Integrated Catchment Management: sharing science and stories



Plans and pressures: how characterisation helps us act as custodians of our catchments

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EDITORIAL

Editorial

Welcome to the Winter 2018 Catchments Newsletter.

This issue focuses on the River Basin Management Plan 2018-2021. We've got summaries of some of the Significant Pressures on our water bodies, and what is being done to help improve water quality. The next three years are all about implementation and improvements in our 190 Areas for Action across the country.

New teams of people are now in place – the Local Authority Waters Programme, including both the Communities Team and Catchment Assessment Team, and the Agricultural Sustainability Support and Advice Programme (ASSAP). These new teams, a total of more than 80 people, will collaborate with existing Local Authority staff on Local Catchment Assessments to help understand local pressures, and identify and implement local measures.

The EPA Catchments Unit will continue to provide technical advice and guidance to support the process. A key focus for us recently has been developing a guidance manual for carrying out Local Catchment Assessments, and a training programme for the new teams who will be implementing the Water Framework Directive (WFD) on the ground. The development of the guidance manual especially has been a large body of work, and we have been very grateful for the help and support from the 25-member working group that has contributed. We have renamed the Newsletter News and Events section – it is now Waters and Communities News. This will highlight the work being done in local communities all around the country. The Newsletter will have short summaries, and often there will be longer articles available on catchments.ie. In future issues, this section will also highlight how the new Community Water Fund is helping communities across the country to protect and improve their local waters.

The unusually warm and dry summer we had this year brought lots of people out to their local beaches. If you are visiting your local beach during the summer swimming season, you can check out www.beaches.ie for up to date water quality information. Don't forget to do a #2minutebeachclean when you are there - whether it's for a summer swim, or a winter walk.

And lastly, a special note of thanks: content of this Newsletter draws heavily on the content of the River Basin Management Plan 2018-2021, which was produced by the Department of Housing, Planning and Local Government. You can read all about what is in the plan and find a link to it on catchments.ie.

Jenny Deakin, EPA Catchments Unit

One thing you can do: Clean Coasts - #2MinuteBeachClean

We have all seen the evidence of marine litter along Ireland's coastline and now for all you beach lovers out there, here's an opportunity to do something about it in just 2 minutes!

We are asking everyone who goes to the beach to do their very own #2minutebeachclean. Take a snap of the litter you collect and post your snap on Instagram/Twitter/Facebook with the hashtags #2minutebeachclean and #cleancoasts - it's as easy as that!

The #2minutebeachclean idea is simple and inspiring. It was originally started by Martin Dorey in 2013/2014, after a series of brutal North Atlantic storms left beaches all over the UK littered with marine plastics. Using Twitter and Instagram to try to inspire others, Martin came up with the idea of doing just 2 minutes at a time – but every time - and began using the hashtag. Since then many thousands of hashtagged posts have appeared on Instagram and Twitter from every continent.

Get involved with Clean Coasts:

There are over 600 Clean Coasts groups across Ireland working to protect our waterways, beaches, seas and marine life. You can find them all, or register a new one if there isn't one in your area www.cleancoasts.org





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WATERS AND COMMUNITIES NEWS



Domhnall Kennedy, Teagasc, Allison Treanor, Cavan County Council, Brendan Connolly, Teagasc, Thomas Gibbons, Irish Water & Con Feighery, Teagasc.

Cavan Protecting drinking water from pesticides

During March 2018, Bunnoe Community Centre hosted an event for Teagasc's Protecting Drinking Water from Pesticides Programme, which included talk on using pesticides safely, and an outdoor demonstration of how to spray rushes.

Pesticides are used in agriculture to control rush growth, in domestic gardens, and on golf courses, playing fields and parks. They are generally used between April and November.

To protect human health, it is important that pesticides do not end up in our drinking water. Pesticides may have been sprayed on land far from where drinking water is taken from a lake, river or groundwater, and often pesticides are sprayed a considerable time before the drinking water samples were taken and analysed.

Con Feighrey, Regional Area Manager, Teagasc, chaired the event which included Thomas Gibbons from Irish Water, Allison Treanor from Cavan County Council's Environment Section, and Teagasc's Advisory Section.

Thomas from Irish Water gave an overview of the pesticide action and monitoring programmes, and highlighted Irish Water's plans to reduce the risk posed by pesticides by raising awareness through engagement and collaboration. Alison from Cavan's Environment Section discussed the River Basin Management Plan and the catchment-based approach to protecting human health and the environment. Teagasc advised on alternatives to pesticides in controlling rush growth, and outlined the steps are necessary prior to even considering using pesticides to manage rushes, including drainage and soil testing. There was also an outdoor demonstration on spraying rushes.

Learn more:

For further information on pesticides, water quality or any other queries you may have regarding protecting water quality, please contact the Environment Section of Cavan County Council on 049 437 8486 or alternatively at environ@cavancoco.ie



Donegal Source-to-Tap in the River Derg catchment: pilot cross-border grant scheme in Donegal and Tyrone helps farmers protect rivers and drinking water

In July 2018, the Sourceto-Tap project launched an innovative and exciting new pilot cross-border Land Incentive Scheme in the River Derg catchment upstream of Derg Water Treatment Works. The scheme will support farmers in adopting farming practices that help to protect the quality of river water that is the source of drinking water for communities in Counties Donegal and Tyrone.



Robin Bolton, CAFRE, Michael Chance, IFA (Irish Farmers' Association) Donegal County Chairman, Diane Foster, Source to Tap Project Manager, Paul Harper, NI Water Director of Asset Delivery, Trudy Higgins, Irish Water, Environmental Strategy Lead, Mark Horton The Rivers Trust, and David Brown Deputy President UFU.

