



Annual Fisheries Report 2017 to 2018

East Anglian

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

In each of our 14 areas we carry out a wide range of work in order to protect and improve fisheries. Below are some examples of what has been happening in the East Anglia (EAN) Area, much of which benefits fisheries from funding from both fishing licence fees and other sources. For a wider view of the work we do across the country for fisheries please see the national Annual Fisheries Report.

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1. Fishing licence checks and prosecutions

During the 2017 to 2018 financial year (the last complete year of data) a total of 64,702 fishing licence checks were carried out by our fisheries enforcement staff across the country. Our checks show us that evasion was relatively low with a national average of 3.97%. Below are details from East Anglia:



134,803 rod
licences sold



£2,874,265.25
income generated from
rod licence sales



5,241 rod
licences
checked



174 successful
prosecutions



£24,554
fines and costs
imposed

2. Illegal fishing

Illegal fishing remains a threat to game and coarse fish stocks in England and the fisheries they support. The Environment Agency uses a combination of covert and overt patrols to deter and detect poachers, as well as responding to reports of illegal fishing where there is a credible threat to fish stocks and where we have a realistic chance of apprehending the alleged offenders. We cannot respond to every report of illegal fishing so we must prioritise where we focus our efforts. For EAN:

364 illegal fishing incidents
were reported to our incident
hotline (0800 80 70 60)



High fines

We had some pretty big fines for people caught fishing without a rod licence, here are some examples.

Two men have been handed hefty court fines for fishing illegally in separate offences at Manor Farm Lakes Northill, Bedford. They were caught fishing without a rod licence during targeted patrols by Environment Agency fisheries enforcement officers. Jay John

Whitbread, 22, of Church Lane, Bedford, was caught fishing without a licence at the same location on two separate occasions and both cases were heard together at court. He was fined £657, and ordered to pay a victim surcharge of £30 and £127 costs. A total of £814.

Liam Knight, 27, of Westmill Lane, Hitchin, was also caught fishing without a licence. He was fined £293, and ordered to pay a victim surcharge of £30 and £127 costs. A total of £450.

The defendants both pleaded guilty to Luton Magistrates Court on 6 March 2018.

Remember it's a crime to fish without a valid licence and offenders could be fined up to £2,500, have your fishing equipment seized and be banned from fishing. Our enforcement officers inspect rod licences throughout East Anglia and could turn up at any time.

All income from rod licence sales is invested directly back into maintaining and improving fisheries. Those who fish without a rod licence are having a direct effect on that work and are selling other anglers short. At £30 for a 2 rod coarse and non-migratory trout license, or £82 to also fish for salmon and sea trout, and short term options available too, the rod licence is great value for money.

OPERATION CLAMPDOWN is a joint Environment Agency, Police and Angling Trust - Voluntary Bailiff Service enforcement strategy. It ensures reactive and planned enforcement activity prevents illegal fishing on lakes, rivers, ponds and canals where coarse fishing is allowed. Officers will be ensuring all anglers have a valid rod licence, and are always on the look-out for those using illegal baits, banned methods of fishing and fishing in prohibited areas.



Enforcement Officer on Patrol

Fisheries patrols - net benefits

Fisheries Enforcement Officer Nick Beardmore carried out 6 joint patrols with Norfolk Police during late July and early August, following an urgent short notice request from them for support.

The River Yare was under threat of anti-social behaviour, public order, poaching, litter and drink driving offences. Shared intelligence suggested issues were taking place during afternoons and evenings most week days around Ferry Lane, Postwick.

Nick planned the dates and itineraries, which included using Norfolk Police's Broads Beat boat, their Safer Neighbourhood Teams, and carrying out foot patrols between the hours of 7am and 10pm. Technical Specialist Steve Lane provided support on some of those dates, as did the local authority. He also met with Norfolk Police Superintendent

Chris Harvey and Corporate Director of North Norfolk District Council to explain our fisheries enforcement work and emphasise the importance of partnership working.



Our Officers and some of our partners

Rod licencing crackdown pinpoints 23 offenders

The Enforcement Team (East) led a fisheries enforcement blitz across Essex and Norfolk on 6, 9 and 10 September, under the name Operation Springfield II.

