters.

This year we invested £1,329,087 into 162 fisheries improvement projects with match funding of £1,825,689.

Funding was allocated based on the following priorities:

- Angling benefits
- Match funding
- Coarse, trout and eel habitat/passage
- Length of river restored (km), or area of stillwater benefiting (ha)
- Length of river opened, to next obstruction or source (km)
- Water Framework Directive status (fisheries reasons for failure)

We also recognised there may be local research and investigations; supporting collaborative arrangements with universities or specific projects that help better understand local fisheries. These small allocations of money needed to demonstrate results by:

- Socio/economic benefits or natural capital added value

We need to demonstrate how fisheries projects deliver benefits aligned with Defra's strategic aims of:

- A cleaner and healthier environment that benefits people and the economy
- A thriving rural economy, contributing to national prosperity and wellbeing

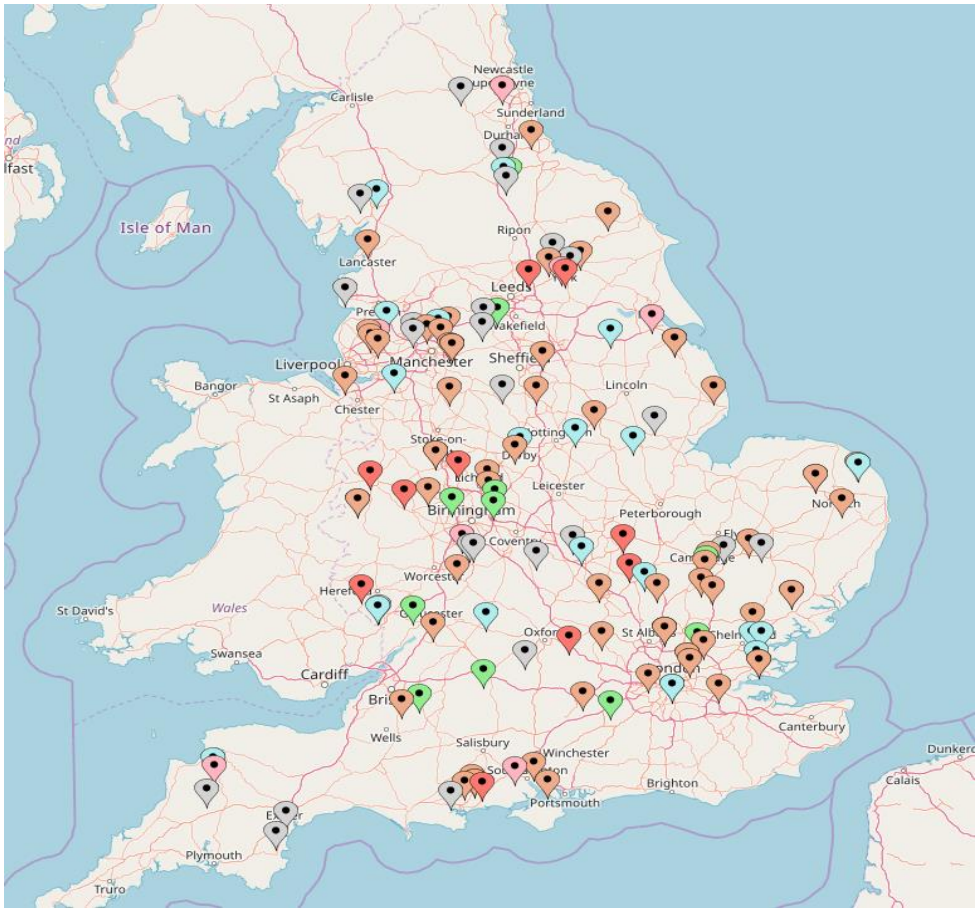
As a result, a number of projects on rivers or lakes are made more accessible for anglers and the general public. We can also link these projects with other National Angling Strategy outcomes

This year we sold more fishing licences than expected resulting in additional funds being released in September. Additional funds were offered on a competitive basis, we evaluated project proposals on the best predicting outcomes, the original priorities, and also the ability of local teams to complete all works by the end of the financial year.

Combining the two round allocations the actual expenditure was follows:-

Area	17/18 Total Expenditure
Cumbria & Lancashire	**£215,077**
Devon, Cornwall & IoS	**£30,380**
East Anglia	**£306,324**
East Midlands	**£87,556**
Gt. Manchester, Merseyside & Cheshire	**£59,743**
Herts & N London	**£25,780**
Kent, South London & East Sussex	**£43,765**
Lincs & Northants	**£21,625**
North East	**£43,355**
Solent & South Downs	**£26,453**
Thames	**£111,245**
Wessex	**£99,419**
West Midlands	**£124,630**
Yorkshire	**£133,735**

The FIP projects were spread across all Environment Agency Areas in England.



A wide range of rivers and still waters benefited; improving coarse fish and trout populations for anglers. The headline outcomes were:-

- The total length of river improved by the Fisheries Improvement Programme was a minimum 126km
- FIP funding was used to remove obstructions or install fish passes at 23 sites
- We worked with 374 different partners across the country
- We estimate 116,659 fishing licence holders directly benefitted from the works

Much of the funded work is to create or restore habitat for fish such as backwaters to provide refuge habitats, or the addition of natural substrate or woody material to alter water flow and clean spawning gravels. Riparian fencing and tree management is important to provide cover and increased sources of food.

Case study: New fish pass on the Sussex Ouse - flat packed

Working together, the Ouse and Adur Rivers Trust, Pevensey and Ouse Asset Performance team, Sussex fisheries team, Haywards Heath and District Angling Club and our contractors have now installed a fish pass at East Mascalls Bridge on the river Ouse near Lindfield. Using the Catchment Partnerships Action Fund, we sought to find a cost effective method of construction and installation of a pass which would increase fish passage through this priority site.

Rather than building the pass in the channel on site, which was proving difficult to plan safely, we used our original designs to pre-fabricate the pass from HDPE plastic to enable it to be lifted and fitted into place in a single day. The pass was delivered to site as a ‘flat pack’, ready to be bolted together. Using our upstream assets to control flows it made installation much easier and safer and the pass was fitted together, lifted in by crane and bolted into place with the whole process taking around eight hours.

The result of this approach was a cost saving of over £40,000 from the original quotes and shows another fantastic example of us working in partnership to deliver real improvements to the catchment.

During and after the project

Case study: Scarletts Lake improvement project

Working in partnership with Bromley & District Angling Society (BDAS) to improve one of their stillwater fisheries.

Scarletts Lake in Kent is a popular mixed fishery of 4 acres owned entirely by BDAS. Silt carried in by the Kent Water meant that over half of the lake was less than 600mm deep. This was causing poor water quality, stressed fish and less angling opportunities. The aim of the project was to remove around 6 to 7000 cubic metres of silt, which was utilised for bank and island repairs. This resulted in a much greater depth to the lake, creation of better habitat which is more resilient to climatic conditions, and in time improvement to fish stocks and angling. A silt trap was also dug, slowing the process of future siltation.

Funding for the project came from EA FIP pot – nearly 8k (£7455 plus £410 staff time) with the club providing over 2.5k in cash and members time.

Silt trap at Scarletts Lake, Kent

3.3.2 Wild Trout Trust partnership

This year Wild Trout Trust (WTT) worked with angling clubs and landowners offering expert advice, delivering projects, demonstrating habitat improvement techniques and carried out river habitat enhancement projects.

Projects involved habitat improvements such as small-scale weir removal and the introduction of wood debris to create more of a complex habitat. Work included providing advice on how to manage rivers which included fish stocking (or removal if too many) and the reduced in-river and bankside vegetation clearance.

Examples of feedback on WTT advisory visits 17/18

"All members of the club have appreciated the help and advice from [WTT] and as a club we feel a great deal more confident that our guardianship of the Esk around Danby is making the right choices for the long-term benefit of the river, its stock of natural trout, sea trout and salmon, and its wildlife". Colin Adamson, Danby Angling Club

"…the value of having a professional opinion from an organisation with a great track record has been of real value in dealing with the landowner…. These visits and the very comprehensive professional reports generated from them are the real strength of the WTT and reinforce the feeling of an organisation that 'punches well above its weight' and actually gets things done". Don Stazicker, Cressbrook & Litton AC

During this year, WTT increased staff resource, geographical reach and impact with three new field officers. For more information www.wildtrout.org

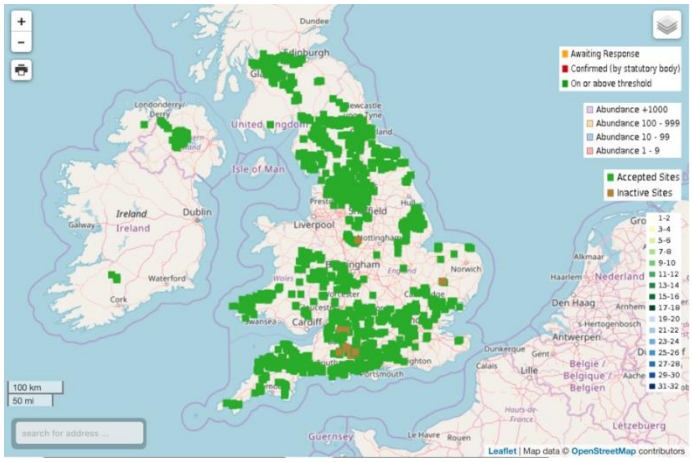
3.3.3 Riverfly Partnership

Riverfly Partnership (RP) ensures projects such as the Anglers' RP Monitoring Initiative (ARMI) and RP Plus effectively contribute to the FIP. ARMI assists in an early warning of river pollutions and, RP Plus helps us meet Water Framework Directive (WFD).

The Water Framework Directive (WFD) is a piece of EU legislation that requires us to make plans to protect and improve the water environment. The Water Framework Directive was adopted in 2000 and provided a common framework for water management and protection in Europe. It was significantly updated in 2017.

RP Volunteers are trained to:

- Take river water samples
- Identify 8 ARMI macroinvertebrate target groups
- Score and compare water samples identifying pollution trigger levels
- Report acute pollution incident details to us
- Submit collected data to the ARMI national database (see Riverfly website).
- More than 2,600 volunteers regularly sample across 1,850 sites nationwide. The volunteers are mainly anglers, who form around 170 ARMI groups. RP have recruitment plans to attract more volunteers in areas with the lowest numbers



Our staff attended training workshops, approved ARMI site locations, set trigger levels, responded to confirmed pollution incidents (ARMI alerts) and provided incident related feedback.

During 2017 we received 235 reports from the RP of pollution and other environmental incidents, including low river flows, siltation, poaching of fish, slurry entering river waters, pollution from road run-off, pesticide pollution, changed river morphology, glycol entering the river and leaking sewage on urban rivers.

Collaboration with our area teams, provided ARMI volunteers with an opportunity to increase their skills and knowledge in other environmental issues such as fisheries management and ecosystem conservation.

Case study 1 – ARMI activity on River Exe, Devon

As one example of the kind of ARMI activities that occur across England we have included here details from the River Exe ARMI group. In total 52 sites are currently being monitored on monthly basis and five trigger level breaches were reported in 2017.

Riverfly scores at the Trigger level were measured on 7 occasions and below the Trigger level on 5 occasions:

Little Exe	Westermill Farm	summer (autumn result above trigger)
Little Exe	Court Farm	autumn (EA is aware of water quality issues)
Dart	Riverside	spring (autumn survey above trigger
Spratford Stream	Cullompton	spring and autumn (EA is aware of the issues)
Yeo	Dunscombe Bridge	autumn (EA advise no cause for concern)

The Spratford Stream tributary of the river Culm, above Cullompton, continues to be of concern as surveys are dominated by very high numbers of *Gammarus* and little else (a typical kick sample yields 2000 Gammarus). This is most likely due to organic enrichment from agricultural activity. Gammarus only exist in low numbers in the River Culm above Cullompton but are found in very high numbers downstream of Cullompton (where the Spratford Stream joins) to its confluence with the Exe ten miles downstream.

The poor results on the Spratford Stream have been raised with the EA. Its own investigations have confirmed the poor diversity, which suggests significant organic enrichment in this tributary. The Spratford Stream has been identified for further investigation by the EA.

A very low autumn score of 3 was collected at Dunscombe Bridge on the Yeo. This was immediately reported to the EA. The EA investigated the site as soon as conditions allowed and advised that they did not find cause for concern; their ARMI equivalent score was 11 which is comparable with previous results. EA suggested ARMI sampling moves to an alternative (nearby) site which is better representative of this length of river.

Another low score of 5 at Exford was also reported. The sample was repeated but no improvement in ARMI score was seen. The matter was referred to the EA for investigation. The EA is aware of intermittent water quality issues in this area and confirmed that the ARMI survey had identified the problem.

Case study 2 – Monitoring urban rivers

Nicola Edgar, EA ecology contact for West Midlands, has developed an extension of the ARMI protocol using 14 invertebrate taxa to reflect the taxa that dominate urban rivers. Since several of the 8 taxa in the original ARMI method do not occur in most urban rivers, volunteers were becoming demotivated as their results were not meaningful. The new system has produced valuable results including improved community engagement, closer working with the local water company to tackle urban pollution, 26 pollution incidents reported, 110 misconnections investigated, 70 misconnections resolved.