The newly launched Land Incentive Scheme in the River Derg catchment is part of a major €5.3 million cross-border EU INTERREG VA funded project called Source to Tap, which aims to improve water quality in rivers and lakes in the Erne and Derg catchment areas, which provide water that serves parts of counties Fermanagh, Tyrone, Donegal, Cavan, Leitrim and Longford.

"We are delighted to launch this initiative as part of the overall project, which will give the farming community the opportunity to apply for 100% funding to support farmers in making small changes in farming practices such as using a contractor to spray rushes and installing stock fencing on watercourses." - Diane Foster, NI Water Project Manager

The overall aim of the scheme is to protect raw water quality at source by reducing contaminants getting into the water in the first place and raise awareness of the importance of protecting our precious drinking water resources.

"This project is win-win for both the environment and agriculture. Farmers understand the importance of water quality and want to help make a difference. This project will help to give them the advice and tools to do so. It is a great example of collaborative working and we are very pleased to be a part of it." - David Brown, Ulster Farmers Union deputy president

The scheme will run from 25 July 2018 to 31 July 2020 and will be operated on a first-come, first-served basis through the Source

to Tap project. The project employs three Project Officers who will work closely with farmers in the Derg area to guide them through the application process, and help them identify what improvements can be made on their farms to benefit both their farm businesses and the water environment.

"This is real money and will be hugely beneficial in contributing to the enhancement of farmland in the Derg Catchment area while ensuring the protection of our water source for generations to come." - Michael Chance, Chairman of the Donegal Irish Farmers' Association

Match-funding for the project has been provided by the Department of Agriculture, Environment and Rural Affairs in Northern Ireland and the Department of Housing, Planning and Local Government in Ireland.

"While this particular project directs funding towards improvement at source and this assists greatly with prevention of pollution, its impact will benefit complete communities in all walks of life and as such we fully support the initiative." - Michael Clarke, County Tyrone Chairman of the Northern Ireland Agricultural Producers' Association

Learn more:

www.sourcetotap.eu

Ring +44 (0)7799 774702 or e-mail info@sourcetotap.eu

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Alan from Ballinderry Rivers Trust shows off their 'Rivers on the Move' model.

Slow the Flow – Natural Flood Management in Inishowen

Inishowen Rivers Trust held a public event in February 2018 to talk about Natural Flood Management in their catchment. Anja Murray spoke and chaired the event, which included speakers from Trinity College, the OPW, Inland Fisheries Ireland (IFI), Ballinderry Rivers Trust and Yorkshire Dales Rivers Trust.

Natural Flood Management (NFM) is a technique that uses natural processes to slow the flow of flood waters. This method of management was explored at an event organised by the Inishowen Rivers Trust in February of this year. Following the significant flood events in Inishowen in August 2017, and subsequent smaller floods since then, the Inishowen Rivers Trust invited a range of experts to visit Inishowen to speak to the local communities about how using natural water retention measures can be used to hold back excessive flows and provide other multiple benefits.

The event, held in Carndonagh Community School on the banks of the Donagh River, suffered damage because of the August flood, with large sections of the bank collapsing and huge quantities of gravel shifting downstream. Many businesses and members of the community were directly affected by the floods and a large crowd turned up to learn more about what happened and to hear about ways flooding may be prevented in the future.

Prior to the presentations, staff from Ballinderry Rivers Trust demonstrated to the audience how a river reacts to increased flow with their Emriver 'Rivers on the Move' model. This large model provides an excellent demonstration of the key principles of morphological changes in a river and simulating effects such as floodplains, sediment transportation and erosion. Alan Keys and Frank were on hand to answers questions and talk about how rivers work. There was ample time for the audience to mingle, meet the experts and share stories.

Presentations began with ecologist and RTE presenter Anja Murray, who gave an overview of NFM. In 2017 Anja was commissioned to produce a report for the Friends of the Earth entitled 'Natural Flood Management – Adopting ecosystems approaches to managing flood risk' and communicated the essence of this technique to the audience, setting the scene for the panel of speakers.

The first speaker, Professor Mary Bourke from the Department of Geography in Trinity College Dublin, spoke about the floods of 2017, exploring reasons for the high level of flooding. She said,

"Severe weather events will become a more regular feature of our seasons and we can prepare for the future by making our landscapes more resilient to floods. I have spent the day touring areas of Inishowen effected by the floods and speaking with local landowners. There are opportunities on Inishowen rivers to implement simple, cost effective solutions for flood alleviation through collaborations with riparian landowners and the various agencies".

Dan Turner from the Yorkshire Dales Rivers Trust described some of the NFM projects his team are implementing in the Upper Wharfedale area in Yorkshire. His work has included publishing a practical guide for farmers on NFM measures such as riparian



planting, swales, sediment traps, in-channel barriers, offline ponds and cross drains. His presentation featured impressive video footage of large areas of the Yorkshire Dales where the work is being carried out.

Speaking next, Conor Galvin, the Project Manager for the South-Western Catchment Flood Risk Assessment and Management (CFRAM) Study, clarified the role of the OPW in relation to flood management and the responsibilities of riparian landowners. He stressed the importance of speaking with the relevant agencies (OPW, local council, IFI) before starting works on a river. Work on one part of a river could inadvertently cause problems to another landowner's property further upstream or downstream.

Finally, Inland Fisheries Ireland representatives Brendan Maguire and Gerry McCafferty presented some interesting photographs of projects the IFI are implementing to repair river banks and protect fisheries habitats in the North-West region. They stressed the importance of restoring habitat after floods, and allowing the ecosystem to recover.

After the presentations, a lively discussion between the expert panel and the audience was moderated by Anja Murray.