The operation was organised and implemented by Fisheries Enforcement Officer Nick Beardmore and Senior Environmental Crime Officer Gary Yardley, working in partnership with Essex Police, Norfolk Police, the Broads Authority and Angling Trust Volunteer Bailiff Scheme. Intelligence and information from our partners focussed rod licence checking activities on high evasion hot spots across both counties.



Gary Yardley checking licences

Over the 3 days, 8 Essex fisheries were checked and one river stretch patrolled in Norfolk (the River Bure). A total of 224 rod licences were checked and 23 offenders identified (10.26% evasion rate).

Click [here](#) to read more about it on the GOV.UK website.



Nick Beardmore with Broads Authority Ranger Chris Morphewon patrol on River Bure, Norfolk

Rural crime

The first ever Essex Rural Crime Strategy event was launched on Thursday 16 November.

It was attended by Senior Environmental Crime Officer Gary Yardley and Environmental Crime Officer Brian O'Neill from the Enforcement Team (East).

The event at Stow Maries Aerodrome in Essex was launched by Essex Police, the Police and Crime Commissioner and Essex Rural Partnership.

It included some 20 partners, such as the Essex Agricultural Society, National Farmers' Union and Essex River Leader Local Action Group.



L-R: Roger Hirst (Police and Fire Commissioner), Gary Yardley, Steven Kavanagh (Essex Police Chief Constable)

Illegal eel net removal

Our fisheries team have been using military grade underwater sonar cameras to look for illegal fishing nets. In December we uncovered a massive illegal eel fishing operation on the Relief Channel in Norfolk which resulted in a record seizure of illegal eel nets. 16 nets in total, capable of significantly impacting an emigrating eel population were removed. The nets were removed, enabling hundreds of eels to be released, and we worked with Norfolk police to investigate the case.

Using boat mounted sonar equipment we can travel up to 10km per day, checking every inch of channel for illegal and submerged equipment. This essential fisheries enforcement work is funded by rod licence income. This is our greatest weapon in halting the illegal exploitation of eels and gives us a chance to completely rid waters of illegal instruments. As well as being used to regulate areas of illegal fishing, including poaching, netting and trapping we can also use the kit to assess fish populations and the importance of underwater habitat for fish.

The Environment Agency leads on the enforcement of permits for migratory species like eels, smelt and lamprey. Regular auditing of these fisheries is essential to ensure protection of these iconic and in the case of eel – a critically endangered species; but also to ensure that the activity is regulated and sustainable. With the eel stock in decline the EA work to protect their habitat, improve access for them further upstream and regulate other activities that might impact on each life stage of the species.

In the East the fens provide excellent habitat for mature eels. Adult “silver” eels will return to the Sargasso Sea as their final life stage to spawn and much of the enforcement work protects this phase.

Anyone fishing for eels should be permitted, be fishing within the conditions of the licence, and nets must include visible and valid tags, as well as being equipped with otter guards too. Any suspected illegal fishing activity should be reported to the Environment Agency’s Incident Hotline on 0800 80 70 60. Anyone wishing to fish for migratory species including eels should visit [Permission to trap crayfish, eels, elvers, salmon and sea trout](#).



Fyke nets seen through our acoustic camera

Recovered fyke nets

Community-It's good to talk.

Fisheries officers set up a trade stand, showcasing our work tackling environmental crime across Essex, with the focus on serious and significant fly-tipping, illegal waste sites and fisheries enforcement.

Members of the public were invited to ask questions and find out more about what we do, as well as understand more about the new Police rural crime strategy.



Norfolk multi-Agency day of action

Following complaints of regular illegal fishing, littering and general anti-social behaviour over the last few months from Norfolk Broads residents along the River Yare in Norwich, Fisheries Enforcement Officer Nick Beardmore raised the issue with the monthly Norfolk Police Broadsbeat Partnership meeting. Meeting partners include Suffolk Constabulary, Norfolk Fire Service, the Broads Authority, The Home Office, HMRC and Norfolk & Suffolk Coastguard. This resulted in a multi-agency planned day of action on 14 January to clean up the area, erect signage and carry out rod licence checking which took place on Sunday 14 January.