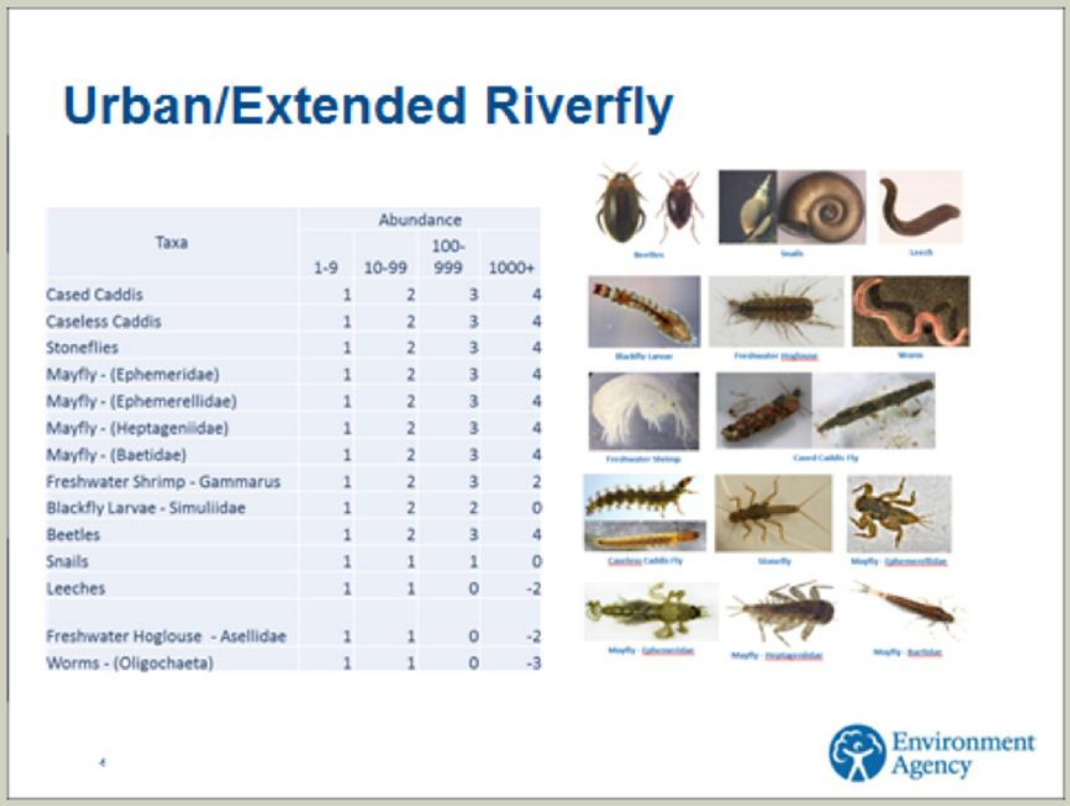


Fig. 9.

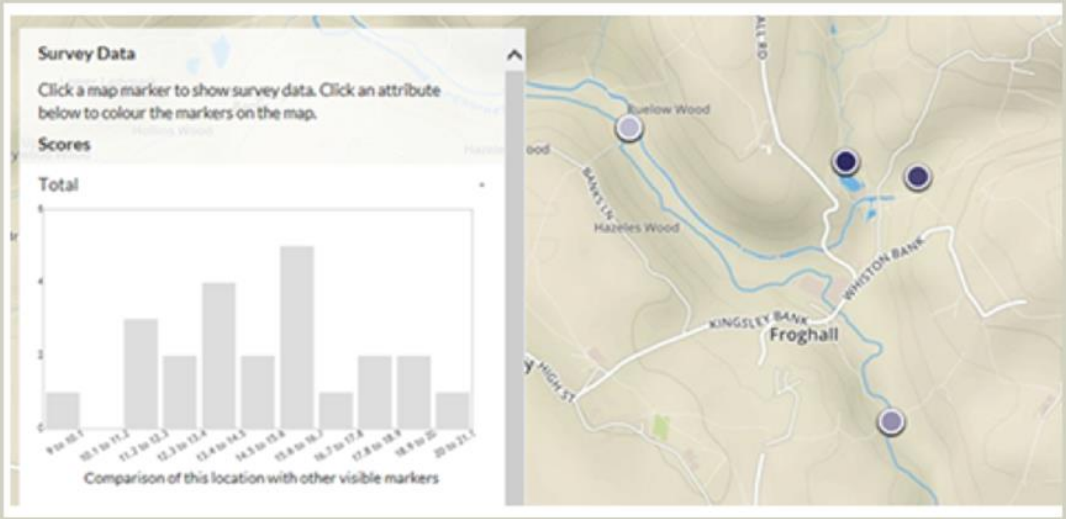


Fig. 10.

Figs 9-10. Revised ARMI method for use on urban river systems (figures courtesy of Dr Nicola Edgar).

3.3.4 Your Fisheries - The Rivers Trust

We worked in partnership with The Rivers Trust to develop a catchment fisheries initiative called 'Your Fisheries'. It provided a common web-based planning system that brought together evidence from a range of different sources to enable the production of catchment specific fisheries reports that looked to develop actions delivering improvements in fish populations and fishing opportunities.

Phase 1 of the project saw the initial development of the web based planning system. Phase 2 concentrated on trialling 'Your Fisheries' in a number of pilot catchments. There was at least one pilot in each River Basin District in England as follows:

- Bristol Avon Rivers Trust – Bristol Avon and North Somerset Streams (Severn)
- Westcountry Rivers Trust – Tamar (South West)
- Ribble Rivers Trust – Ribble (North West)
- Tees Rivers Trust – Tees (Northumbria)
- Trent Rivers Trust – Dove (Humber)
- Norfolk Rivers Trust – Broadland Rivers (Anglian)
- South East Rivers Trust – Kentish Stour (South East)
- Ouse and Adur Rivers Trust – Ouse and Adur (South East)
- South East Rivers Trust – Loddon (Thames)
- River Thame Conservation Trust – Thame and South Chilterns (Thames)
- Wessex Chalk Streams Rivers Trust – Dorset Stour (South West)

An evaluation report was produced and formed the basis of the possible ‘next steps’ for the 'Your Fisheries' initiative. Contact Tom Sherwood (tom.sherwood@environment-agency.gov.uk) more information or a copy of the full Your Fisheries Evaluation Report.

Two new backwaters created on the River Thame in Oxfordshire with the River Thame Conservation Trust

Examples of 'Your Fisheries' reports are available at www.yourfisheries.org

3.3.5 Institute of Fisheries Management

To improve the professionalism of the fisheries management advice given by our officers and partners including angling clubs we have worked to develop fisheries courses with the IFM.

The award in applied fisheries management enrolled its first cohort of students in October 2016 and since then over 20 members of our staff have taken the full two-year course, with an additional 20 staff choosing individual units from the six on offer.

The course has continued to develop and this year we added an additional unit on Fish Health and Welfare. This is an important area of fisheries management and all of the students have benefitted from the studying this unit.

Each unit has a lead trainer, and there is an overall course manager from the IFM. Students enrolled on the course undertake a written assignment for each module and are supported in their studies with course handbooks, additional resource packages for each module and mentoring should they require it.

3.3.6 Fisheries management workshops

The IFM delivered a series of stillwater fishery management workshops.

In the first round of workshops close to 100 angling clubs and associations were represented. Between them these clubs manage in excess of 150 stillwaters and have thousands of individual members.

The workshops covered water quality, fish health, predation management, fish biology and habitat improvement. The workshops also included practical sessions on monitoring water quality and the use of our fish ageing kits.

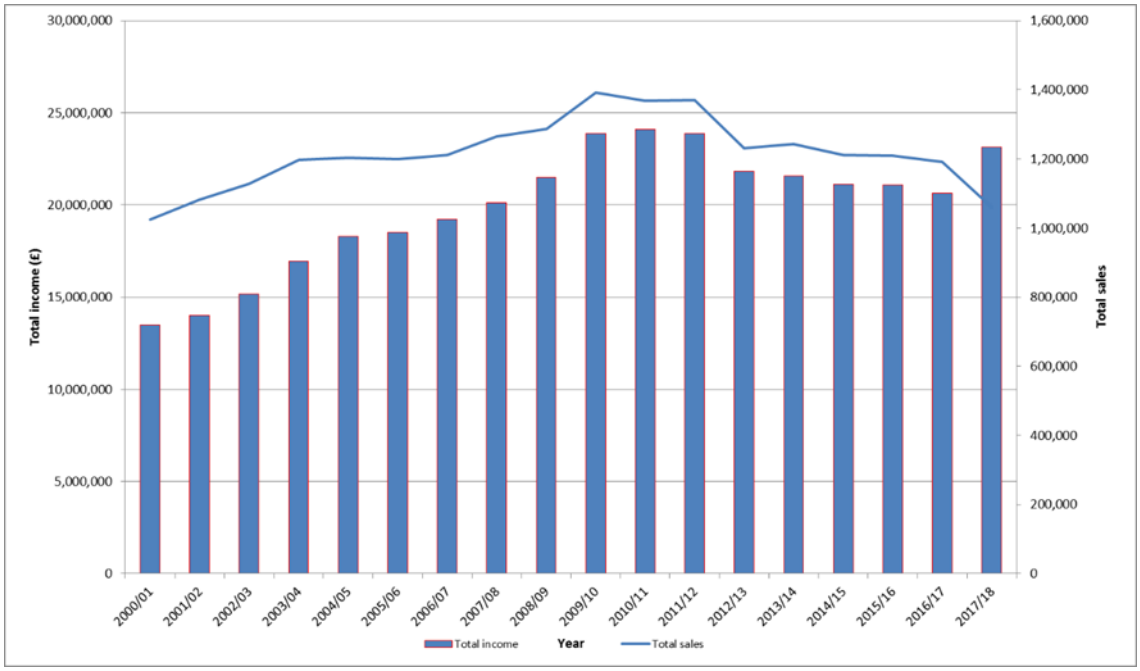
These workshops will allow the fisheries to take a more proactive approach to their fisheries management and will lead to a reduction in the number of incidents.

4. Angling

4.1 Fishing licence sales

In the period 2000 to 2010 supported by concerted efforts to boost angling participation and extensive marketing and communication, the annual sales of Environment Agency fishing licences for England increased by 37.5%, from 1.02 million in the 2000 to 2001 financial year to 1.4 million in the 2009 to 2010 financial year generating £24.1 million of income.

Since this peak the number of licences sold has reduced by 23.8%. However as a result of an increase in duty from April 2017 the income generated has only fallen by 3.2% or £763,777 from this peak. Sales in 2017 fell by 130,721 licences (11.0%) compared to 2016 in part due to the new licence products such as the new three fishing licence however income rose by £2,471,026 (12.0%). This has enabled us to improve our fishing licence sales systems and invest more money in improving fisheries this year.



Changes in licence structures make direct comparison of different categories with the previous year difficult, however junior licence sales showed a marked increase as did senior sales. Junior licences were made free of charge for the first time in 2017 which may account for some of this uptake. The increase in senior licence sales in part reflects an ageing angling demographic.

Short term (1 and 8 day) licences also saw a decline which may reflect the increase in duty this year. In total short term licence sales fell by 130,143 (32.0%) Unlike 2016, Easter fell in April 2017, the new licence year. We know that the Easter holiday is traditionally a time when many people buy their licences and so it is disappointing that higher sales were not generated at this time which may be a reflection of poor weather at the start of the year and the introduction of a 365 day fishing licence making people more likely to delay purchasing a licence until they start fishing.

In addition to this we issued 398 'worthy causes' fishing licences during 2017 enabling more than 5,800 people to experience the joy of angling for the first time. The breakdown of fishing licence sales for 2016/2017 across England is shown in Appendix 2.

4.2 Fishing licence sales changes

Following the public consultation we conducted during 2016 we introduced changes to fishing licences making them last for 12 months from when it was purchased, irrespective of the time of year, thereby giving anglers better value for money. We also developed a new licence to give anglers the option of fishing with up to 3 rods with an additional charge rather than having to buy 2 separate fishing licences.

For the first time in 7 years, we increased fishing licence duties raising a full coarse and trout licence from £27 to £30 and a full salmon licence from £72 to £82. Other licence types were also increased but we made junior fishing licences free of charge, although anglers aged 12 to 16 must still get a licence.

All changes came into force from 1 April 2017.

4.3 Fishing licence marketing

Following several years of declining sales, we initiated a marketing project in an attempt to increase licence sales and reverse the declining trend. Our objectives:

- retain more existing licence holders
- re-recruit lapsed anglers
- up-sell short-term licences to annual licences

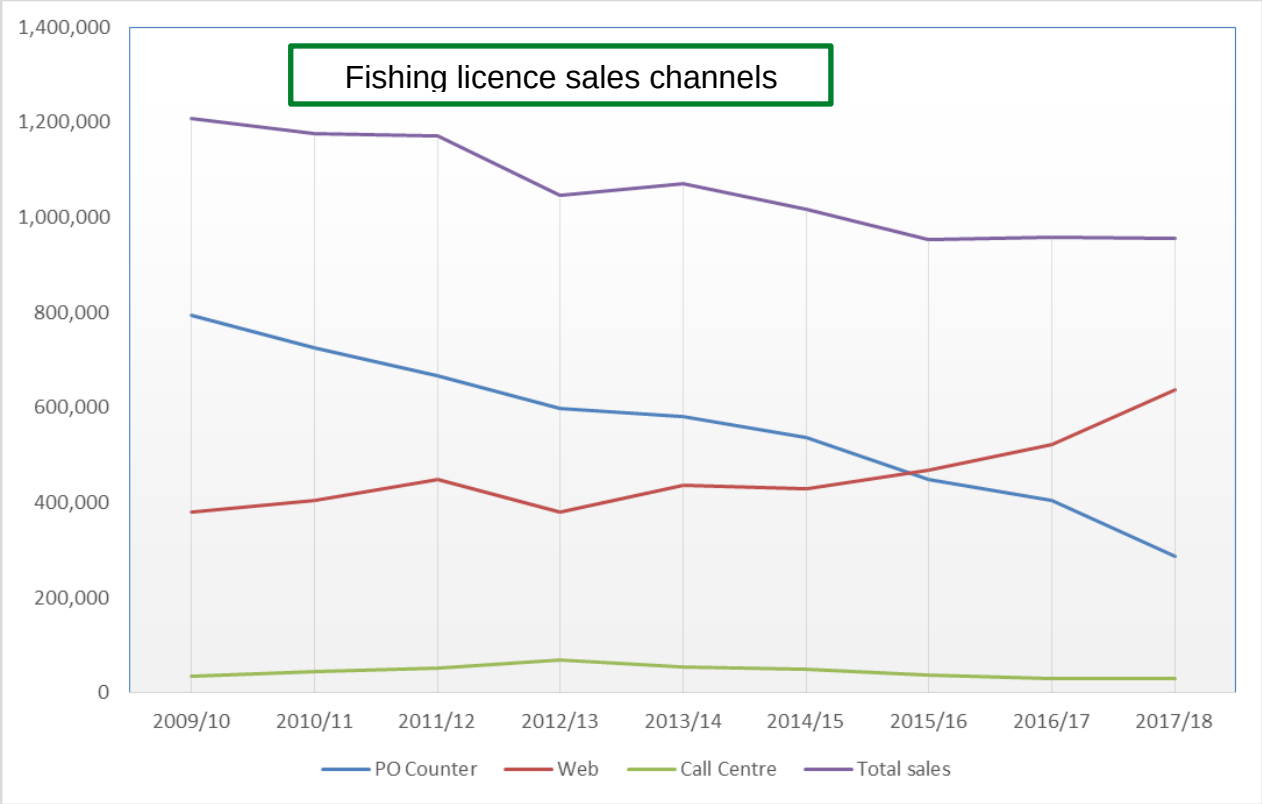
We produced a monthly newsletter, worked with our partners to promote angling activities and events, opened and actively maintained social media accounts, radio advertising, increased our media presence, attended angling and country shows.