After the event, Inishowen Rivers Trust secretary Trish Murphy said,

"Speaking to the right people is important but the absence of one agency to take overall responsibility for the rivers was clearly a frustration for the audience. Our experiences in Inishowen, like other areas across Ireland and the UK, has made it clear that there is no quick fix solution for flooding - but there are opportunities. With the right guidance, communities can act and work together to repair the damage and help avoid further flood devastation. The Trust hope to be able to help in this regard, and the support of landowners who are willing to try these techniques would be an excellent start. We can't change what has happened but we can prepare for the future."

Almost ten months after the flooding, there is still a palpable despair among parts of the community effected by the floods but now, perhaps, there is a glimmer of hope. This event has helped to build relations with both the community and the agencies by providing a positive opportunity in which to learn together. Reaction to the 'Slow the Flow' event and the discussions on the night was positive.

The Inishowen Rivers Trust hopes to provide up to date information on natural water retention techniques through the trust website and through various public events in the coming months. In addition, the Trust will apply for funding to pilot natural water retention projects in Inishowen and continue to encourage the community to learn more about how rivers work and how we can work with them.

Inishowen Rivers Trust would like to thank everyone who came along to the event including those effected by flooding, members of angling clubs and river groups, farmers, landowners and public representatives, community representatives, academic and agency staff. We would like to thank the panel of speakers, the Waters and Communities Office, and the OPW for funding this event, and staff at Carndonagh Community College for hosting this event.

Trish Murphy, Inishowen Rivers Trust

Learn more:

www.inishowenriverstrust.com

You can read the Friends of the Earth report on Natural Flood Management by Anja Murray here: <u>https://www.foe.ie/download/pdf/natural_flood_management_a</u>

study for friends of the earth february 2017.pdf

Emriver Models are designed to help people of all ages and backgrounds understand complex river behaviour: https://emriver.com



Bredagh River, Donegal - for data on this river, see www.bit.ly/bredaghdonegal.



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WATERS AND COMMUNITIES NEWS

Dublin

Dublin celebrated World Water Day in March, and then it had the amazing Dublin Waters Action Day in April, which saw over 1,000 volunteers cleaning up at 35 locations across Dublin.

World Water Day – 22 March

World Water Day is celebrated every year on 22 March. This year Dublin City Council and the Waters & Communities Office teamed up with local students and water stakeholders to celebrate the importance of the natural water environment of Dublin

The focus was on nature-based solutions that can help solve many of the water challenges we face today, such as; flooding, drought, pollution and biodiversity loss. An interactive display celebrating World Water Day and the water environment of Dublin was held in the Atrium of Dublin City Council offices at Wood Quay, from 21 March to 6 April. The display included information about water and simple tips on how householders can make changes to reduce chemical use in car washing, cleaning, use of garden fertilisers and herbicides.

The exhibition also explored ways of protecting and improving water quality using green infrastructure such as rain gardens, permeable paving and water conservation methods. To encourage conservation, a competition was sponsored by the Environment and Transportation Department of Dublin City Council that offered two rainwater harvesting butts as prizes. An outdoor classroom was held along the Santry River in Raheny with fourth class pupils from Scoil Áine and members of Raheny Tidy Towns. The children learnt about the benefits we get from the water environment and ways in which they can help protect water and wildlife through everyday actions. The Santry River is one of the prioritised Areas for Action in Dublin under the River Basin Management Plan 2018-2021 and it was only fitting that it should be celebrated on World Water Day.

Learn More:

http://worldwaterday.org/

http://www.dublincity.ie/main-menu-services-water-waste-andenvironment/water-framework-directive

Dublin Waters Action Day – 21 April

On Saturday 21 April, over 1,000 volunteers gathered at 35 locations as part of the National Spring Clean to improve their local coastal areas, rivers and canals. Roughly 10 tonnes of waste were removed from the River Dodder, Tolka, Ward, Camac, Grand & Royal Canals, Wicklow and Dublin Coastlines.

The event involved Dodder Action, who have led a community clean-up event every April called "Dodder Day" in which several groups target fly-tipping and littering along the whole river channel



Photo: (L-R) Sinead Hurson, Waters and Community Office, Niamh Ni Cholmain, Biodiversity Office, Dublin City Council, Seamus Griffith, Raheny Tidy Towns. Image by Raheny Tidy Towns.

and its tributaries. This year groups along rivers and canals in all of county Dublin came together for one day, making a concerted effort to clean their local water environment. Clean Coasts organised clean-ups in areas including Sutton, Shellybanks and Bull Island. Dublin Clean Up, supported by Dublin City Council, helped groups across the city work together to make their communities clean and attractive. Dublin Canal's Action Day had several clean up locations along The Grand and Royal Canal.

This inaugural one-day event was a wonderful opportunity to showcase the great work being carried out across Dublin and beyond all year long. A big thank you to everyone who freely give up their time and to all the agencies who supported the event. Clean-ups will take place throughout the year so please contact your local group if you would like to get involved.

Learn more:

www.teamdublincleanup.ie

All Waters, One Day, One Big Clean-up!



Do you live near a stream, canal, lake, pond, river or the sea within County Dublin? Get involved in

Dublin Waters Action Day

as part of National Spring Clean by simply organising a clean-up around your local waterway on

Saturday April 21st 2018, 11am

We hope that groups along rivers and canals throughout Dublin will join together for one day to make a concerted effort to clean their local water environment.



Cuan



WATERS AND COMMUNITIES NEWS

Galway

Catherine Seale, Galway's Community Water Officer, tells us how Cuan Beo, a recently formed community organisation, let locals have their say on Galway Bay in April. In May, the Tuam community came together in May to celebrate their River Nanny and The Irish Workhouse Centre held a conference on Portumna and its waterways. Finally, we learn from Louise Garvey about how Glenamaddy Tidy Towns are now looking after their turlough...