PC Bassham said, "it was recognised that if we didn't all pull together to tackle the emerging issues, the problems would continue to escalate, once the weather turned warmer taking up valuable resource time and making the residents around Heron island lives miserable." Police Cadets from North Norfolk and Broadland areas used tools to clear the island and erect new signage. They were working alongside Broads Authority Rangers, residents, a tree surgeon and the Agency. Four Norfolk Police Broadsbeat Officers used two Police boats to transport everyone over to island and carry out hi-vis patrols along the Rivers Wensum and Yare.

Nick Beardmore said, "the residents were overwhelmed with the support they received and wished to thank all the organisations involved for coming to their aid. They hoped the problems encountered in the past would now be resolved."



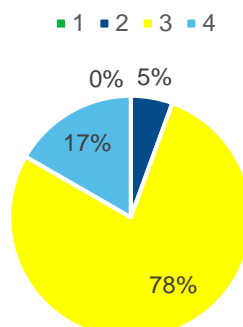
Partnership working

3. Incident management

Responding to fish kills and other environmental incidents is a vitally important part of what we do. We respond to thousands of substantiated incidents annually. Members of the public report incidents through our Incident Hotline (0800 80 70 60) and we are able to respond 365 days a year and on any day, at any time, providing an effective and proportionate response.

All incidents are categorised according to potential and actual impact on the environment and the impact on our resources. We can then break this figure down into categories of incident as shown below. Category 1 is the most serious and Category 4 is a reported incident with no impact.

East Anglian Incident Management Categories



Hydrogen peroxide / H₂O₂; our hero

You arrive at your favourite fishery and notice something wrong, fish are gasping at the surface and some are dying. It's a distressing site, and one that could happen almost anywhere, and it's time to call the EA.

Whilst there are many reasons for such a situation occurring, one of the most common is due to de-oxygenation, a reduction in the level of oxygen dissolved within the body of water that fish rely upon. A loss of dissolved oxygen may be due to factors such as pollution or overstocking, but quite often is due to the collapse of an algal bloom. In East Anglia West fisheries staff run a roster to make sure a member of staff is on hand to attend such incidents and where appropriate, provide emergency aeration to protect fish stocks. Aeration may be provided using mechanical pumps to create splash, venturi aerators which suck air into the water, or via chemical aeration.

It is this latter method that we use when a rapid improvement in water quality is required. Hydrogen peroxide is water with an extra oxygen molecule attached as H₂O₂. When introduced into a fishery the chemical binds to organic matter to release oxygen, a 30-kilo drum of liquid hydrogen peroxide contains around 5 kilos of oxygen!

This equipment was essential in our response when de-oxygenation occurred on a large 18 acre specimen carp fishery. Oxygen saturation had fallen to a critically low level, a number of the fishery's large inhabitants had died and many more were in distress and gasping. Although the size of the water meant it would be impossible to treat the whole lake, by careful dosing of several large bays the team was able to provide a number of safe pockets of water where oxygen concentration would remain at survivable levels until a natural recovery could occur. The team visited the fishery over the following days to replenish oxygen saturation and monitor the fisheries recovery. The lake soon bounced back and continues to provide excellent sport to visiting anglers. Another lakes stock saved and all paid for by your rod licence.



Dosing hydrogen peroxide to raise oxygen levels



We can be out night and day responding to incidents

Non-native fish removal from Layfields Lakes, Norfolk.

After receiving a report that illegal populations of sturgeon and catfish existed within one of the water bodies at Layfields lakes, the EA took action towards removing the unwanted fish from the fishery. The severity of the issue was dramatically increased by the fishery being located within the floodplain of the River Wensum (SSSi). Working in partnership with the fishery manager, the EA devised a plan of action, which was to include a full drain down of the 3.5 acre lake and ensuring the full removal of any non-native fish from the fishery and the river catchment.

Due to the scale of the operation the EA coordinated a large team of personnel which included fishery specialist, enforcement officers and field operation teams. Over a 5 day period the lake was slowly drained down using large scale pumps, and the fish were captured using seine netting and Electrofishing techniques.

Although the natural behaviour of the targeted non-native fish species, coupled with the scale of the task itself, made the fish removal exercise extremely challenging at times. However the team work exceptionally hard over a 4 day period until all non-native fish had been captured and removed from the lake.

Six months after completing the operation the fishery manager has confirmed that only two catfish have been caught from the lake since, both of which were removed and rehomed to a fishery permitted to hold catfish.