Analysed licence sales showed that our efforts were successful, the rapid rate of decline in fishing licence sales was significant improved. In 2017 to 2018 we generated £4,427,292 more in sales than we had predicted. However, this was largely due to the rise in sales duty. Combined with the additional income from the previous year's marketing campaigns we had generated an extra £4,705,390 to invest in fisheries.

Moving forward, to maximise income levels a sustained marketing plan will be required to focus on the challenges of declining angling participation.

Other highlights from our analysis of the marketing programme included:

- Changing purchasing habits, we have been successful in persuading more anglers to buy their fishing licences online with an increase of 12.25%. On-line purchasing was the most popular way of buying a licence with 66.78% of purchases being made this way (see figure below). This is also partly due to the move from the Post Office platform to a new look and far easier system on GOV.UK. Online sales are now easier and more efficient for many customers. This retrospectively increases the number of emailed reminders, which cuts our administrative costs and our carbon footprint. Allowing us to invest the saved funds back into angling
- We re-recruited 3,440 lapsed anglers that generated a further £65,210 of sales



While many of the results we achieved this year were positive, the underlying trend of participation remains downward. We sold licences to 929,176 individual anglers a drop of 3.38% in individual anglers buying licences from 2016.

A free junior fishing licence has helped to reverse the decline in junior licences but we need to ensure these young anglers continue to fish and transition into licence buying adults. We are also seeing an increase in senior licence sales which in part reflects an ageing population.

With our partners and the Angling Trust we are developing clear objectives and targets to strengthen links between angling participation and fishing licence marketing. In order to drive sales amongst newly recruited anglers, especially juniors.

We will need to work hard across all aspects of participation, marketing and communication to sustain and increase the number of people going fishing in the future.

5. How do we know if fish stocks are healthy?

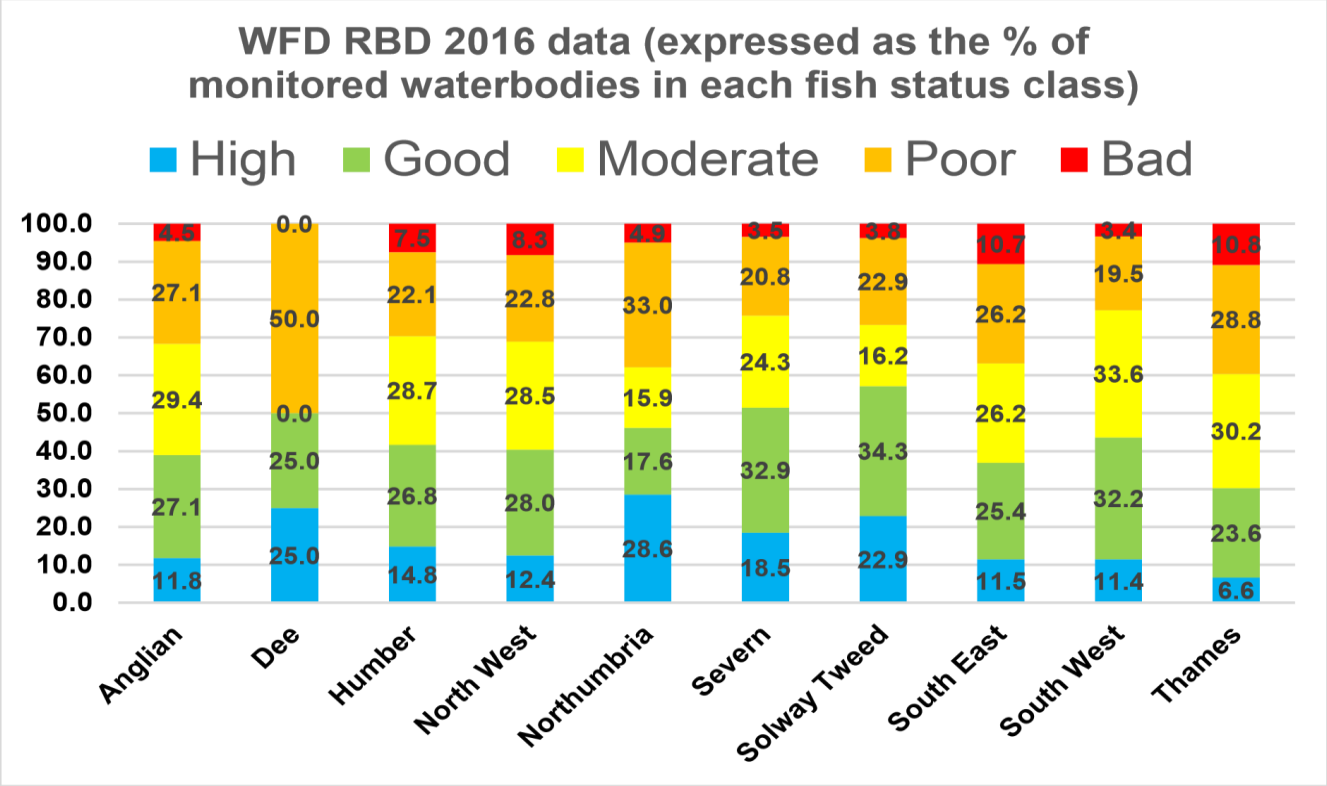
5.1 Fisheries monitoring

Water Framework Directive monitoring has now moved from an annual to a triennial (every three years) report. The next update is now due in 2019.

In the year 2016, 1,935 or 41.9% of the 4,617 freshwater and transitional waterbodies in England were monitored for fish as part of the wider Water Framework Directive monitoring programme. Not all waterbodies are monitored for fish because, amongst others reasons, we concentrate predominately on the higher risk sites. In 2016, 42.1% or 815 waterbodies of the monitored sites achieved good fish status or better (Table 1). Figure 1, shows the 2016 fish status data, as the percentage of monitored waterbodies in each River Basin District.

WFD status of fishing in England (2016)

Fish Status	Number of waterbodies monitored	% of total
High	284	14.7
Good	531	27.4
Moderate	526	27.2
Poor	471	24.3
Bad	123	6.4
Total	1,935	100

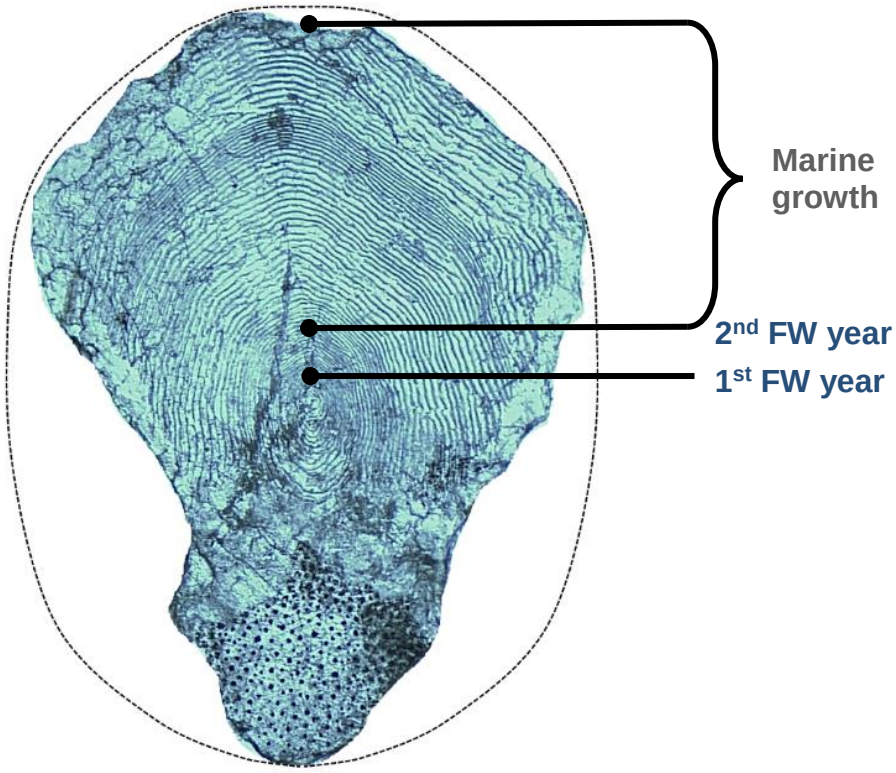


Fish ageing

The ability for us to tell the age of fish is an important tool in fisheries management, helping us monitor the performance and health of our fish populations. Scales are most commonly used for ageing as they are easily obtained and can be quickly replaced by the fish, but we also use the otoliths (ear bones) for micro-scaled or scale-less fish such as the European eel or the non-native Wels catfish. We manage a fish ageing service at the National Fisheries Laboratory, where a specialist team analyse over 20,000 fish scales a year in support of the national fisheries monitoring programme and the Water Framework Directive

A small number of scales are removed from the fish caught in surveys undertaken by our area teams. From these, the Fish Ageing team can not only tell how old the fish is, but also how its growth has changed throughout its life, the number of spawning events it has had, and whether there have been long-term issues affecting the fish population. Fish ageing can also be used to answer specific fishery questions such as how well fish have performed after improvement works, or what impact non-native species are having on our native fish populations

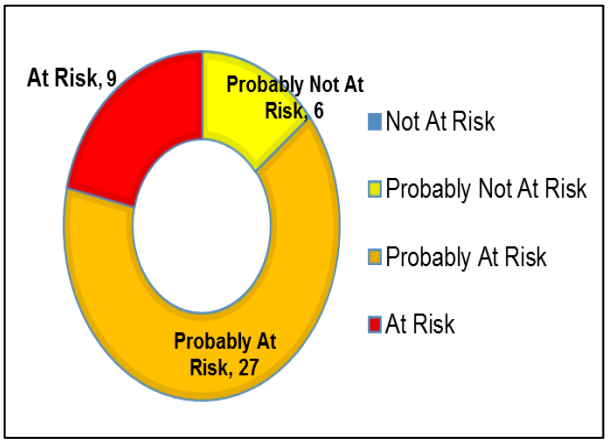
The Fish Ageing team age all of the salmon and sea trout sampled as part of the Environment Agency's Salmonid Index Monitoring Programme. We report on the age each fish smolted, how long it spent at sea, and in the case of sea trout, how many times they have spawned previously. This information is critical in helping us understand how the stock composition changes over time and helps us identify issues with our salmonid stocks. This data is reported internationally, contributing to wider understanding and management of salmonid fisheries.



Example of a salmon scale: *Captured from the River Tamar, we can tell that this fish spent two years in freshwater before smolting, then a further 1.5 years in the marine environment before returning to spawn. Significant scale erosion can be seen, where scale material has been re-absorbed to provide energy and nutrients during migration (dotted line indicates original scale shape).*

5.2 Status of salmon stocks fisheries monitoring

The 2017 assessment of England's salmon stocks highlights the continuing concerning status of salmon populations. Our assessment places each rivers' salmon stock into one of four categories with the strongest classed as 'Not at Risk' and the weakest as 'At Risk'. In 2017, 36 of England's 42 principal salmon rivers were assessed as being 'At Risk' or 'Probably at Risk'. None were categorised as 'Not at Risk'.



Status of England's 42 principal salmon rivers assessed against the management objective, for 2005-2017 and as predicted for 2022.

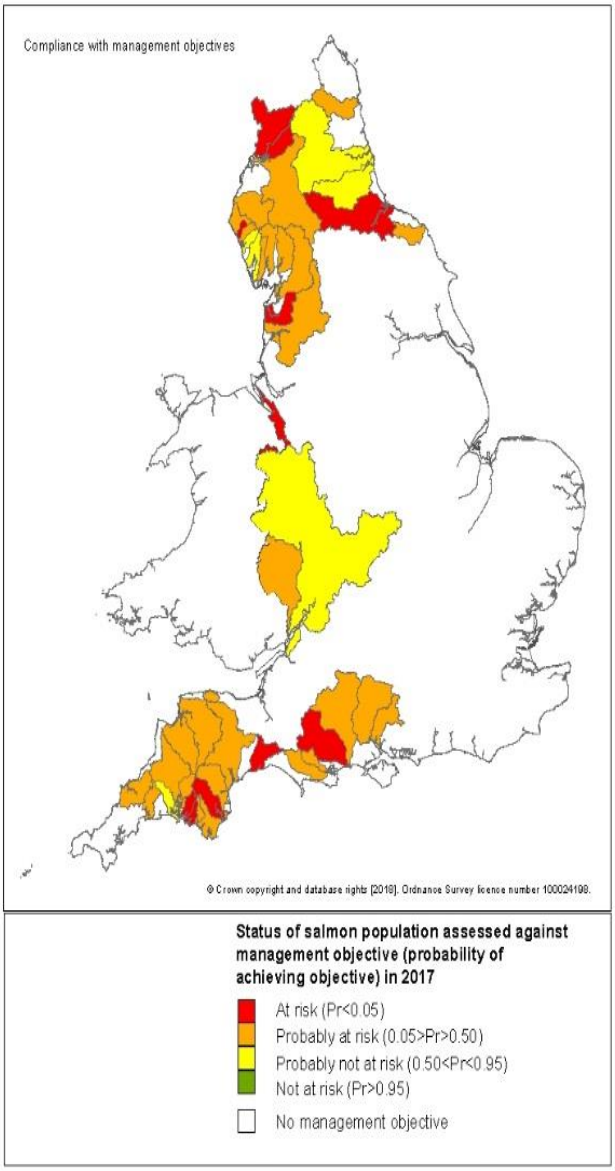


Figure 32. Status of river catchments in 2017 assessed against the management objective (i.e. that the CL is met or exceeded in at least 4 years out of 5, on average).

Rod catch - The declared rod catch for England was 10,336 salmon, which is 16% higher than 2016 and 3% higher than the 5-year mean. Catch and release was 79%.

Net catch - The declared catch by nets and fixed engines for England was 9,869 salmon, which is 51% lower than 2016 and 24% lower than the 5-year mean. 93% of the catch was made in the North East.

The Annual Assessment of salmon stocks and fisheries in England and Wales has been produced for the International Council for the Exploration of the Sea (ICES) since 1997 and takes data from rod, net and trap catches, fish counters and other sources to describe the status of salmon stocks and fisheries. The latest (2017) edition can be read here.