Cuan Beo: Let's Talk about Galway Bay

Three large public meetings were held by Cuan Beo to get people talking about Galway Bay and their connections to the land and sea. Cuan Beo is a recently formed community based organisation established with a mission of improving

the quality of life, environment, economy and heritage around Galway Bay. People got to meet the Cuan Beo team, and other organisations involved in managing Galway Bay and the catchments surrounding it in both Clare and Galway.

These meetings were organised with the support of the Waters and Communities Office, and both Galway and Clare County Council.

Learn more:

www.cuanbeo.com

Celebrating the River Nanny – Tuam, County Galway

To celebrate the River Nanny, Tuam Tidy Towns and Tuam Anglers Association worked together on a sign to highlight the unique habitat it provides for local wildlife. The sign was officially unveiled by Minister of State for Rural and Community Development and Fisheries, Mr. Sean Kyne, on Saturday 5 May at the Palace Grounds Bridge in Tuam Town.

Immediately downstream of the Palace Grounds Bridge and the sign is a four-metre-deep pool. If you are patient, trout rises can be seen in this pool. These trout depend on the river and the insects that live in it. We all need to do our bit to make sure that all the wildlife in our rivers continues to thrive.

All our rivers are special, and have features that make them unique. The River Nanny is in the Corrib catchment, and rises in a gravel pit



Some of the wonderful wildlife that lives in and around the River Nanny.

in Cortoon. The River Nanny carries this gravel downstream, which makes great spawning areas for fish. It is a key nursery for the River

Clare and Lough Corrib, and the Nanny itself is unusual as speckled red trout live in it.

The launch involved a walk and talk by Community Water Officer Catherine Seale and Michael Waldron (Tuam Tidy Towns) about the features of the habitat, while historian Rianna O'Dwyer highlighted local industrial heritage with a fascinating talk on the newly renovated millwheel.

The sign includes a painting by local artist Nuala Higgins representing the river habitat in flower throughout the year. It was funded by Galway County Council under Local Agenda 21.

Learn more:

The River Nanny Sign is a feature of the new Tuam Heritage and Nature Trail. <u>https://heritage.galwaycommunityheritage.org/</u>content/category/places/tuam-heritage-and-nature-trail

Irish Workhouse Centre: Portumna, Lough Derg and the River Shannon



The Irish Workhouse Centre's conference on Portumna and its waterways took place on 5 May. It was a full house, with

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attendees including Minster for the Diaspora Ciaran Cannon, who congratulated the centre on its integration efforts during a recent 'Polish Day', and graduates from the University of Limerick's Local History Certificate programme.

Events included living history re-enactments, marine archaeologist Donal Boland discussing migration via inland waterways, and Ciaran Ó Murchadha highlighting links between waterways and the famine. The event was supported by Waterways Ireland. The Workhouse also worked with Community Water Officer Catherine Seale on 'Sights, sounds and stories of the Shannon' for Heritage Week in August 2018.

Learn more:

www.irishworkhousecentre.ie



Sunset over Glenamaddy Turlough

Glenamaddy Tidy Towns: looking after their local turlough

Glenamaddy Tidy Towns have always been proud of their beautiful turlough and in the past year they have embarked on a project of maintaining, improving and promoting this wonderful natural amenity which suffered considerable damage due to flooding in recent winters.

It began with an An Taisce Clean Coasts in June 2017, when the area was cleared of rubbish and litter by the group's volunteers. Next the group undertook a survey of wildflowers in Glenamaddy Turlough led by Catherine Seale, Community Water Officer, with a view to providing an information panel on flora and fauna for the amenity area.

This was followed by the group working closely with Galway County Council, Galway Rural Development and the local Community Employment Scheme to bring about the painting of the boundary railings, resurfacing of the carpark area, rebuilding of paved areas, replacing litter bins, anti-litter signs and flower planters and the clearing of excess ivy from the adjacent stone walls and trees where bat, bird and bee houses were erected.

Earlier this summer new picnic benches were installed, sponsored by local Bakery, Westbake, and kindly secured to the paving by local man Larry Donaghue. Finally, on a sunny May morning the Wildflower and Butterfly Information Board was installed, with graphic design by local designer Valerie Keaveney. This sign now provides a great source of education to the community and visitors alike on the wildlife and flora of the turlough. Special thanks to Galway County Council who provided Local Agenda 21 Environment Partnership funding for the Information Panel.

Louise Garvey, Glenmaddy Tidy Towns



Glenamaddy Turlough's newly installed information sign



Mayo

Community Water Officer Mick Kane tells us how 4.5 kilometres of the Castlebar River was cleaned by the community in April 2018, and the River Moy Trust got involved with Ballina's Salmon Festival in July.

Castlebar Community Clean

There was a great sense of the Meitheal around Castlebar on 20 April for an organised community clean-up of the Castlebar River. Volunteers from different community groups and voluntary organisations were joined by people from public bodies, resulting in lots people all prepared to get stuck in and do what was necessary on the day.

Groups and organisations involved were Mayo County Council, the Waters and Communities Office, students from GMIT Outdoor Education Course, Castlebar Tidy Towns, Inland Fisheries Ireland, the Environmental Protection Agency, Castlebar Kayak Club, Turlough Village Enhancement Group, Moy River Trust, Clean Coasts, South West Mayo Development Company, the Ballina Moy Search & Rescue and the Grainne Uaille Sub Aqua club.

The hard efforts of all involved resulted in a 4.5 Kilometre stretch of the Castlebar River from Lough Lannagh to Turlough being cleared of a massive amount of waste and litter including hundreds of bottles, cans, tyres, shopping trollies, fire extinguishers, and plastics. Huge thanks and credit goes to those who planned the event and to all the volunteers, community groups and public bodies who gave up their time to help. The Castlebar River is now much cleaner!