The lake is now considered to be completely free of non-native fish, and thus the risk that such fish species pose on the greater environment has been successfully removed from the SSSI river catchment.



Incident Management



Incident Response - Lyatts Lake, Stebbing Essex

Following reports from a fishery bailiff of concerns the water quality within Lyatts Lake was deteriorating, the Environment Agency, (EA) attended site to assess the lake and give advice. The fishery is dominated by carp and pike and was said to be of moderate stock levels.

The large lake was dominated with what appeared to be blue/green algae. Samples were taken and submitted to our Brampton lab, where it was confirmed blue/green algae, *Aphanizomenon* sp. Oxygen readings were taken, which were normal. The fishery did not possess an oxygen meter, as this was currently out of service. Advice was given to ensure this vital equipment was working and calibrated to monitor the levels throughout the day. Due to the potential toxic nature of the algae, anglers were made aware and warning signs were installed. Further fisheries management advice was given with regards to emergency aeration should conditions change, techniques to reduce nutrient in flow from agricultural land and habitat creation.

Further monitoring saw dissolved oxygen readings drop to potentially damaging levels. Chelmsford and Blackwater Operations team were able to provide emergency support using 3 aerators, purchased under incident response budget. This support was critical in elevating oxygen levels as the blue/green algae began to die off.

It was also advised that the syndicate reduce the impact of stress on the fish by reducing/removing angling pressure. Fishing was subsequently stopped until the lake returned to a more natural balance.

Additional aeration equipment was brought in from another local angling club, Colchester Angling Preservation Society (CAPS) and Lyatts fishery has also purchased its own equipment to ensure they can continue with aeration, allowing the EA equipment to be removed from site.

The fishery was willing to take advice and work collaboratively with us and another fishery to achieve the desired outcome. The advice given and progress the club have made will hopefully reduce EA involvement in future. A partnership has been formed between fishing clubs which will in the future benefit both parties.

Lyatts Lake



4. Fisheries improvements

The table below lists many of our environmental improvement projects that have helped to deliver benefits to fisheries; many in conjunction with our partners. We have included the time of our fisheries officers in the funding considerations for the projects as their posts are funded by rod licence income. Considerable amounts of their time and expertise has been provided for the projects. Many projects have also received funding from government or from other parts of the Environment Agency e.g. flooding, the Environment Programme or Water Framework Directive budgets however where contribution has included rod licence income, this has been noted.

£326,156 + £253,650 = £657,706

EA Funding

Match Funding

Fisheries Improvements

In 2017 to 2018 EAN installed 4 fish passes and opened up 17.9 km of habitat or spawning ground for fish.

Project Title	Outcome or benefit	Partners	EA Funding (£)	Match funding (£)	Total Cost
Great Ouse barbel conservation - Harrold Country park – Phase 2, Beds	Off-flow fry refuge improving fry survival	Bedfordshire Wildlife Trust	£16,000	£9,000	£25,000
Habitat management, Gingerbread Lake, Phase 2, Cambs	Improved marginal habitat and access	Biggleswade and Hitchin AC	£5,000	£5,500	£10,500
Hall's Pool lake restoration, Cambs	Improved habitat, lake management and access for coaching	Cambridge Fish Preservation Angling Society	£3,000	£3,250	£6,250
River Lark river restoration, Phase 3, Suffolk	Improve spawning habitat	Lark Angling Preservation Society	£1,000	£9,150	£10,150
Magpie Lake lake restoration, Cambs	Soft revetment to improve marginal habitat and prevent erosion.	Waterbeach Angling Club	£3,000	£3,500	£,6500
River Nar river restoration, Norfolk	Narborough - Soft revetment, erosion control and habitat creation	River Nar Trout Club	£4,500	£10,000	£14,500
Shepherds Port and Tottenhill Restoration Project, Norfolk	Improved marginal habitat and access	Kings Lynn Angling Association	£4,600	£3,950	£8,550