For details of individual rivers' catches go to:

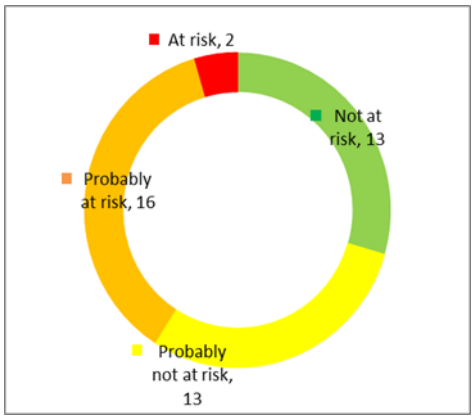
https://www.gov.uk/government/publications/salmonid-and-freshwater-fisheries-statistics

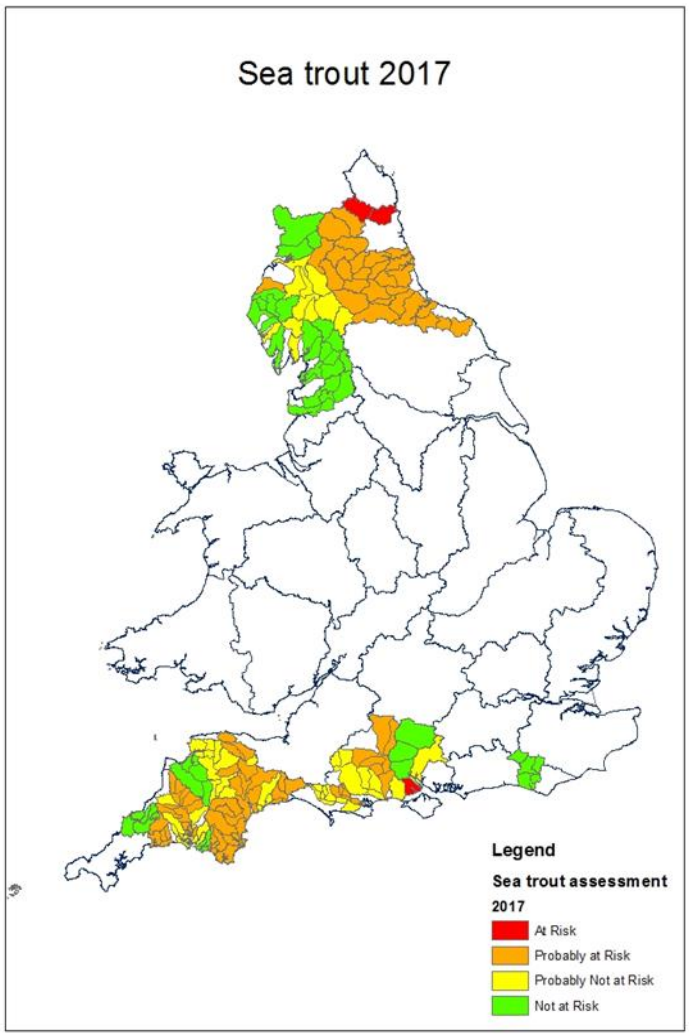
5.3 Status of sea trout stock

Of the 44 principal sea trout rivers in England (with a rod catch of >50 fish), 26 rivers are classified as "not at risk" and "probably not at risk", 16 rivers are "probably at risk" and 2 are "at risk", which is a slight decline on 2016.

It should be noted that the assessment is a reflection of rod fishery performance and this isn't always an indication of stock performance. It is therefore necessary to consider other available data, such as juvenile trout performance, when assessing sea trout stock status.

State of England's 44 sea trout rivers





The declared sea trout rod catch in England for 2017 was 12,202, which was 12% less than 2016 and 23% less than the 5-year mean of 15,742. Of these, 9,216 sea trout (76%) were returned alive.

The total declared sea catch by nets and fixed engines in England for 2017 was 35,958 which was 10% down on the catch recorded in 2016 and 16% less than the 5-year mean of 43,019.

5.4 Status of eels

Eel management plan reports

Every 3 years, a progress report on delivery of our Eel Management Plans (EMPs) is sent to Europe. The 2018 EMP progress report was approved by Defra in October 2018. This triennial EMP progress report describes the continuing actions taken in the UK, in the reporting period 2014 to 2016 inclusive, to help conserve and restore the eel stock. These include regulation of fishing, improving or creating new eel habitat, removal of barriers, installing eel passes, screening of high priority water intakes and restocking of elvers. You can request a copy of the report by e-mailing the Environment Agency

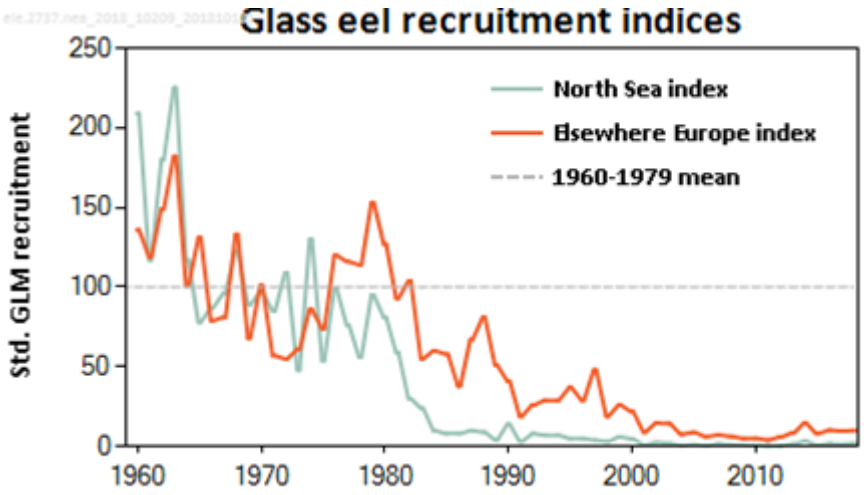
ICES eel advice 2018

The latest International Council for the Exploration of the Sea (ICES) advice on eel was published on their web site in November 2018 and the status of eel remains critical. The graphs below, show the decline of eel stock from historically high amounts in the pre-1980s to their current low levels.

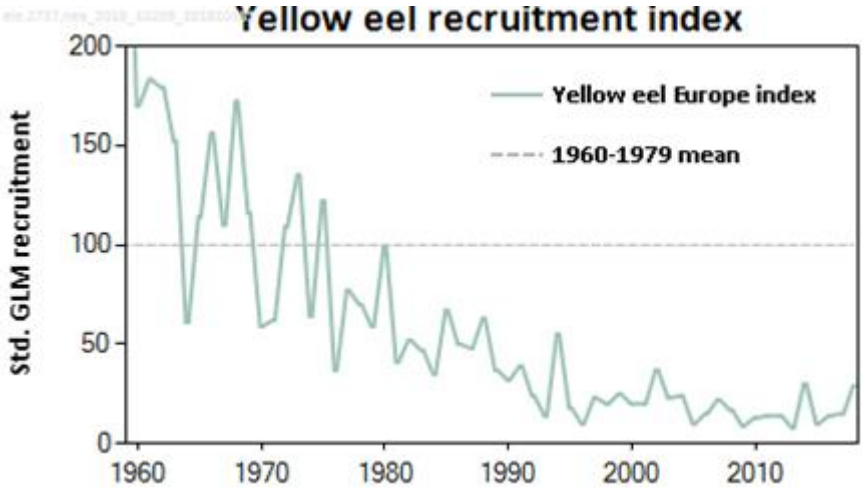
The first graph shows the overall pan-European decline in glass eel numbers across its European range (ICES advice, 2018). A similar pattern of decline is seen in yellow eels (Figure 2) including within the UK. The annual recruitment of glass eel to European waters

in 2018 remained low, at 2.1% of the 1960–1979 level in the “North Sea” series and 10.1% in the “Elsewhere Europe” series. The annual recruitment of young yellow eel to European waters was 29%of the 1960–1979 level. These recruitment indices remain well below the 1960–1979 reference levels

A copy of the advice is available here.



Glass eel recruitment for the continental “North Sea” and “Elsewhere Europe” series. The UK is included in the “Elsewhere” series.



Yellow eel recruitment trends for Europe.

5.5 Net licence sales

Migratory salmonid net licence sales

Region	Licence Type	Number of licences	Number of Licensees
North East - Northumbria	Combined	2	2
	Drift	8	8
	T/J	20	20
North East - Yorkshire	Drift	1	1
	T/J	27	27
Anglian	Drift nets	12	12
	Other nets (various)	5	5
South East	Seine nets	1	1
South West Devon and Cornwall	Seine nets (single river)	15	15
	Drift nets (Camel)	5	5
Midlands	Lave nets	22	22
	Seine nets	1	1
	Fixed engine ranks: (50 putchers per unit)	1	1
North West	Haaf nets (Solway)	66	66
	Drift nets (Ribble)	4	4
	Haaf nets (Lune)	12	12
	Drift nets (Lune)	7	7
	Lave nets (Kent)	3	3
	Lave nets (Leven)	2	2
	Coop traps (Eden)	3	1

Eel, elver, lamprey and smelt netting

Fishery	Method	No of Licences	No of Instruments
Adult eel	Small wingless traps	10	216
	Fyke nets	61	2,000
	Fixed traps	5	5
Elver	Dip net	452	452
Lamprey	Pot traps	1	40

	Fyke nets	0	0
Smelt	Pot and Fyke traps	5	215

5.6 Catch statistics

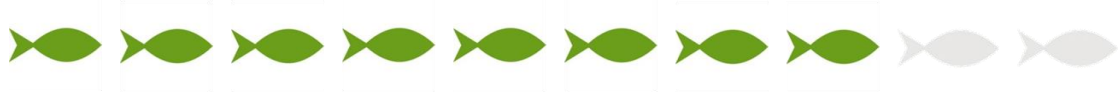
5.6.1 Salmon

Net

In 2017 there were 21 coastal and river estuary net fisheries operating in England. The net fisheries caught a total of 9,869 salmon, of which the majority (9,157) were caught by the drift, T and J nets of the North East Coast fishery. The catch in 2017 was 51% lower than that of 2016, and 24% lower than the five year mean of 12,940.

Rod

In 2017 a total of 10,336 salmon were caught by rod and line in England. Of these, 8472 (82%) were returned alive. The 2017 catch was 16% higher than that of 2016, and 3% higher than the five year mean of 10,020.



80% of rod caught salmon returned

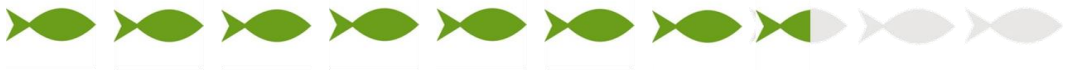
5.6.2 Sea trout

Net

In 2017 the 21 coastal and river estuary net fisheries caught 35,958 sea trout. The catch in 2017 was 10% lower than that for 2016, and 16% below the five year mean of 43,019.

Rod

In 2017 a total of 12,202 sea trout were caught by rod and line in England. Of these, 9,216 were returned alive (76%).



76% of rod caught sea trout returned

5.6.3 Eel

In 2017 a total of 3.567 (7.282) tonnes of silver eel, and 22.126 (25.582) tonnes of yellow eel, were caught by small traps, fyke nets and fixed traps. A total of 3.315 (4.040) tonnes of elver were caught by dip net. 2016 figures are given in parentheses.

5.6.4 Lamprey

We authorise the use of fyke nets and small traps for the exploitation of lamprey in Yorkshire and Nottinghamshire. In 2017 only 2.995Kg of

lamprey were caught, (compared with 903 Kg in 2016). All lamprey caught in 2017 were returned alive to the river by agreement with the net licensees, as part of investigations into the sustainability of the fishery.

5.6.5 Smelt

We authorise the use of fyke nets and small traps for the exploitation of smelt in Yorkshire and East Anglia. In 2017, a total of 1.21 tonnes of smelt was taken in these fisheries, compared with 9.65 tonnes caught in 2016.

6. Fisheries improvements

6.1 Coarse and trout

As our most popular form of fishing we recognise the importance of developing and improving coarse and trout fishing in England.

Through working with partners to ensure fishing licence fees go as far as they can, we have introduced a number of funding channels and programmes which continue to make a difference year on year to coarse and trout fishing.

In total 162 Fishing Improvement Fund (FIP) projects were completed in the 2017 to 2018 financial year. The total fishing licence reinvestment in FIP projects was £1,329,087 of fishing licence income with an additional £292,500 from other Environment Agency functions. A further £766,555 from other organisations, £217,000 of additional grants, or similar, and £549,634 in-kind support. This provided a total of £1,533,189 of additional funding to support the fishing licence contribution.

Additionally we ensure additional fisheries improvements are carried out when other teams within the Environment Agency are carrying out routine work e.g. flood alleviation work and water resource improvement works.

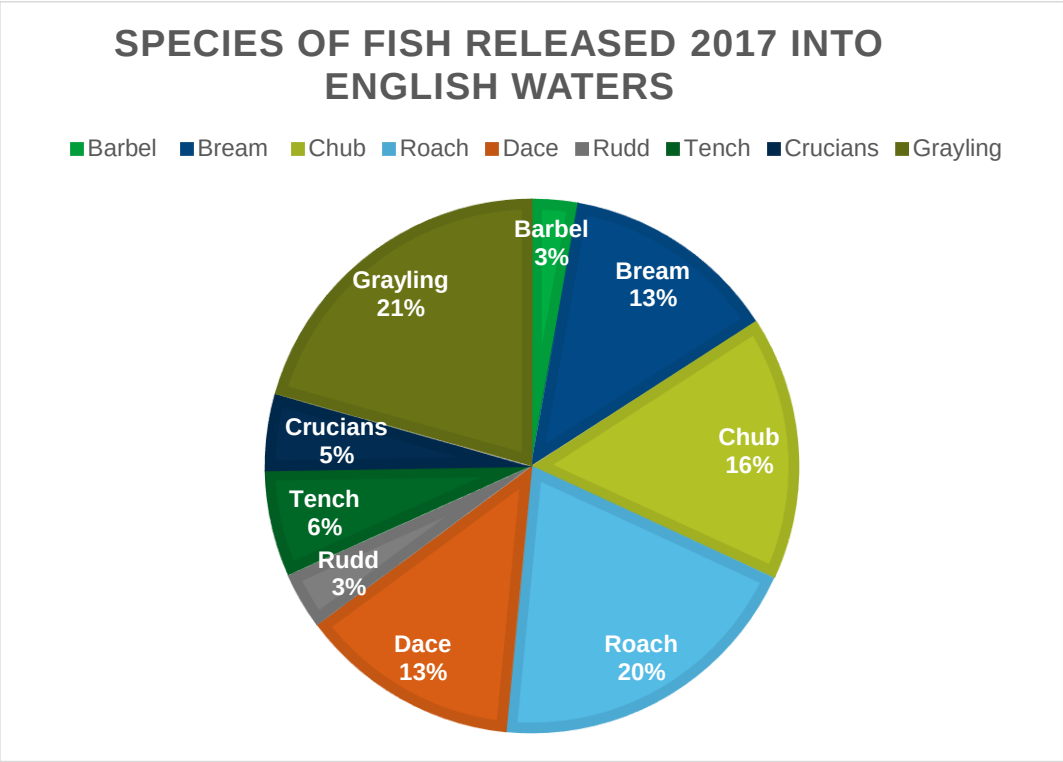
We continue to monitor the status of English fish stocks under the WFD and use this to drive improvements to water quality, geomorphology and fish passage throughout our river system.