Ballina Salmon Festival: fun in the sun

Local children got to experience all the Moy Valley has to offer at the Salmon Festival on 10 July. Kids aged 9-12 got to kick sample with the Mayo County Council team, led by Pamela Bergin. They learned all about what lives in their river, using magnifying glasses to identify various insects and bugs. The National Parks and Wildlife Service showed them what animals live along the Moy, and Ballycroy National Park even had some stuffed animals to show the kids, telling them what distinguished each species, what they fed on, and where you could see them in the valley.

An Owl and a Peregrine Falcon also joined in the festivities – Mount Falcon's Falconer Martin McPhillips brought them along to enjoy the day. The Moy River Trust brought a glass tank filled with some of the fish that lived in the river, and local anglers and ghillies showed the children how they fished the river, and gave the children a chance to capture their own salmon on the worldfamous Cathedral beat of the river.

Learn more:

You can contact the Moy Trust on 087 6159954 or moytrust@gmail.com



Who needs hats when you can get up close and personal with Mount Falcon's owl and falcon?



Learning to fish on the Cathedral beat of the River Moy

Westmeath

Community Water Officer Basil Mannion has been involved with Willow Park Housing Estate in Athlone, who have started cleaning and restoring the River Al. He also has been working with St. Joseph's Foroige in the aptly named Streamstown on an award-winning project to reduce pesticide use.

Athlone: community spirit and the **River Al**

Athlone is well known for having the River Shannon flowing through the town, but there is also a lesser known river to the east of the town flowing through the Willow Park housing estate on its way to join the Shannon at Golden Island - the River Al.

In recent decades, the River AI has been neglected and subjected to heavy dumping and littering. The community in Willow Park have come together, and are working hard to restore the Al to its former glory. An awareness event was held in the Community House in Willow Park which was very well attended by people from the local area. Community Water Officer Basiil Mannion spoke about the restoration work being undertaken by members of the community and how these efforts will deliver benefits for water quality and biodiversity in the local area. Ricky Whelan of Birdwatch Ireland and the Irish Wildlife Trust spoke about birds associated with the River Al and the Shannon and gave information about a Swift survey which is being conducted nationwide. A huge contribution to the event was made by Michael Fitzsimons and Pat McDonnell, both from Inland Fisheries Ireland, who spoke at length about additional improvement works that can be undertaken along the river to build on the great work completed to date. This was followed by a river walk along the Al with discussions around points of interest along the way. There was even time to do some kick sampling in the river to demonstrate the types of insects and bugs living in the Al.

The local community group have continued with the restoration work on the River Al during the summer of 2018, with similar information events planned as improvement works progress and there is more to tell. Huge credit is due to the residents of Willow Park, and to Padraig Higgins, Chairman of the Residents Committee who is the driving force behind the restoration project.



A successful community clean – a full skip of rubbish taken form the River Al.



Michael Fitzsimons takes a kick-sample from the partially restored and cleaned River Al.



Michael Fitzsimons and Pat McDonnell of IFI educate the community group on what life there is in the River Al.





Back row L- R: Roising Killian, Emer Killian , Aine Maxwell, Laura Conlon, Joyce Conway Front row: L – R: Adam Kelly, Sinead Robbins, Ciara Maxwell. Missing from photo: Eoin McCormack.

St. Joseph's Foroige, Streamstown – award-winning work to reduce pesticide use

St. Joseph's Foroige, Streamstown County Westmeath won a gold medal for their project on weed killer at the Aldi Foroige Youth Citizenship Awards held in City West Dublin in April 2018. The Foroige group have been busy for the past year researching and coming up with an alternative to chemical weedkiller with a view to protecting our natural waters from harmful chemicals.

Their work included carrying out a survey in the community to establish the use of chemical weedkillers, and to determine if the community were willing to trial alternative, eco-friendly sprays if they were available. The Streamstown Tidy Village approached the group as they were keen to try and get away from relying on chemical sprays and it was a perfect project for our group to get working on.

The club members have worked hard and were delighted to get assistance from both the Council's Environmental Awareness Officer, Ruth Maxwell and Community Water Officer Basil Mannion. They advised on how the chemical sprays affect both our water and pollinators and help research alternatives. Helena Connell, Foroige Leader and Basil emphasised that the project is especially relevant, because the Streamstown area and wider catchment are located within the headwaters of the River Gageborough, which has been selected as an Area for Action in the River Basin Management Plan 2018-2021.

Stories about water and your community

We have had stories from across the country in the Catchments Newsletter. You can read them all on www.catchments.ie

If you would like to tell your story or that of your community and its connection with its water, or to get involved in looking after your local river, lake or stream, contact your Community Water Officer – see <u>www.watersandcommunities.ie/</u> <u>community-water-officers/</u>



Our stories to date: you can see them all on www.catchments.ie/maps



Community Water Officer's locations across the country

ARTICLES

Understanding our catchments: Water Framework Directive characterisation

Jenny Deakin from the EPA Catchments Unit outlines how we carried out the characterisation process for the 2nd Cycle of the Water Framework Directive, what we've learned, and how this knowledge and insight is informing action.

Every 6 years, Ireland produces a plan for how we are going to protect and restore the quality of all our waters – rivers, lakes, groundwaters, estuaries and coastal waters. To develop a plan, we need to understand what is happening within our catchments, a process called characterisation. Simply put, characterisation means finding out where the problems are, what is causing them and why, and how we can fix them. Resources will always be limited, so it is important that the focus is on key actions that will improve water quality and provide the best return for the investment. It is a key principle for this cycle that we target the right measure in the right place.

What is the scale of the problems?

For this cycle, Ireland has one national river basin district (RBD) and two international RBDs. The country has been divided up into 46 catchments, which are made up of 583 subcatchments, which in turn encompass a total of 4,829 waterbodies.