Wallington Hall lake restoration, Norfolk	Improved marginal habitat and access	Downham Market AA	£4,000	£3,900	£7,900
Fish passage assessment of Jesus Green Lock - River Cam, Cambs	Assess fish passage options at Jesus Green lock	Cambridge City Council	£4,000	£7,500	£11,500
Whittlesford Pit Restoration (Phase 2)	Improved marginal habitat and access	Saffron Walden AC	£1,620	£3,900	£5,520
Astwell Mill Lake – restoration, Bucks	Improved marginal habitat and access	Towcester AC	£4,000	£8,000	£12,000
Fenland soft revetment	Improved marginal habitat and access	Lower Ouse and Fenland Fisheries Consultative Association	£5,000	£0	£5,000
River Cam River restoration, Cambs	Improved habitat, flows and spawning features.	Cambridge Trout club and Wild Trout Trust	£1,336	£3,800	£5,136
Floating Pennywort management – Cam and Bedford Ouse	Management and removal of Floating Pennywort to improve angler access and ecology.	Lower Ouse and Fenland Fisheries Consultative Association	£15,000	£70,000	£85,000
Burnt Mill Fish Pass, Cambs.	Improve fish and eel passage on the river Cam	Environment Agency	£115,000	£0	£115,000
River Bure, Ant and Thurne and Broads Fish Movement Study	Understand fish stocks and use of complex habitats (spawning, overwintering etc) in the Broads to maintain, improve and develop fisheries (Statutory Duty) and socio-economic contribution of angling in rural areas, worth £100 million annually to the	Bournemouth University Natural England Fishtrack Ltd Angling clubs and local anglers	£33,000	£79,700	£112,700

	Broads (Statutory Guidance). Deliver and support objectives of Broads Angling Strategy; Ensure we evidence base to advise and guide partner organisations in wider management of Broads e.g. Lake restoration, navigation.				
Ramsey River Maintenance Summer Programme	In-channel works such as clearance made river habitat available to fish and other wildlife using the river corridor. Floating pennywort removed from site allowing fish, invertebrates and other river species to use the water and habitat that will develop.	Harwich Angling Club	£3,000	£7,000	£10,000
River Stour Fish Refuge Creation	Creating off-channel refuge	River Stour Partnership	£3,000	£3,000	£6,000
Your Fisheries – Wensum Project	Addressing silt input into the Wensum.	Norfolk Rivers Trust	£5,000	£5,000	£10,000
River Ter Habitat Creation	In channel works to improve habitat availability to coarse fish and eels.	Ilford and District AC and Wild Trout Trust	£1,500	£2,000	£3,500
Langford Cut/Long Pond Chelmer and Blackwater Canal	In-channel works such as clearance made river habitat available to fish and other wildlife using the river corridor. Floating	Essex Waterways	£3,000	£7,000	£100,000

	pennywort removed from site allowing fish, invertebrates and other river species to use the water and habitat that will develop.				
Fish Refuge Project	Pilot project to trial the provision on refuge areas for over-wintering fish in off-stream areas to protect them from predation.	Manor Adventure Kingfisher Lakes	£3,000	£3,500	£6,500
North Norfolk Brown Trout Project	To quantify the origin, distribution and migration characteristics of sea trout within North Norfolk Rivers and associated coastal waters. Findings will provide regulatory authorities with the knowledge required for sustainable stock management.	ZSL, Wild Trout Trust, Atlantic Salmon Trust, Norfolk Rivers Trust.	£65,000		£65,000
Essex Profile Weirs Project	Pilot project to identify means of enabling fish to pass specific gauging weirs. Installation due 2018/19.		£15,000	£0	£15,000
Stillwater Fisheries Enhancement	Provision of artificial habitat such as floating islands, coir rolls etc to proactive clubs who have issues with high nutrient issues.	Various clubs in Norfolk and Essex	£5,000	£2,000	£7,000

River Wensum Fish Refuge Pilot Scheme	To trial a methodology of protecting over-wintering fry from predation in off-stream areas including monitoring.	Kingfisher Lakes	£2,600	£3,000	£,5600
Total			£326,156	£253,650	£657,706

5. Monitoring

Monitoring of all fish species is vital to our assessment of the condition of the environment. Surveys of fish populations, including coarse fish, are used to assess the status of stocks and contribute to the overall assessment of ecological status of a water body. In EAN:

65 Waterbodies
assessed for
fish 2016/17

60% of waterbodies
assessed were at
good status or above
for fish

You can look at our Catchment Data Explorer for more information. The next assessment is due to take place later this year.