The WFD in particular has placed a duty on all organisations to improve the quality of water bodies. Fish populations are recognised as a one of the elements used to assess ecological status.

Investment into angling and fisheries in the 2017 to 2018 financial year

The Environment Agency's National Coarse Fish Rearing Unit at Calverton, produces 9 species of fish for stocking into rivers and lakes throughout the length and breadth of England. These fish are used to improve stocks in rivers and lakes after habitat or water quality improvements and to create fisheries in areas where there is a shortage of angling opportunities. All of the work at Calverton is funded by fishing licence income. During 2017 we produced 358,552 fish although this is 45,332 fish less than 2016 we had a significant improvement on the average size and quality of the fish. We also witnessed a 97% breeding success rate.

You can see a breakdown of species stocked below and in addition to this we stocked more than 6,335,000 million advanced larvae into rivers and lakes throughout England, which is 3,635,000 more larvae than 2016.



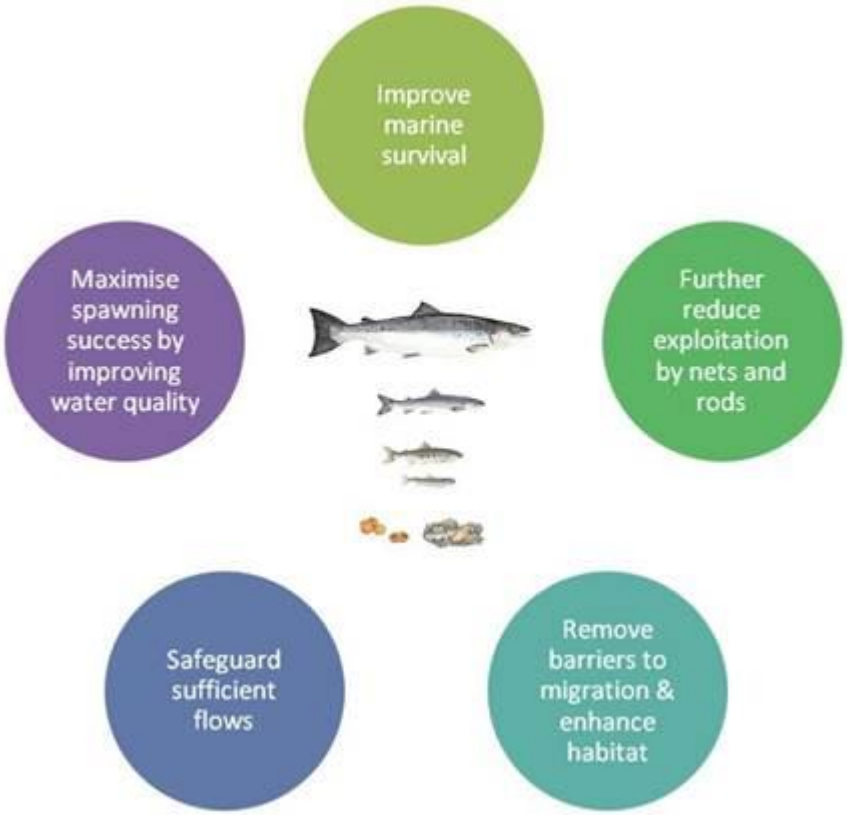
Water quality in many of our traditionally industrialised rivers keeps improving dramatically. This allows us to focus on cultivating fish stocks which we can be confident will have a great chance of repopulating reaches. We have accelerated restocking from our fish farm of natural fish stocks. Many rivers and lakes throughout England have benefitted thanks to your fishing licence income.

Fish Farm Tanks

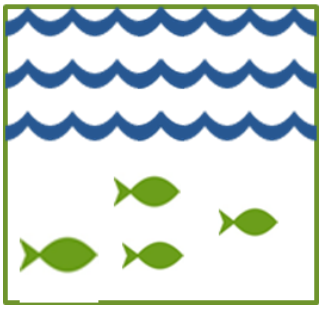
The National Coarse Fish Rearing Unit at Calverton is fully funded by fishing licence income

6.2 Salmon update

During 2017/18, implementation of the Salmon 5 Point Approach by ourselves, Defra, Cefas, NGOs and fisheries interests, saw a number of key outcomes delivered to conserve and enhance England's salmon populations.



Improve marine survival



To manage high seas salmon exploitation, through NASCO (North Atlantic Salmon Conservation Organisation), Greenland has agreed that their salmon fishery is an internal consumption fishery only and have unilaterally committed to further reduce the total annual catch. In line with a commitment to improve monitoring and control measures, all fishers will now be required to have a licence and report their catches. Faroese authorities on the basis of the advice from ICES set a zero quota for their salmon fishery for 2016 to 2017; and this decision will also apply in 2017 to 2018, 2018 to 2019, 2019 to 2020 and 2020 to 2021.

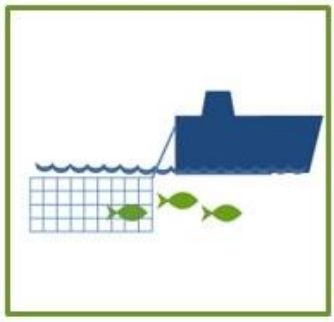
To minimise by-catch by inshore sea fisheries (within six nautical miles) we have been working with a number of Inshore Fisheries and Conservation Authorities (IFCAs). As a result of this, new byelaws have been introduced by the Devon and Severn IFCA and Cornwall IFCA that significantly increase the level of protection for migratory fish.

Significant progress is being made in improving understanding of salmon and sea trout behaviour in estuaries and inshore waters, through the SAMARCH (Salmonid Management

Round the Channel 2017 to 2022 €7.4m England-France EU Interreg Cross-Channel) project. In particular, information on sea trout swimming depths at sea from data storage tags is challenging perceived understanding on sea trout behaviour. New information from the SAMARCH project will be used to inform and influence coastal zone management to improve salmon and sea trout marine survival. To find out more visit: www.samarch.org

6.3 Further reducing exploitation by nets and rods

To protect salmon stocks new byelaws are proposed to protect salmon stocks in English fisheries and on the Border Esk that will stop the taking of salmon from the majority of net fisheries by 2019; and for rivers with the lowest status salmon stocks, introduce a mandatory requirement to return all salmon caught in rod fisheries and in any net fisheries entitled to continue to fish for sea trout. This reflects the need for both net and rod fishermen to help us protect salmon stocks.



The Poole Harbour NLO was reviewed and a reducing NLO was introduced with a target of zero (the fishery will close for the duration of the NLO should the existing licensee cease fishing). A single licence was still issued in 2017, although all salmon were returned with the support of an Environment Agency local conservation agreement. Anglers on the river already operate a voluntary 100% catch and release policy.

A new reducing NLO was also introduced on the River Ribble which restricts the number of licences to a single drift net; 4 licensees continued to operate in 2017 and these licences will not be replaced as individuals leave the fishery until a single licence remains. Byelaws were also introduced restricting the total catch by all nets to 48 salmon and restricting anglers to a 2 fish per season bag limit.

Mandatory catch limits remained in place for both net and rod fisheries on a number of rivers in England.

Catch and release in rod fisheries for England was 82% in 2017 with 8,472 fish released.

Illegal fishing continues to pose a risk to stocks across England. Intelligence-led targeted operations are carried out by the Environment Agency, often jointly with Inshore Fisheries and Conservation Authorities (IFCAs), the Marine Management Organisation (MMO), and the police. By way of an example, in North East England, working with the police we secured a number of cases including: three people lamping and using gaffs on the Waskerly Beck; a case of lamping on the South Tyne at Haining Burn, a cast-net on the River Wear in Durham and a set line on the Tyne.

6.4 Removing barriers to migration and enhancing habitat

On England's 42 principal salmon rivers, work was undertaken on 7 barriers to fish migration during 2017, improving access for salmon to 154km of river. Rivers improved included the: Lune (fish pass improved with Larinier super active baffle), Dun (2 fish passes improved with Larinier super active baffles), Stour (fish pass improved), Clun (weir removed) and Test (2 weirs removed).

To mitigate the effects of climate change the Woodland Trust, who now lead on the Keeping Rivers Cool project, reported in 2017 that 11,100 trees were planted and 5.2km of fencing was

erected on the Tyne and Ribble. In 2017, the Keeping Rivers Cool project passed the significant milestone of 100,000 trees planted.

Salmon and Trout Conservation UK are continuing their investigation into the state of fly life and the impact of phosphate and sediment. This could help better target measures to address diffuse pollution.

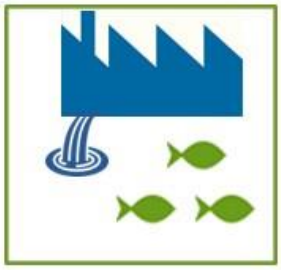
The Environment Agency have continued to fund the work of two Fishery Management Advisers (FMAs), based with the Angling Trust for a further two years. The FMAs continue to advise clubs and fishery owners about techniques for managing predation by fish-eating birds, including measures to protect parr and smolts. They have also contributed to licence application processes and the successful implementation of a number of area-based licences to coordinate management activities at a catchment scale. These now include the Rivers Itchen, Test, Exe, Axe, Eden, Ribble, Cumbrian Derwent, Hampshire Avon and talks are progressing on the River Frome.

Safeguarding sufficient flows

Since 2008, the Restoring Sustainable Abstraction (RSA) programme has changed 274 unsustainable abstraction licences preventing damage (or the risk of damage) by returning approximately 30.5 million cubic meters of water to the environment. 82 of these licences were on England's 42 principal salmon rivers. A remaining 153 licences will be modified under the RSA programme by 2020; 15 of these licences relate to salmon rivers.

In addition to the above, the Environment Agency is working to recover unsustainable abstraction where it exists, utilising a range of policy mechanisms provided by government, including: addressing serious damage, recovering unused licences and ensuring no deterioration at licence renewals.

Maximising spawning success by improving water quality



To meet requirements for protected areas and 'no deterioration' under the WFD, the Water Companies' National Environment Programme 2016-2021 is scheduled to deliver 42 improvements, 160 investigations, 15 catchment schemes and 10 water resource schemes on England's 42 principal salmon rivers.

For the next water company investment cycle (PR19), the Environment Agency has put forward proposals under the National Environment Programme for 196 new projects for principal salmon catchments and 72 projects for recovering salmon rivers. The plans are provisional at this stage with the majority being water quality driven and nine water resources driven.

In 2017, for England's 42 principal salmon rivers, the Environment Agency recorded that 327 km of river had been improved. Of the 132 schemes delivered, pressures addressed were: 58 diffuse pollution, 42 physical modification, 20 point source pollution, 5 flow, 1 abstraction and 6 other. An example of a project is the Test and Itchen River Restoration Strategy, which improved 2km of habitat in 2017 through removing two impounding structures and enhancing spawning habitat.

Catchment Sensitive Farming (CSF) advice has now been given to 20,573 farm holdings covering an area of 3 million hectares. CSF delivers practical solutions and targeted

support to enable farmers and land managers to take voluntary action to reduce water pollution from agriculture and to protect water bodies and the environment.

From 2 April 2018 new rules for all farmers in England were introduced to help protect water quality across the country. It will require farmers to keep soil on the land, match nutrients to crop and soil needs, and keep livestock fertilisers and manures out of the water. The Environment Agency will roll out the rules through an advice-led approach, working with farmers to meet the requirements before enforcement action is taken. The new farming rules for water are part of a package of measures to help farmers and land managers look after the environment. Around £3bn has been allocated to supporting agri-environment and woodland schemes, such as Countryside Stewardship, under Pillar 2 of the Common Agricultural Policy (CAP) between 2014 and 2020. Wildlife conservation is one of the primary goals of these schemes.

Under cross-compliance guidance, from 1 January 2017 landowners must take all reasonable steps to maintain a green cover and they must not cultivate or apply fertilisers or pesticides for all agricultural land within 2 metres of the centre of a watercourse or field ditch and from the edge of the watercourse or field ditch to 1 metre on the landward side of the top of the bank.

Designations under the Water Framework Directive for England's 42 principal salmon catchments place the highest elemental failure as phosphate, followed by macrophytes, fish, invertebrates, dissolved oxygen, hydrological regime, ammonia and metals. Current principal salmon water body status (2016) is: 25% Good/High, 54% Moderate, 19% Poor, 2% Bad.

The five-year WFD funded, piscicide based programme instigated in 2011-2012 to eradicate the highly invasive topmouth gudgeon (Pseudorasbora parva) has been implemented and 25 sites have been treated. Three further populations have been identified and will be treated shortly. Salmon catchments protected through this programme in 2017 include the Rivers Test and Severn. One site in the Test catchment had 42 ponds that required treatment.

In 2017, approximately 200 pink salmon were captured in the English NE coast net fishery and anglers also reported the capture of pink salmon in the rivers Frome, Hampshire Avon, Tyne, Coquet, Wear, Hull and Duddon. Captures of pink salmon were widely reported from around the north Atlantic and are believed to originate from populations established in northern parts of the Russian Federation and Norway. Post-mortem analysis of 9 pink salmon indicated that all samples were free from viruses.

Over the last two years, we have invested £600,000 of Defra science capital funding to improve the resilience of our salmon counter network, which has included: rebuilding the River Kent counter, improving the River Itchen counter, developing a new fish counter sensor, upgrading digital recorders, computers and cameras and undertaking preparatory work to refurbish the River Tyne counter and build a second fish counter on the River Test.