The first step was to determine which water bodies are At Risk of not achieving their Water Framework Directive objectives (Figure 1). Water bodies that are At Risk require action, which means expenditure of monies. It is therefore important that there is sufficient evidence to justify that expenditure.

Risk has therefore been determined on the basis of the evidence from the monitoring data. Water bodies that are At Risk had either not achieved their objectives by 2015, or had achieved their objectives but the trend data indicates that they are deteriorating and that further action is required.

Water bodies that are Not at Risk have achieved their objectives and have either no significant trends, or improving trends.

Water bodies in Review have insufficient information to determine the risk, or have had measures implemented but some additional monitoring is required to confirm that the expected improvements have been achieved.

Approximately 30% of all water bodies are At Risk of not achieving their WFD objectives and need further action (Figure 2). Transitional waters (estuaries) and rivers have the greatest challenges. The main water quality problem is eutrophication which is caused by the loss of excess nutrients, mainly phosphorus in our rivers and lakes, and nitrogen in our estuaries. Sediment is also a problem in places, particularly in high status waters, as well as physical modification (hydromorphology) of rivers and lakes. It is important to note that waterbodies that are currently Not at Risk could still deteriorate in the future, and they therefore need ongoing protection, including implementation of best practice management strategies, and prevention of accidents, such as slurry spills or operational issues at waste water treatment plants, for example.



Figure 1: Water bodies At Risk of not achieving their WFD Objectives.



Figure 2: breakdown of At Risk, Review, Not At Risk by water body type.



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What are the Significant Pressures causing the impacts?

There are many pressures in the catchment areas of all water bodies, but not all of them are significant. Significant pressures are those pressures that are having a significant impact on ecological status and need to be addressed before the status will improve. Significant pressures are only identified therefore for water bodies that are At Risk of not achieving their objectives.

The assessment to identify which pressures are significant has been extensive, involving almost 50-person years worth of work, over 140 datasets, a range of modelling tools, local information and experience from local authority and Inland Fisheries Ireland staff which was contributed through a series of county-based discussion workshops, and peer review by the relevant pressure regulators.

You can read a summary of some of the significant pressures on pages 28 - 38 of this Newsletter. You can also view the significant pressures on our water bodies on www.catchments.ie/maps

Agriculture is the most prevalent significant pressure impacting on At Risk water bodies (53%), which is not surprising given that agriculture is also the most prevalent land use. The other most significant pressures include hydromorphology (24%), urban wastewater (20%), forestry (16%), domestic wastewater (11%), urban runoff (9%), peat extraction and drainage (8%) and industry (7%) (Figure 3). Approximately half of all water bodies that are At Risk are impacted by more than one pressure.



Figure 3: Frequency of significant pressures and source of pressures on At Risk water bodies. Source: River Basin Management Plan 2018-2021.

Measures

The Catchments Unit has used the source-pathway-receptor framework in the characterisation process which is also the first step towards identifying the most appropriate measures. For example, measures can be targeted at the source, the pathway or the receptor:

- Source control: The most commonly applied measures in Ireland and elsewhere are applied at the source, as this is the point at which activities are carried out and regulated. This approach works well for large point sources, but is generally not sufficiently effective on its own for diffuse sources.
- Repair the receptor: Restoration of receptors are most commonly used in Ireland for treating drinking waters to the required standard, or for restoring fish habitat after channel maintenance activities. However, these measures are often expensive, and focus on the symptoms in an impacted water body rather than the cause.
- Break the pathway: For diffuse sources of contamination, particularly where contaminants are delivered to receptors via overland flow pathways, which are activated during rainfall events, it may be far more effective to intercept the transport pathway. This is especially useful where phosphorus is the issue because it takes a very, very small proportion of the amounts of phosphorus that are used in agricultural production to be lost to cause an ecological water quality problem. Relying only on source control in this instance is unlikely to be an effective solution.

Areas for Action

The large number of water bodies requiring further action means there is a need to prioritise where action is focussed. The EPA and the Local Authority Waters and Communities Office (LAWCO) jointly led a collaborative workshop process involving Local Authority personnel and all public bodies with an interest in water to decide, at a regional level, which water bodies should be prioritised as Areas for Action. The decision process was based on the priorities in the river basin management plan, the evidence from the characterisation process, expertise, data and knowledge of public body staff, and local priorities such as amenity value. The River Basin Management Plan has consequently identified 190 Areas for Action across the country, which includes a total of 726 water bodies. Public engagement and feedback sessions on the Areas for Action was then carried out by The Local Authority Water and Communities Office (LAWCO). You can find out where these areas are, and the reasons for their selection, at https://www. catchments.ie/areas-for-action/

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Water Framework Directive Status for surface water bodies, 2010-2015.

What actions will be carried out?

In 2018, the Local Authority Waters Programme Catchment Assessment Team was established to carry out Local Catchment Assessments within the 190 Areas for Action. The purpose of the Local Catchment Assessments is to carry out catchment, stream, street and shore walks to figure out precisely what the problems are at the field scale, what the options are for addressing them and how best to get appropriate actions implemented. Ten regional offices have been established and 35 new scientists will be doing the work. The Catchment Assessment Teams will also be working closely with other public bodies that have local knowledge and expertise and can contribute to getting actions implemented.

The Catchments Unit, together with a working group made up of 25 representatives from different relevant public bodies, has developed a comprehensive local catchment assessment guidance manual to support these local activities. A comprehensive associated training programme has also been developed and rolled out to all the new staff.





How will the measures be implemented?