Social media video's

Rookery waters - The Environment Agency's fisheries team in East Anglia are all anglers and we are passionate about fish and fisheries. One of the many ways we invest your fishing licence money is to help fisheries manage their fish stocks and to restock waters after pollution incidents. We give thousands of unwanted fish new homes and helping fishery managers and clubs understand their waters usually results in better informed fisheries management decisions. We work to protect fisheries and promote angling, and your fishing licence money is essential for that. This video explains how we helped a commercial fishery with a perch explosion, restock a Fenland drain that had been affected by pollution, we assessed stocks at the lake too.

Relief channel - The relief channel is a huge flood relief system in Norfolk, protecting the fens, it's up to 4m deep and home to shoals of roach and bream. It's a channel 16km long and up to 100m wide. So how do our fisheries officers go about trying to understand fish stocks within it?

Back in the day it was all down to miles of net, fishery officer muscle, time and whole lot of luck... for 2017 our fisheries monitoring techniques have moved on. We use a variety of methods to try to fully understand what's going under the water, improving accuracy of our data, and reducing the luck element of our netting surveys. By using sonar imaging we can survey the whole channel, understand density (how many fish) and

locations. We also use fish finder technology to get a more accurate feeling of fish distribution and even underwater shoaling and behaviour.

By combining all of these techniques we have increased our efficiency, have a much better understanding of fish populations, and even now have access to additional fish management options. What does it mean for anglers? It means, like us, anglers have a better understanding of their fisheries and where best to cast their lines – in short everyone's a winner!

Watch the [YouTube video here](#)

Relief channel at Stow Bridge

The fisheries team carry out nearly 80 fisheries surveys a year throughout the Great Ouse catchment as part of the National Monitoring programme. This data helps us understand how healthy our rivers and fisheries are. We'll use survey techniques like netting, electric fishing, specialist sonar cameras and even match fishing data to help us build a picture. If we notice trends in populations we can use the data to think about management actions and if necessary improvements.

In 2017 we were carrying out our routine fish population surveys on the relief channel in Norfolk. The relief channel is a large bit of water, nearly 100m wide and over 16km long; we had a rather poor catch the previous day at Denver Sluice, but were hopeful that Stow Bridge would be much kinder to us!

Whilst we were preparing our kit, we noticed a few splashes and a bit of commotion between our stop nets. To our amazement, we saw big bream launching themselves straight out of the water like pods of dolphin! We managed to quietly set the seine net between two stop nets and then slowly began to haul the net in! After some serious



hauling of our extremely heavy net, we were greeted with hundreds of fish, most of which were very big bream! We sorted them into keep cages as quickly as possible, to minimise stress to the fish. A total of 214 hard fighting bream were caught the average size being 461mm about 6lbs but we measured fish up to 601mm – that's well into double figures!

We took scale samples from 83 of them to be aged by our National Fisheries Service Fish Ageing Team. The results showed that some of these fish were 13+ years old. The scales also showed a very fast growth rate indicating that there is plenty of food and very little in the way of growth restraints. We shared the information with Kings Lynn Angling Club and have continued to hear of excellent catches for the channel ever since.

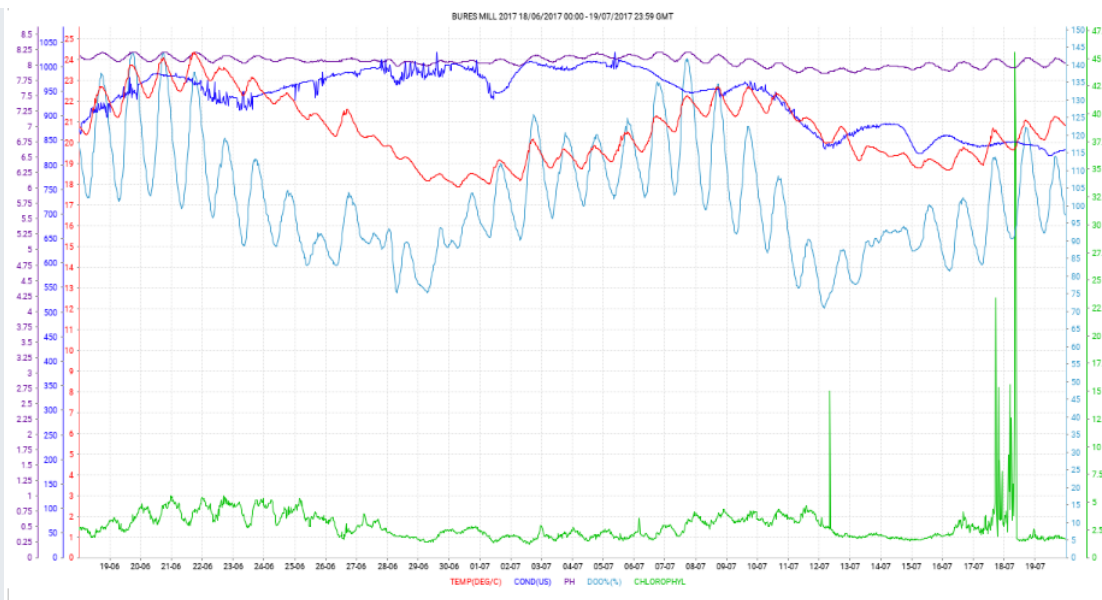
One of the larger bream, approximately 12lbs