6.5 Stocking

Kielder Salmon Centre was built to mitigate for habitat loss due to the construction of Kielder Water which impounded 7% of the whole River Tyne catchment and covered approximately 40% of the spawning and juvenile nursery habitat of the North Tyne when construction was complete.

Each year adult salmon are captured at the beginning of November from the River Tyne system and are brought back to Kielder Salmon Centre. Eggs are collected from the fish during November and December before these adults are returned alive to the river.

The eggs are hatched and grown at the Salmon Centre before young salmon are transported to the river the following summer as fry to areas of good quality habitat but where naturally occurring juvenile salmon densities are likely to be lower than they could hold.

Stocking juveniles on a North Tyne tributary

In the 2016 to 2017 financial year we stocked a total of 406,506 salmon into the River Tyne to mitigate for Kielder Water and estuarine mortalities of adult salmon.

Kielder Salmon Centre is funded through the Water Resources budget, 95% of which is derived from abstraction licence fees of the local water company as part of the long term commitment made during the planning stages of the construction of Kielder Water.

6.6 Kielder pearl mussel breeding project

This species is under significant threat of extinction across its range across its range, they even more threated than the Giant Panda!

The river North Tyne still contains one of the largest populations of freshwater mussels in England, however the Tyne population is in steep decline due very little or no survival of juveniles. Mussels here usually live until they are around 100 years old, but with many of the mussels in the river now over 80 years old and with little or no recruitment their survival is under threat. It is important that we protect these mussels as they are form an important part of the rivers ecosystem. They filter up to 70 litres of water per day from which they get their food, they stabilise the river bed and increase juvenile salmon and trout numbers by up to two to three times around the beds in which they live.

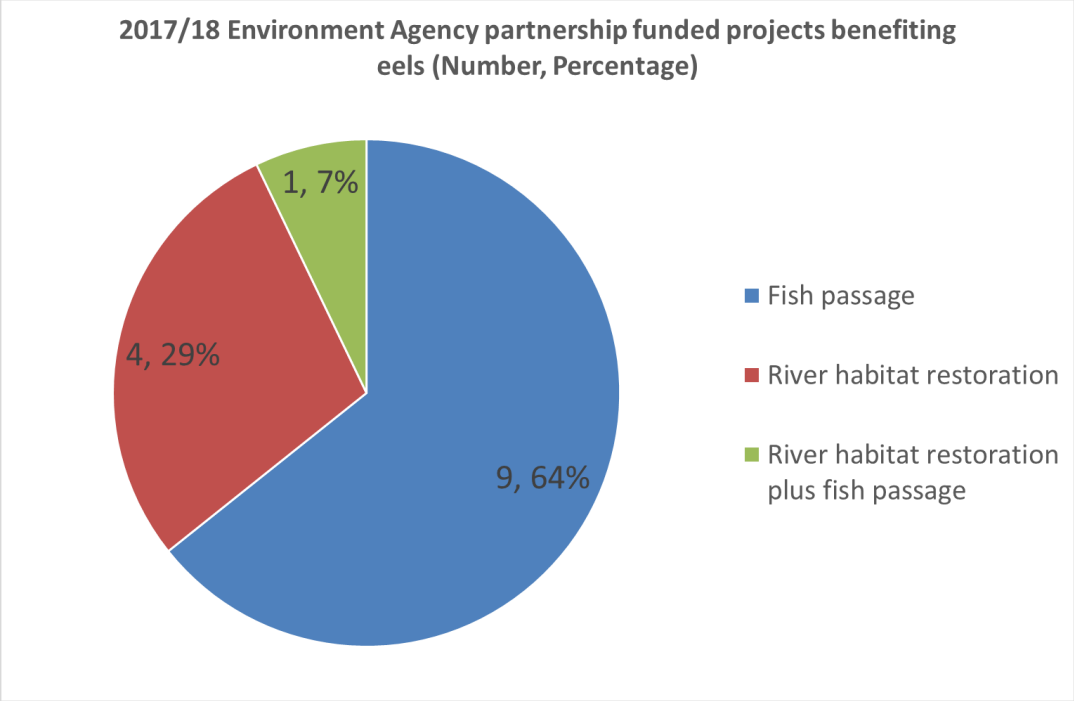
This fascinating species have a complex life cycle which, in part, involves a stage where the tiny juvenile mussels attach to the gills of trout in the River Tyne.

For the first time we have successfully collected these young mussels as they leave the trout's gills, at this point, when they are 10 months old they still just a mere 0.5 mm long (see picture). We have successfully reared the juveniles through the very challenging early stages and hope to return them to the river next year to help prevent this important species from becoming extinct.

Early life stage of mussels on trout gills

6.7 Eels

During the 2017 to 2018 financial year a total of 15 Environment Agency funded projects were created which will contribute in full or part to the aims and objectives of our Eel Management Plans (EMPs). These plans are designed to help bring back eel numbers to sustainable levels. The majority of these projects (64%) are for eel passage improvements, but 29% are for other projects to tackle the more expensive and ambitious challenge of restoring river habitats. The total cost of these 15 projects was just over £2.5 million but the project will also benefit other fish species too.



6.8 What's happening on the ground?

The Environment Agency has fisheries officers based in each of our 14 areas who identify, plan and deliver projects benefitting fisheries. Each year our officers deliver hundreds of projects through working with local stakeholders, land owners and partners such as the Angling Trust, Rivers Trusts and Wild Trout Trust. Read about fisheries projects in your area on GOV.UK.

We removed obstructions and installed fish passes **61** weirs

We opened up **1,218 km** of habitat for fish

Some examples of the work we have been doing across the country include:

- Improving fish passage by installing 61 fish passes, removing obstructions and modifying culverts
- Improving spawning opportunities for coarse and salmonid fish
- Improving habitat quality 361km
- Introducing gravel to modified channels to improve spawning opportunities

- Installing fry refuges
- Installing floating reed beds to give fish protection from predators
- Stocking fish where environmental conditions have improved
- Installing pre-planted coir roll to create marginal habitat between angling pegs
- Installing woody debris designed to change flow velocity and encourage various fish species
- Repairing buffer strip fencing along grazing land to ensure rivers are protected from livestock
- River restoration
- Developing techniques for the control of signal crayfish numbers with a view to reducing impact to fish and their habitats
- Conducting investigations into poor catch numbers
- Bankside improvements to benefit angling such as strimming paths and banksides
- Invasive species control
- Working to reduce sediment input in to improve water quality
- Educational programmes

Our projects are funded through a mixture of fishing licence income, funding from other parts of the Environment Agency and partnership funding.

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7. Our research and development programme

Evidence underpins the work of the Environment Agency. Our research and development programme helps to ensure we have a rigorous evidence base to support risk-based decision making and deliver sustainable fisheries management.

In 2017, we undertook a range of scientific research projects to address key evidence gaps and improve our understanding of issues affecting fish populations. Where possible, we work in collaboration with our partners to deliver shared research objectives more cost-effectively.

Appendix 3 details National projects undertaken by the Research, Analysis and Evaluation (RAE) Team under the fisheries research and development programme. This includes projects completed in 2017 to 2018, projects which are on-going and a list of publications relating to our work is available on the GOV.UK website.

Our research and development projects receive funding from various source including GiA, fishing licence income, from other sections of the Environment Agency and from external sources including other UK government agencies, universities, NGO’s and the European Union.

Case study: Use of still water ageing surveys to inform fishery management

The National Fisheries Laboratory have been working with a number of angling clubs to help understand how their fisheries are performing and if improvements could be made. A fishery is sent a still water fish ageing kit containing everything needed to collect scales from fish captured by anglers.

One club benefitting from this service was suffering from poor captures of common bream. Before undertaking a stocking in an attempt to improve fishing, the club wanted to see if there were any underlying issues. When the scales were examined, it was clear that the bream were much smaller than we'd expect them to be for their age, showing a high degree of stunted growth. As a result, it was suggested that some fish were removed from the fishery to free up resources for those remaining.

The club took our advice and rather than adding more fish and making the situation worse, they cropped their water. Soon after, the bream fishing improved and so did the growth rates of the other fish. This not only saved the club money, but minimising the number of fish stockings into a fishery also reduces the risk of introducing harmful disease and non-native species.

A scales is taken from a roach for age and growth analysis

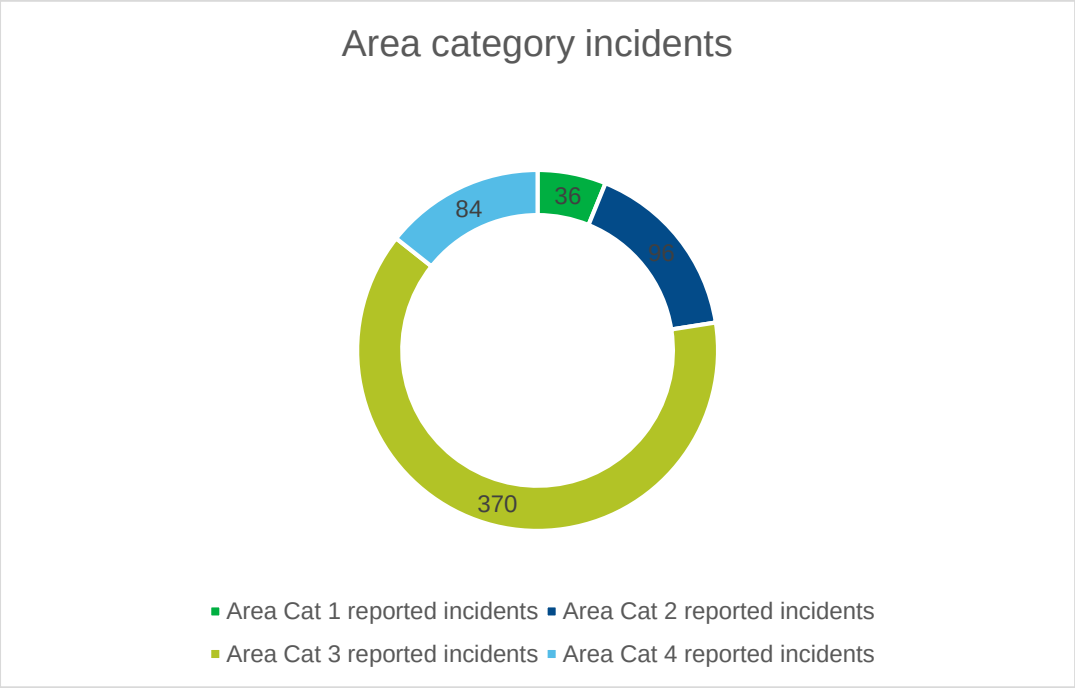
8. Incident management

Responding to fish kills and other environmental incidents is a vitally important part of what we do. Our organisation respond to thousands of incidents every year. There has been an overall reduction in the number of serious incidents with serious, persistent or extensive impacts to people, the environment or property.

Members of the public report incidents by calling our Incident Hotline (0800 80 70 60) and we are able to respond 365 days a year, day or night. A proportion of these incidents are fisheries incidents and includes:

- Illegal fishing
- Pollution incidents causing impacts to fisheries and angling
- Weather related incidents (warm weather, drought and floods)
- Fish disease outbreaks
- Incidents where algae can deoxygenate fisheries or release toxins

During 2017 to 2018 we responded to 569 reported fisheries incidents compared with 590 reported incidents the year before. All incidents are categorised according to potential and actual impact on the environment and the impact on our resources. Category 1 is the most serious and Category 4 is a reported incident with no impact.



2017 to 2018 breakdown of incidents by category

Case study: Incident at Nottinghamshire lake gets oxygen boost

In June we were asked for help by an angling club when fish were seen gasping for air at the surface of their lake. During periods of hot weather this can lead to fish mortalities due to reduced water levels, accelerated growth of algal blooms and poor water quality'. When we arrived unfortunately, some fish had already died and oxygen levels were dangerously low. We used our Oxyjet equipment to boost oxygen levels, which helped save the remaining fish. The problem had been caused by severe algal dieback. Our fisheries teams are trained and experienced. As part of our service we can offer advice to fisheries to help prevent this.

Nottingham Lake

8.1 Our response

Our response to incidents can range from giving advice to a fishery owner over the phone, to deploying our aeration equipment in a river which is suffering from low dissolved oxygen problems or, as a last resort, to rescuing fish at risk of dying and placing them in a more stable environment.

The level of our response will depend on the seriousness of the incident based on the number and species of fish involved, the effect on the environment and habitat and the impact on the fishery. We use our categorisation system to prioritise incidents as we may not be able to attend every reported incident but will do our best to respond appropriately and proportionately. We will respond to incidents on rivers, canals and lakes, and at public, angling club and commercial fisheries. In many cases, commercial fisheries buy their own or share emergency equipment to protect their stocks, calling on us only when necessary.

8.2 Fish health

The Environment Agency has a central role in the detection and management of fish diseases in England. This is achieved through investigations of fish mortalities, conducting health checks to support fish stocking activities, surveillance and risk assessments for new and emerging diseases, and implementing regulatory controls to limit the spread of high risk parasites and diseases.

Fish mortality investigations are led by our area based teams who carry out initial assessments to establish the severity of a problem and the likely cause. A site visit may be required to investigate water quality, pollutants, algal and diatom blooms, fishery management practices, fish stocking activity, biosecurity and clinical signs of disease. Where disease is suspected, detailed laboratory investigations are undertaken by our team of specialists at the National Fisheries Laboratory.

Following reports of fish deaths and fish in distress to our National Incident Hotline, initial assessments carried out by area based teams resulted in laboratory investigations being undertaken on fish from 56 stillwater fisheries in 2017 to 2018.

Our investigations cover all fish species, and we test for all types of disease during our laboratory examinations. These include common disease conditions, native and non-native parasites, novel pathogens and notifiable diseases.

Examining a fish for disease

Our investigations over the last year have resulted in the detection of a wide variety of viral, bacterial, parasitic and fungal pathogens. Of these, specific attention is given to the detection of exotic viruses as these can be particularly damaging and include a number of new and emerging diseases that pose a threat to our fisheries.

This year we investigated a particularly upsetting case of Carp Edema Virus (CEV), during a large scale mortality of carp, including many specimen fish. CEV is a highly damaging virus of common carp and its emergence across Europe has been met with concern. We also had three cases of Anguillid herpesvirus (AngHV-1), a virus affecting the already critically endangered European eel. By regulating the movement of fish we aim to control the spread of these pathogens and we are working with partners to understand more about their impacts and triggers.