A key part of this work will be working with local landowners. This work will be carried out by another new organisation, the Agricultural Sustainability Support and Advice Service (ASSAP). This advisory programme has 20 Teagasc Advisors, funded by the Department of Agriculture, Food and Marine and the Department of Housing, Planning and Local Government, and 10 specialist dairy advisors, funded by the dairy industry. ASSAP will work on a voluntary and collaborative basis with farmers in Areas for Action. These advisors have extensive experience, and will work directly with farmers and their existing advisors. They will work on farm level action plans - looking at yards, lands and nutrient management planning. Other public bodies, for example the Forest Service, Inland Fisheries Ireland, EPA and local authority staff, will play an important role in helping the Catchment Assessment Teams to get actions implemented.

The Waters and Communities Team will be supporting the Catchment Assessment team by working with local communities to engage with their local waterways, talk about their catchments and what is happening, and harness local knowledge. Community buy-in will be essential for getting measures implemented and for protecting local water resources for the long term.

WFD Surface Waterbody Status 2010 - 2015



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A key part of all this work in Areas for Action will be identifying any grants or supports available to help people to make changes where necessary, to help improve their local waters – whether that is a homeowner who wants to fix a septic tank, or a farmer fencing off watercourses and putting in drinking troughs.

What is next?

Now that the 2nd cycle is well underway, we are starting to turn our attention towards characterisation for the third cycle. In particular, we would like to better understand some of the key scientific questions that have arisen during the process thus far so that we can better target the actions in the next cycle. For example, approximately 400 water bodies improved during the last cycle, so what has happened in their catchments to effect that change? Similarly, approximately 500 water bodies have deteriorated, so what learnings can we glean from them and how can we reduce this level of decline? There have also been significant and worrying losses of our highest quality status sites which are so important for biodiversity, for recolonisation of degraded sites lower downstream in these catchments, and to provide our reference conditions. What is causing these losses and how can we protect them into the future?

Working together, to achieve more

Between now and 2021, Ireland faces significant challenges to achieve the water quality outcomes set out in the river basin management plan. Considerable resources are being invested in carrying out field scale Local Catchment Assessments in our 190 Areas for Action, and in supports to help farmers and local communities find local solutions. This is a major change in comparison to the first cycle where the approach was just to rely on enforcement of the 'one size fits all' national regulations. Awareness raising, engagement, change of practice, and supports are the main focus of this new approach. Expected outcomes include 726 water bodies achieving general water quality improvements, and 152 water bodies experiencing improved water quality status.

Some of the problems we face are very challenging – most especially, for diffuse sources of pollution, for which there are multiple and diverse land holders, multiple problems, multiple agencies and players, multiple (and often conflicting) messages, and lack of resources in households or farms. Local, specific and tailored advice will be critical. We will not need new measures everywhere – but the one size fit all approaches are not the full solution. We will all need to work together, and try and make sure that we can achieve the right measure, in the right place.

Jenny Deakin, EPA Catchments Unit

Telling Stories with Data

Eva Mockler from the EPA Catchments Unit outlines some of the data and models used by Catchment Scientists to assess Ireland's water bodies, and how this knowledge can help us get the right measure in the right place.

Characterisation of our catchments means that we understand how catchments work from the mountains to the sea. This includes assessing the impacts and risks of human activities on the water environment to help prioritise high risk areas for management strategies, including targeted programmes of measures, and monitoring. The goal is to get the right measure in the right place.

However, real world data rarely gives us a single, clear story. This is why Catchment Scientists need to rely on expertise and judgment to reach conclusions based on all the evidence available. Using data, they can start with the big picture and provide context so we will be less likely to jump to mistaken conclusions. Most importantly, they can highlight the insights in the data which may be hidden below the surface and use this understanding to tell the story of the catchment.

Diffuse sources of pollution are a major challenge and understanding the source-pathway-receptor framework, and the critical source areas for these pollutants, is important for targeting measures.

Data analysis and models have played an important role by adding value to available national datasets, mapping and expert assessments. Catchment management can be supported by a variety of modelling tools to reduce the resources required to analyse substantial amounts of information.

Data and Models to support Catchment Science and Management

Numerical modelling complements the EPA's environmental monitoring and assessment programme by synthesising available information to test hypotheses and uncover new relationships between sources, pressures, and impacts on environmental systems.

In recent years, the EPA has increased the use of modelling to support the assessment of inland and marine waters and the development of the River Basin Management Plan. For example, numerical modelling has been used in the EPA Catchments Unit to enhance scientific assessment methodologies, thereby enabling our team to target key pressures and highest-risk geographical areas.

Water-related modelling has been commissioned through the Water pillar of the EPA's Research Programme which funds research projects and fellowships to undertake a variety of environmental modelling studies on topics including floods, droughts, and water pollution. For example, the EPA

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Research Programme has invested significantly in catchment characterisation and modelling tools, including the Catchment Characterisation Tool and the Source Load Apportionment Model. These include tools to support the Water Framework Directive risk characterisation process and to undertake scenario analyses that assist in identification of appropriate programmes of measures.

Modelling for Catchment Characterisation

Contribute to characterisation alongside monitoring data, local knowledge... Analyse trends in pressures and water quality to improve evidence and knowledge

Assess whether proposed measures are future proofed

Figure 1. Data and models supporting catchment science and management.