River Stour water quality monitoring and augmentation

In previous years, the River Stour in Essex has seen dramatic chemical and biological changes due to diatom blooms, which in 2015 resulted in numerous fish deaths over many miles of river between Sudbury and Cattawade. To combat this problem the EA have installed a series of water quality monitoring sondes, which relay real time data to laptops and staff smart phones. This information can then be used to assess whether changes in daily chemical rhythms such as dissolved oxygen and pH are likely to have a detrimental effect on the health of our fish.

In the dry summer of 2017 and 2018, this data was used to inform how the transfer of water from our Ely Ouse augmentation scheme, (which supplements water for abstractors and water companies on the river Stour and Blackwater in Essex), was managed over this dry period. Maintaining steady flows throughout a longer period instead of transferring in large short term volumes helped to keep the diatom bloom in check and help the river naturalise instead of boom and bust flows. This will also have aided recruitment of fry, which can struggle to find shelter from temporary increased flow. Fish surveys from 2016 and 2017 have supported good recruitment in these sections and no fish kills have been reported as a result of dramatic changes in chemistry.



Chemical Rhythms

Understanding movements, barrier passage and habitat use of sea trout in Norfolk Chalk Streams

A collaborative project carried out by the Environment Agency and the Zoological Society of London and supported by Wild Trout Trust, Atlantic Salmon Trust and Norfolk Rivers Trust is underway to quantify the origin, distribution and migration characteristics of sea trout within North Norfolk rivers and associated coastal waters. A total of 188 trout from the Rivers Glaven, Stiffkey and Burn were tagged in 2018, building on the 607 tagged during 2016/17. PIT and acoustic telemetry are being used to generate time-stamped positions of individual fish, enabling individual movements to be mapped as they move through the rivers and their estuaries. Monitoring at structures such as flow gauging weirs and tide gates shows when fish are delayed, and thereby provides indication of how these may be better managed to reduce obstructions to free passage. Telemetry coverage of the estuary has enabled us to track sea trout movements as they leave the rivers after spawning and enter nearshore areas, which have been shown to provide important habitat and feeding grounds.



Sea trout

In addition to the telemetry data, through working with commercial and recreational fishers, tissue samples were collected from over 530 migratory sea trout and resident brown trout. These were analysed by researchers at the Technical University Denmark who are building a database of the genetic diversity of sea trout stocks across the whole North Sea area. Preliminary results indicate that Norfolk sea trout comprise a distinct genetic stock, which has important implications for its future

management. Tissue samples were analysed for stable isotope signatures of ^{15}N and ^{13}C in relation to baseline signatures for the study rivers. This enables us to determine what proportion of trout fry in a location are from brown as opposed to sea trout, and thus highlight key sea trout spawning areas for future protection and enhancement.

Findings will provide regulatory authorities with the knowledge required for sustainable management of stocks, i.e. provide evidence for the Net Limitation Order (NLO), inform on the requirement for marine conservation zones, determine key spawning grounds, and identify barriers limiting migration.



Monitoring

Northern Broads fish tagging project:

In the biggest scheme of its type, the EA has joined forces with consultants, contractors, universities, Natural England, and the angling fraternity on a monitoring project to determine how fish use the Broads' unique lowland system.