We have also detected a number of 'notifiable diseases' within our mortality investigations and work closely with the Fish Health Inspectorate at Cefas to make them aware of cases where we suspect, or have detected these diseases. As well as the predicted cases of Koi herpesvirus (KHV), this year also included an unusual finding with an outbreak of Spring Viraemia of Carp (SVC).

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Case study – Detection of Spring Viraemia of carp (SVC)

April 2017 saw the return of the notifiable viral disease, SVC, following reports of losses at a still water fishery in the midlands. Environment Agency fishery officers arrived on site and secured a sample of fish for laboratory investigations after suspecting the involvement of disease.

SVC is primarily a disease of common carp and its ornamental variants, but it can also affect other coarse fish species. It is highly virulent, with typical losses affecting up to 50% of the carp within a population.

Pathologies seen during our laboratory examinations were consistent with symptoms of SVC, and further diagnostic testing confirmed the presence of the virus. The control of notifiable disease is the responsibility of the fish health inspectorate, who were promptly advised of the suspicion of SVC and subsequently placed controls to prevent its spread.

This represents the first outbreak of SVC since 2011, when the Environment Agency conducted an eradication alongside the Fish Health Inspectorate in order to retain recognised freedom from the disease. We continue to assist with ongoing disease surveillance at the site and offer advice to the fishery in order to aid recovery. The detection of this disease highlights the importance of early reporting of problems at a fishery and the need to carry out thorough investigations.

The combination of onsite assessments, environmental monitoring and detailed laboratory investigations allows us to understand the many different causes for fish mortalities. This also allows us to provide fishery management advice to get a fishery back on track and help reduce the risk of a problem re-occurring.

Case study – helping control Argulus infections in still water fisheries

The fish louse, Argulus, is a highly damaging parasite that causes significant economic losses every year in still water trout fisheries, and controlling the parasite represents a significant challenge. Staff from our National Fisheries Laboratory have been working with affected fisheries and our area based teams to trial a new approach to help control the parasite. This involves the use of plastic pipes, placed in the margins of affected fisheries to harvest the eggs that are laid on them by Argulus. Working with our area teams, we have installed these pipes at fisheries across the country. Once installed, the pipes are raised above the water every two weeks to dry-off and kill the eggs, breaking the life cycle of the parasite. Initial trials have been very promising and it is hoped that this will provide a simple, cheap and effective approach to reduce impacts of the parasite and improve fishery performance.

Officers trailing a new approach to control parasites:

Egg strings on the pipe

We have a central role in the detection and management of fish diseases in England. This involves mortality investigations at fisheries where disease is suspected as a possible cause and fish movement regulations to prevent the spread of non-native parasites and emerging pathogens. We also conduct health checks in support of fish movements between permitted sites.

Mortality investigations are led by our area teams with support from National Fisheries Services, who carry out fish disease examinations at our disease laboratory in Brampton, Cambridgeshire. Here, detailed post mortem examinations are conducted by our team of specialists to confirm the cause of death, identify any pathogens responsible for the incident and provide fishery management advice to minimise losses and help prevent future problems arising.

In the last 20 years, disease investigations have led to the detection of a number of new and emerging diseases. These can pose a significant threat to our fisheries and have been the focus of fish movement regulations to limit their spread, or partnership projects to better understand their distribution and impact.

Examples of diseases detected through this work include Puffy Skin Disease (PSD) of rainbow trout, Red Vent Syndrome (RVS) in wild Atlantic salmon, Anguillid herpevirus (Ang-Hv-1) in wild European eels and some notorious diseases of common carp like Koi Herpesvirus (KHV).

KHV was first detected in 2003 and was made a notifiable disease in 2007.

The incident response service is funded by fishing licence income and is available to all waters that are fished. This includes our laboratory services which involve comprehensive post mortem examinations and diagnostic tests for all types of disease. The majority of disease incidents that we investigate involve stillwaters, but we also monitor the health of fish in our rivers and canals, and respond to these in the same way should a mortality be detected. This work encompasses coarse fish populations, as well as eels and migratory salmonids.

We respond to disease incidents all year round, although most problems occur during warmer water temperatures. During the cooler months, we conduct health checks to support fish movements between permitted sites. These lab based examinations are carried out to ensure that the fish being moved are fit for purpose and that they don't have any non-native parasites or novel pathogens.

We regulate the movement of fish from waters known to have high risk pathogens (known as Category 2 listed diseases). These can cause serious damage to fisheries. Where new pathogens are found, we conduct rapid risk assessments to see if fish movement controls are needed. These controls are in place to protect the health of our fish populations and the performance of our fisheries. We also work with partner organi

sations to identify and fill knowledge gaps regarding the distribution, impact and management of these parasites.

8.3 Prevention

We continue to work to reduce the number of fisheries incidents by working closely with water companies and the agricultural sector to improve practice and infrastructure with a view to reducing the risk to the water environment. The Rivers Trust is increasingly playing a key role in providing advice and guidance to local communities and farmers and we are working closely with Natural England, Catchment Sensitive Farming to prevent pollution events from occurring by advising on infrastructure improvements.

Many incidents reported to us, particularly in the summer season, involve private or commercial still water fisheries. We continue to advise these fisheries on best practice on fishery management to help them to reduce their risk of incidents caused by management issues and manage incidents at their own fisheries. We do this with an aim of improving the environment for their customers and fish and consequently reducing reliance on external parties for support.

9. Regulation and enforcement

9.1 Legislation

We use byelaws, permits and other regulations to manage where, when and how people fish, and how many fish they can take. Many fishery owners impose additional rules and codes of good practice. You can download the angling byelaws for the area where you fish from https://www.gov.uk/freshwater-rod-fishing-rules.

Newly created fisheries are often stocked to help establish fish populations (mainly stillwaters) and many existing coarse fisheries are sustained by occasional or regular restocking. To support these fisheries and fish supply businesses, we regulate live fish movements to reduce the risk of transferring fish disease and non-native species between waters. Any fishery planning to restock and all fish suppliers must first be permitted by us and we apply conditions to permits to restrict which fish can be stocked into which waters and whether they must have a health check first.

We also have powers to require the owners of some weirs and other structures to build fish passes or take other measures to reduce barriers to fish migration. We can also require water companies and other abstractors to place screens on their intakes to prevent fish from entering and potentially being harmed or killed.

9.2 Fishing licence enforcement - rod and line

During the 2017 to 2018 financial year (the last complete year of data), a total of 64,702 fishing licences were checked by our fisheries enforcement staff. Our checks show us that evasion was at a national average of 3.97%. This ranged from a high of 6.67% in Solent and South Downs, area to a low of 1.8% in Thames.

Area breakdown of fishing licence checks in 2017 to 2018

Area	Fishing Licence Checks	No. of Multiple Checks	No. of New Licences Checked	No. of Reports Issued	Evasion Rate
Cumbria and Lancashire	1,794	3	1,791	58	3.14%
Devon and Cornwall	929	26	903	44	4.65%
East Anglia	5,241	87	5,154	300	5.50%
East Midlands	8,070	77	7,993	212	2.58%
Greater Manchester, Merseyside and Cheshire	5,532	149	5,383	111	2.02%

Hertfordshire and North London	6,820	1212	5,608	260	4.43%
Kent, South London and East Sussex	6,008	96	5,912	191	3.13%
Lincolnshire and Northamptonshire	2,799	106	2,693	113	4.03%
North East	2,602	198	2,404	138	5.43%
Solent and South Downs	3,047	544	2,503	179	6.67%
Thames	5,399	645	4,754	87	1.80%
Wessex	1,784	110	1,674	58	3.35%
West Midlands	8,707	326	8,381	394	4.49%
Yorkshire	5,970	183	5,787	372	6.04%
Total	64,702	3762	60,940	2,517	3.97%

9.3 Fishing licence evasion prosecutions

As a result of the fishing licence checks made, 2,257 anglers were prosecuted for fishing licence offences. Successful prosecutions resulted in a total average penalty of £267 with total fines issued (including costs) totalling £583,483. Prosecution fines and costs are paid to the court. The costs of the prosecution are calculated and we apply to the courts for these costs to be repaid. These cost only cover the work we needed to undertake work up to the stage of the magistrates judgement. Applications for costs will be considered after that of a fine and awarded. Fines are paid on to central government and costs are awarded to the Environment Agency.

9.4 Regulation-moving and keeping fish

The keeping and introduction of fish (England and River Esk Catchment Area) regulations 2015 came into force in January 2015. Anyone moving fish between inland waters must now hold a live fish movements supplier permit (supplier permit) and anyone who introduces fish or keeps certain fish species must hold a live fish movements site permit (site permit). Both permits have conditions to ensure that fish being moved, kept and introduced are suitable and healthy thereby protecting fish populations. The site permits are permanent, and greatly reduce the amount of administration for fisheries and the fish supply trade.

These changes are enabling us to focus more attention on higher risk fish movements, and giving more freedom to people to manage their own fisheries without unnecessary paperwork.

Since January 2015, we have issued 5,207 site permits and 356 supplier permits. In the 2017 to 2018 financial year we issued 2,041 authorisations to use fishing instruments (other than rod and line) for the purposes of fish surveys, fish rescues and fisheries management.

5207 site permits

356 supplier permits

Since the implementation of the new regulations, we have established the new permits and ensured that fisheries have been able to manage their fish stocks and the fish supply industry to operate uninterrupted whilst protecting fisheries and the wider environment. We are now increasing the number of compliance checks we do, focussing attention on high risk activities.

9.5 Invasive non-native species

Ideal floating pennywort growing conditions in 2017 created a number of incidents across South and East England. Thames Area removed over 60 tonnes of weed from the River Thames and its tributaries and similar work was undertaken on the Rivers Cam and Ouse. Local partnerships and management plans proved effective in preventing similar reoccurrences in 2018 and guidance on developing floating pennywort management plans has been agreed with the affected areas.

Good biosecurity by anglers is essential to preventing the spread of invasive non-native species, diseases and parasites. The non-native species secretariat has produced biosecurity guidance for a range of interest groups, including anglers, which is available on the NNSS website. We encourage all anglers, fishery owners and competition organisers to ensure good biosecurity and use the resources available from the NNSS to promote good behaviour in others.

Case study: Eradicating water primrose

Water primrose, Ludwigia grandiflora, was introduced into the UK as an ornamental aquatic plant, and is invading ponds, lakes, wetlands and waterbodies. It is already causing serious damage to waterbodies and wetlands elsewhere in Europe and in Japan. Water primrose forms dense mats which excludes native species, degrades amenity use and may increase flood risk. It is now banned from sale in the UK, but it has been found in a variety of waterbodies, especially, ponds, fisheries and wetlands. The Environment Agency is coordinating the eradication of water primrose. To date, 35 sites have been found, of which, 14 are believed to have been eradicated. It is proving a hard plant to completely eradicate, often requiring a combination of mechanical, chemical and manual removal methods before the site is declared free from water primrose. We are working with a number of fisheries that have water primrose infestations and we are encouraging anglers and fishery owners to report this plant. If you find water primrose, report it at mailto:alertnonnative@ceh.ac.uk. More information is available on the NNSS website

9.6 Regulating eel and elver fisheries

We issue authorisations to fish with traps for adult eel (yellow and silver eel) and with nets for juvenile eel (elvers). The authorisations state where, when and how fishing can take place. Authorisation holders are required to submit a return to report to us the weight of eel caught. We can restrict the number of authorisations we issue and we can revoke an authorisation once it has been issued.

Adult eel fishing mainly takes place in the low lying land and coastal fringes of south and east England. The season is restricted to 1 April to 10 December. Fishing usually takes place using fyke net traps, pipe or basket traps or similar, or fixed eel racks. We cap the number of traps that can be fished in England to around 2,750. In 2017, we issued 69 authorisations, covering 2,030 traps. From catch returns, trappers caught 32,864 kg of eel made up of 25,582 kg yellow eel and 7,282kg silver eel.

Juvenile eel or elvers may only be caught in two areas in England – rivers flowing into the Bristol Channel and the northwest coast, from the River Dee in Cheshire to the River Leven in Cumbria. The season lasts from 15 February to 25 May. Elver fishers may only use a single hand-held dip net (one per person). We issued 488 elver authorisations in 2017 and recorded a total catch of 4,003.24 kg.

Given the decline in eel stocks across Europe, the EU eel regulation stipulates that 60% of the annual elver catch in all EU countries must be placed on the market for restocking. This restocking supplements rivers which have lower elver numbers, with the aim of increasing the number of potential spawning adults that can return to the sea to reproduce. In 2017, 1,921 kg or 48% of elver were used for restocking (although the number made available for restocking was 73%, but not all were eventually used for this purpose).

We charge an authorisation fee to cover the cost of regulation, principally the cost of determining and issuing the authorisation. In 2017, we recovered £50.9k in eel and elver authorisation charges.

9.7 Regulating salmon and sea trout fisheries

We only license net and trap fishing for salmon and sea trout in specific estuaries and coastal waters. It is prohibited elsewhere. In these areas, we use Net Limitation Orders (NLOs) to limit or reduce the number of licences we can issue in order to regulate fishing effort. All NLOs can only last for a maximum of ten years, at which point they must be reviewed and re-issued if they are still required to protect stocks.

In 2017, we reviewed the Solway NLO: the new Solway NLO reduces the number of haaf net licences available from 105 down to 75.

List of current NLOs and available licences in England in 2017

(Please see explanatory notes below this table)

Net Limitation Order	Licences available	Licences issues in 2017[1]	Expiry date
Anglian Coast	0 nets (various)	18 nets (various)	31 December 2023
Severn Estuary (Gloucestershire)	1 draft net 15 lave nets	1 draft net 25 lave nets 4 putcher ranks[2]	19 May 2019
Northeast Coast	55 T&J nets 0 drift nets	60 T&J nets 9 draft nets	5 December 2022
River Kent (Cumbria)	6 lave nets	3 lave nets	7 May 2023
River Leven (Cumbria)	2 lave nets	2 lave nets	7 May 2023
River Lune (Lancashire)	12 Haaf nets 7 drift nets	12 Haaf nets 7 drift nets	25 November 2019

[1] Please note, where the number of existing licence holders exceeds the number of licences available, they are entitled to hold a licence until they retire from the fishery.

[2] Putcher ranks (salmon traps) only operate in a few locations and are not regulated by Net Limitation Orders

River Ribble (Lancashire)	4 drift nets	4 drift nets	19 June 2027
Solway Firth (Cumbria)	105 Haaf nets	55 Haaf nets	12 November 2017
Southern Coast	1 seine net	1 seine net	31 July 2018
River Camel (Cornwall)	6 drift nets	6 drift nets	23 May 2018
Christchurch Harbour (Dorset)	0 Nets	0	26 February 2022
River Dart (Devon)	0 draft nets	0	7 December 2025
River Fowey (Cornwall)	1 draft net	1	3 January 2018
River Exe (Devon)	3 draft nets	3	26 May 2021
Poole Harbour (Dorset)	0 nets	0	19 June 2027
Rivers Tamar, Tavy and Lynher (Devon/Cornwall)	4 draft net (reducing NLO to 0)	4	23 May 2024
River Taw and Torridge (Devon)	3 draft net (Reducing NLO from 3 to 1)	3	27 May 2022
River Teign (Devon)	3 draft nets	3	8 December 2020

As well as limiting the number of licences available, fisheries byelaws regulate where, when and how fisheries can operate and what fish they can take. Byelaws also require licence holders to make an annual return, telling us how many fish they caught and how often they fished.

During 2017 we issued 217 net and trap licences for salmon and sea trout, the same number as 2016. Between them, they caught 9,869 salmon and 35,958 sea trout. The vast majority of fish were caught in the North East coast fishery.

A more detailed assessment of salmon and sea trout catches and stocks is presented on page 40 and 41 and more details of catches can be found in the latest fisheries statistics report.

9.8 Lamprey and smelt fisheries

We regulate a few smelt and lamprey fisheries, principally in rivers along the east coast. In 2017, the netsmen agreed to voluntarily cease fishing for commercial purposes and to operate their pots to gather scientific data to assess the sustainability of the fishery. As a result only 1 authorisation was given to operate 40 pots. No fyke net authorisations were granted. All lamprey caught were subsequently released alive further upstream Our authorisation and net licence charges are published here

9.9 Tackling illegal fishing and poaching

The Environment Agency takes the threat of illegal fishing very seriously. The level of salmon and sea trout poaching has reduced from the 1970's, but illegal fishing remains a risk to salmon stocks, especially where they are already under pressure from other threats.

Case study: Fishing licence blitz

29 April to 01 May was the first bank holiday blitz of 2017 for East Anglia fisheries enforcement. Senior Environmental Crime Officer Gary Yardley and Fisheries Enforcement Officer Nick Beardmore took part in operations across Essex and Norfolk.

Our officers checked a total of 270 fishing licences and found 31 anglers fishing illegally (an 11% evasion rate). The work was supported by Herts & North London Senior Environmental Crime Officer Berwyn Williams and Angling Trust Volunteer Bailiffs.

Gary Yardley (left) with Berwyn Williams at Hanningfield Reservoir

Nick Beardmore carrying out his patrol with Norfolk Police

The incidence of coarse fish poaching however, has increased. Whilst salmon, sea trout and, more recently, some coarse fish are targeted for consumption, specimen coarse fish are often also taken alive to illegally restock other fisheries, increasing the risk of transferring fish diseases and invasive non-native species.

We use a variety of tactics to tackle illegal fishing, including covert and overt anti-poaching patrols, as well as responding to reports of incidents from anglers and fishery owners. We work with the Angling Trust, the Police, Inshore Fisheries & Conservation Authorities and other partners, to make best use of our combined skills and resources, including running high profile deterrent campaigns.

Case Study: Poaching

We prosecuted two County Durham men for poaching while using illegal fishing equipment.

The two men aged 38 and 22 were each given a 12 month conditional discharge by Newton Aycliffe Magistrates' Court on 6 December 2017 after pleading guilty to the offences. They were also each ordered to pay £420 costs.

Magistrates heard that on 30 November 2016 Environment Agency fisheries enforcement officers observed the men shining torches into the upper River Browney near West Butsfield, during a targeted evening patrol.

The River Browney and its catchment is an important and improving area for migratory fish, especially sea trout. Recent improvements to aid fish passage and water quality and a robust approach to enforcement have led to an increase in returning fish but at present, stocks remain low and vulnerable.

After detaining the men they seized two torches and a landing net containing three dead sea trout, each at various stages of spawning. Under the Salmon & Freshwater Fisheries Act 1975, lights are prohibited, as are landing nets if used without an authorised rod and line. It is also illegal to fish during the close season for migratory fish.

During interview, one admitted to shining the torch into the river and using the net to take fish but denied knowing it was illegal. He also denied knowing it was illegal to take fish during the close season. This was despite him holding a fishing licence at the time, which spells out when and how legal fishing can be undertaken. The other confirmed he understood that using a lamp to either take or assist in taking fish is an offence.

Kevin Summerson of the Environment Agency said:

“This was a serious poaching incident using illegal instruments that could have had a severe impact on future stocks of sea trout in the River Browney. At this time of year sea trout are returning to rivers to spawn and protecting returning fish is vital to maintaining a healthy fish population. That’s why our fisheries enforcement officers work hard to target those people flouting the law and we won’t hesitate to take action.”

The conditional discharge will appear on the offender’s criminal record. If either commits another crime within the next 12 months they can be sentenced for the first offence and the new offence.

Sea trout recovered from poachers on the River Browney

Appendices

Appendix 1: Statutory fishing duties

We have a statutory duty to operate a licensing system for fishing under Section 25 of the Salmon and Freshwater Fisheries Act.

The Environment Agency 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”.

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

The Environment Agency’s role for fisheries encompasses protection of fish stocks and their environment and a service to anglers paid for from the fishing licence duty to manage fisheries.

The powers of the Environment Agency to meet these duties are contained primarily in 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), 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).

There are specific powers relating to licensing of angling by rod and line and netting of fish in section 25 Salmon and Freshwater Fisheries Act 1975, which includes provisions for operating a licensing system for rods and nets and set-ting licence duties (fees) for them, and to authorising of other fishing methods in section 27A.

The duties and powers are imposed on the Environment Agency in relation to regulation of freshwater and migratory fisheries in England.

The Environment Agency also has a duty under section 6(1) of the Environment Act 1995 which states 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.

Appendix 2: Fishing licence sales by area

Area	No of Licences	Income
Northumberland Durham and Tees	43,763	£719,449
Cumbria and Lancashire	48,747	£999,733
Yorkshire	120,961	£2,100,844
Derbys Notts and Leics	83,055	£1,465,300
Lincs and Northants	55,953	£971,452
Gtr Manchester Mersey and Cheshire	93,971	£1,690,277
Staffs Warks and West Mids	109,798	£1,848,741
Shrops Heref Worcs and Glos	50,081	£924,836
Wessex	63,866	£1,114,082
Devon and Cornwall	27,678	£510,100
Cambs and Bedfordshire	59,354	£1,075,702
Essex Norfolk and Suffolk	93,904	£1,582,873
Herts and North London	92,892	£1,519,903
West Thames	73,574	£1,318,125
Solent and South Downs	58,773	£971,656
Kent and South London	106,741	£1,748,061
Unknown*	8,031	£100,730
Total England	1,191,142	£20,661,859

* Unknown are sales to anglers from Scotland, N. Ireland and outside of the UK

Appendix 3: Research projects

Completed research and development projects

Title	Reference No.	Start Date	Completion Date	Agency spend	Outcomes
ICES salmon stocks report	N/A	January 2018	March 2018	In-house	RAE provide the lead for the Environment Agency's input in to the production of the Salmon Stocks and Fisheries in England and Wales report in collaboration with CEFAS & NRW. This work helps to inform management decision by ICES and the EA to protect salmon stocks.
DNA-based monitoring methods for fish in lakes	N/A	January 2015	Ongoing	£5,000 plus in-house	A combination of additional fish eDNA sampling on Windermere and a commercial fishery in Midlands, also watching brief on work funded by SEPA and others, is facilitating the rapid development of eDNA as a method of fish sampling in lakes and, eventually, rivers.
Assessment of juvenile salmon stocks in 2017	N/A	January 2018	Ongoing	In-house	Initial examination of the data suggested that whilst salmon fry numbers in summer 2017 were generally low, they were much better than for 2016. In depth analysis still in progress.
A survey of Freshwater Angling in England,	N/A	February 2016	August 2018	£150,000	Both phases of the project were completed by late 2017. Key features

Phases 1 and 2					are that angling contributed around £1.4 billion to the English economy in 2015 and supported 27,000 full-time jobs. Angling activity as number of trips per annum has reduced by 20% since 2005. Stillwaters accounted for almost 70% of all trips made in 2015, carp were the most popular species. Anglers expressed a higher "willingness to pay" for a change from small to medium sized fish than from medium to large fish, though responses were hugely variable. Environmental quality and availability of swims were more highly valued than fish catch.
Strategic Review of data and information on coarse fish	N/A	April 2016	Ongoing	In-house	Detailed examination of data from National Fish Populations Database for a number of rivers has revealed contrasting patterns in the fortunes of various fish species in selected rivers, ranging from the relatively stable and prolific fish community in the Suffolk Stour to much lower overall abundance in a chalk fed river – the Wensum. The data show the recent and

					continuing decline of eels and steadily improving stocks of perch over the thirty year survey period.
Endocrine Disruption in fish	SC17001	April 2017	March 2018	£127,000	A re-survey of the levels of intersex (feminisation) in wild fish in English rivers. A number of sites previously sampled during studies in the 1990s have been revisited to collect samples of roach. The results will help us to understand whether interventions to improve STW effluent quality have been successful.
Salmon 5 point approach: Impact of catch and release angling practices on the survival of salmon	N/A	May 2016	August 2018	£8,000	Completion through to publication of a review of the survival of Atlantic salmon during catch and release angling with recommendations of how to maximise survival.
Salmon 5-point approach: **investigations of salmon angler behaviour**	N/A	April 2017	March 2018	In-house	A study of catch-and-release patterns amongst salmon anglers has informed considerations of options for further regulations on rod fishing to protect salmon stocks, and the possible socio-economic impacts of these.
Investigations of fish behaviour in relation to hydrodynamic	SC120075	January 2013	March 2017	£60,000	Studies of hearing capabilities and responses of eel and lamprey, also behaviour of juvenile

and acoustic cues					chub and barbel in relation to wedge-wire and bar-screens. Acoustic deterrents had some, but not complete deterrent effect on silver eels and bar racks. For young chub, horizontally orientated wedge wire screens offered better fish diversion than vertical screens.
Impacts of plastics in the freshwater environment	N/A	April 2017	On-going	In-house	RAE have provided the research lead on the potential impacts of plastics in the freshwater environment, working in partnership with water companies and universities to identify research priorities and provide the information needed to assess potential risk.

RAE publications

Impact of catch and release angling practices on the survival of salmon. Available at https://www.gov.uk/government/publications/impact-of-catch-and-release-angling-practices-on-survival-of-salmon

Research, Analysis and Evaluation publications

SC120050: Improving river habitats to support wildlife during low flows. Available at https://www.gov.uk/government/publications/improving-river-habitats-to-support-wildlife-during-lowhttps://www.gov.uk/government/publications/improving-river-habitats-to-support-wildlife-during-low-flowsflows.

SC120079: Testing the effectiveness of fish screens for hydropower intakes. Available at https://www.gov.uk/government/publications/testing-the-effectiveness-of-fish-screens-forhttps://www.gov.uk/government/publications/testing-the-effectiveness-of-fish-screens-for-hydropower-intakeshydropower-intakes.

SC140018: DNA based monitoring: method for fish in lakes. Available at https://www.gov.uk/government/publications/a-dna-based-monitoring-method-for-fish-in-lakes.

Effects of run-of-river hydroelectric power schemes on fish. Available at

https://www.gov.uk/government/publications/effects-of-run-of-river-hydroelectric-power-schemeshttps://www.gov.uk/government/publications/effects-of-run-of-river-hydroelectric-power-schemes-on-fishon-fish.

Using DNA-based methods for environmental monitoring and decision-making. Available at https://www.gov.uk/government/publications/using-dna-based-methods-for-environmentalhttps://www.gov.uk/government/publications/using-dna-based-methods-for-environmental-monitoring-and-decision-making-position-statementmonitoring-and-decision-making-position-statement.

SC12006: Understanding fish and eel behaviour to improve protection and passage at river structures. Extended Summary. Available at

https://www.gov.uk/government/publications/understanding-eel-and-fish-behaviour-to-improvehttps://www.gov.uk/government/publications/understanding-eel-and-fish-behaviour-to-improve-protection-and-passage-at-river-structuresprotection-and-passage-at-river-structures

A survey of Freshwater Angling in England, Phases 1 and 2 https://www.gov.uk/government/publications/a-survey-of-freshwater-angling-in-england

Impact of catch and release angling practices on survival of salmon. Available at https://www.gov.uk/government/publications/impact-of-catch-and-release-angling-practices-onhttps://www.gov.uk/government/publications/impact-of-catch-and-release-angling-practices-on-survival-of-salmonsurvival-of-salmon.

List of abbreviations

AIF	Angling Improvement Fund
ARMI	Angler's Riverfly Monitoring Initiative
BDAS	Bromley and District Angling Society
CAP	Common Agricultural Policy
CCD	Check Clean Dry
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CEV	Carp Edema Virus (a disease of carp)
CSF	Catchment Sensitive Farming
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
EFG	England Fisheries Group
EMP	Eel Management Plan
FIP	Fisheries Improvement Programme
FMA	Fisheries Management Advisor
GB	Great Britain
GiA	Grant in Aid
HDPE	High Density Polyethylene
ICES	International Council for the Exploration of the Sea
IFCA	Inshore Fisheries and Conservation Authority
IFM	Institute of Fisheries Management
INNS	Invasive Non-Native Species
IoS	Isles of Scilly
IT	Information Technology
KHV	Koi Herpesvirus (a disease of carp)
km	Kilometre
mm	Millimetre
MMO	Marine Management Organisation
NASCO	North Atlantic Salmon Conservation Organisation
NASS	National Angling Strategic Services
NLO	Net Limitation Order
NNSS	Non-Native Species Secretariat
NRW	Natural Resources Wales
NGO	Non-Governmental Organisation

PR19	Part of water company investment cycle
PSD	Puffy Skin Disease (a disease of trout)
RAE	Research, Analysis and Evaluation team
RBD	River Basin District
RP	Riverfly Partnership
RSA	Restoring Sustainable Abstraction
RVS	Red Vent Syndrome (a disease of Atlantic salmon)
SAMARCH	Salmon Management Around the Channel
SEPA	Scottish Environment Protection Agency
SVC	Spring Viraemia of Carp
T/J	T and J nets (salmon nets off north east coast)
UK	United Kingdom
VBS	Voluntary Bailiff Service
WFD	Water Framework Directive
WTT	Wild Trout Trust

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