Participating anglers throughout the system catch sample fish for tagging. To date over 450 fish (pike, bream, roach and rudd) have been tagged.

A comprehensive receiver network records the location of individual tagged fish as they move around the main Broads system. In addition off-river habitats including broads, ponds and marsh dykes (ditches) have localised monitoring stations to specifically identify spawning areas and migration paths.

Fisheries staff and a PhD student periodically collect and analyse the data. It is likely the volume of data will fuel more than one PhD!

Early indications show fish move considerable distances in their everyday life and even more so leading up to the spawning period. This will help the EA and other bodies make management decisions in the Broads and feed into our more general understanding of fish ecology.



Tag receiver on Marsh Dyke

Eely good news

Helping eels migrate to and from the sea past river barriers is of prime importance internationally. Captures of eel and elver from the improved eel pass at New Mills on the River Wensum (a substantial barrier to fish) were the highest for many years and include eels larger than elver, which showed the design of the eel pass is sound. A survey

conducted in 2017 on a tributary of the River Wensum recorded 2 small eel (170 mm length). Only large eel have been recorded throughout the river since 1985 and prior to this survey. Again this indicates the river is once again passable to eels thanks to the new pass.

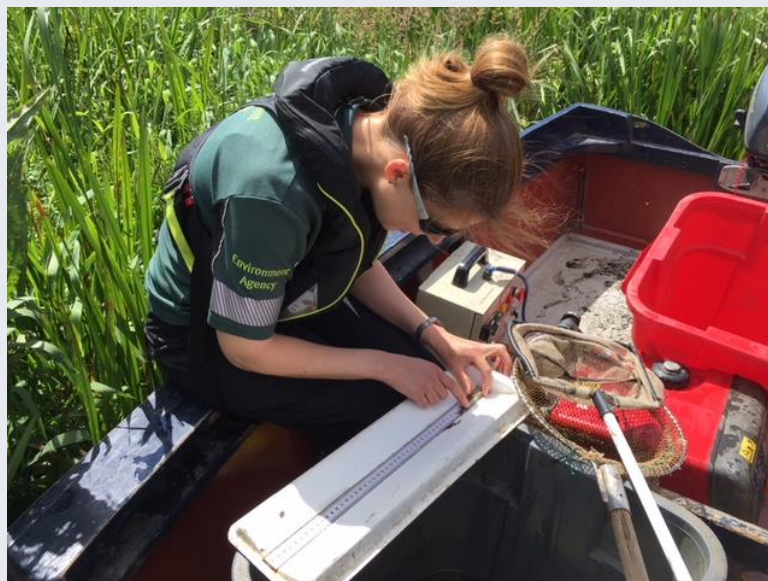
Fish surveys completed in East Anglia East 2017-18

The monitoring teams had another busy year carrying out over 100 surveys in all sorts of waters to assess fish stocks. The busy schedule, concentrated in the April to October period, always presents a challenge to deliver, especially when this period is also the busiest for responding to reports of fish in distress in rivers and private fisheries. Staff in our Sampling & Collection, Analysis & Reporting and Fisheries, Biodiversity and Geomorphology teams have worked hard together and shown great commitment to enable this programme to be completed.

This monitoring is carried out for a number of purposes. Our national programme helps assess stocks of coarse fish and wild brown trout with the angler in mind. It also covers the information we need to feed into the EU Water Framework Directive. In more general terms, the data enable us to provide information to the rest of the organisation to help conserve and improve the natural environment.

Monitoring also helps us address more local issues. This year this we covered:

- Determining the effects of actions taken to improve river habitat. Commonly called river restoration this can include addition of gravel, river narrowing, flow deflectors. It is important to learn if these projects have been successful in benefiting river wildlife such as fish.
- A new category of physical changes called Natural Flood Management aims to slow the passage of water through watercourses above built up areas known to be prone to flooding. 'Leaky log dams' and other measures hold up the water in less vulnerable areas such as woodland, meadows etc. and reduce the height of peak flows. These should also have benefits for river ecology but we need to monitor to make sure.



Fish surveying

Our fish count data is now available online: <https://data.gov.uk/dataset/freshwater-fish-counts-for> [online here](#)

For information on what we are doing across the rest of the country read our other Area reports.

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