The characterisation of water bodies for the second cycle of the Water Framework Directive included evaluation of physical, hydrochemical and ecological characteristics, and a risk assessment of pressures, pathways and impacts. These assessments used results from water quality models to significantly enhance understanding, thereby enabling staff to target key pressures and highest-risk geographical areas. The following are the main models used to support the recent characterisation assessments:

- The Pollution Impact Potential (PIP) maps help locate the Critical Source Areas (CSAs) within catchments for nitrogen (PIP-N) and phosphorus (PIP-P). They were initially developed by the EPA Pathways Project and further developed by the EPA Catchment Tools and Diffuse Tools projects. These maps indicate the main transport pathways of diffuse nutrients from agriculture land to surface waters. They incorporate soils, subsoils and bedrock maps along with average rainfall and estimates of stocking densities. They are suitable to give indications of the nutrient hot spots in a sub-catchment but are not reliable or meant for use at field scale.
- A model to predict the impact of Septic Tank Systems water bodies was developed to support the characterisation of water bodies in rural settings. The Source Apportionment of Nutrients in Irish Catchments for On-Site Effluent (SANICOSE) model estimates the nutrient emissions to water from for each septic tank location. Annual nitrogen and phosphorus loads were aggregated for each water body or sub-catchment and these results were incorporated into other models and assessments.
- The Source Load Apportionment Model (SLAM) results supported the assessment of nutrient load information in a logical, structured, consistent and comparative way across the country and has therefore enabled robust and practical use of the information. This geospatial modelling framework significantly upgraded the available methods and data using new

GIS models to identify the sources of nitrogen and phosphorus to identify potential pressures causing eutrophication. There are nine sector models including 3 types of point sources and 6 diffuse sources. The wastewater calculations use data from annual environmental reports for over 1,000 wastewater treatment plants, and the agricultural calculations use Department of Agriculture data, in combination with export coefficients linked to catchment characteristics.

Modelling the Future

Catchments are constantly evolving as human activities and climate are changing. In addition to assessment, numerical modelling can provide information about the effectiveness of measures and the possible response of water bodies to future actions:

- Models of estuaries and coastal waters have been used to identify the magnitude of nutrient reductions required to achieve Good status, thereby supporting the selection of appropriate mitigation measures.
- Catchment-scale scenario analysis is underway in the East of Ireland to assess the impact of projected changes in land cover and land use change, population increases and wastewater treatment improvements on water quality.
- The Hydrological modelling capabilities of the EPA are being greatly improved by the Hydrometrics and Groundwater Unit. Low flow and e-flow assessments will be based on the Qube model, which will replace Hydrotool in the coming months. This will enable a cumulative assessment of abstractions and discharges and support resilience management for future climate extremes. You can read more about the EPA Hydrometrics Programme on page 39 of this Newsletter.

Sharing data, telling stories

When telling stories with data, the aim is to really explain the data so that complex science can be communicated with clarity, precision and efficiency. By analysing the evidence in a balanced and objective manner, the catchment story should tell itself. Combining Significant Pressure information with the national monitoring data can give insights into trends – see figure 2, and the Pressure Narratives on page 28. Some of these stories may be complex and are still evolving as our understanding improves and as new evidence is uncovered. Check out Catchments.ie for the latest information on the stories of our catchments, including monitoring data and graphs, statistics on water body status, WFD risk and Significant Pressures, maps, articles and more.

Eva Mockler, EPA Catchments Unit



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Figure 2: Combining Significant Pressure information with the national monitoring data can give insights into trends – see the Pressure Narratives on page 28. These graphs show average annual ortho-Phosphate and Ammonia concentrations in rivers from 2007 to 2017 for WFD monitored river water bodies with urban waste water (WWTP) and agriculture as a significant pressure and all river water bodies Not At Risk.

Learn more:

Water Quality and Agriculture: Pollution Impact Potential Maps – A tool to guide resources into areas for further investigation - https://www.catchments.ie/water-quality-agriculture-pollution-impact-potential-maps-tool-guide-resources-areas-investigation/

Modeling the pathways and attenuation of nutrients from domestic wastewater treatment systems at a catchment scale https://doi.org/10.1016/j.envsoft.2016.07.006 Sources of nitrogen and phosphorus emissions to Irish rivers and coastal waters: Estimates from a nutrient load apportionment framework - https://doi.org/10.1016/j.scitotenv.2017.05.186

The impact of nutrient reduction measures on the health of Irish estuarine systems https://www.catchments.ie/impact-nutrient-reduction-measures-health-irish-estuarine-systems/

Groundwater

Anthony Mannix from the EPA Catchments Unit gives an overview of why groundwater is so important, and how its quality and quantity was assessed as part of the WFD Characterisation process.

Why is groundwater important?

Groundwater is important both as a drinking water source and as a pathway to surface water, and for ecosystems. Over 90% of small private supplies have a groundwater well¹ and more than a quarter of large public supplies are from groundwater².

Groundwater provides a proportion of flow to rivers depending on the properties of the aquifer and the overlying soil and subsoil in the catchment. The proportion of flow to rivers from groundwater is greater during dry periods when groundwater base flow dominates.

Water Framework Directive Monitoring of Groundwater

Groundwater quality and quantity is monitored in Ireland for the Water Framework Directive (WFD). There are 513 groundwater

bodies across Ireland. The design of the monitoring network is based on a conceptual understanding of the hydrogeological system and pressures. The groundwater quality network focusses on monitoring points with large zones of contribution (ZOC) because the water quality is less affected by localised pressures. In this regard, monitoring points with daily abstraction rates greater than 100 m³ per day and large springs were prioritised for the groundwater quality network. There are 255 groundwater quality monitoring points for WFD assessment. There are also 24 spring flow monitoring sites, and 135 groundwater level monitoring boreholes.

¹ <u>http://www.epa.ie/pubs/reports/water/drinking/</u> focusonprivatewatersupplies2016report.html

² <u>https://www.epa.ie/pubs/reports/water/ground/WQII_2007-</u> 2009_CHAPTER_TWO_GROUNDWATER.pdf

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Gortgarrow Spring, Co. Galway – Water flow and quality monitoring site on the EPA WFD groundwater network

What are the key issues for groundwater in Ireland?

Elevated nutrient concentrations (phosphorus and nitrogen) continue to be the most widespread water quality problem in Ireland³ across the water categories. The drinking water standard for nitrate is 50 mg/l NO³ and this relates to potential for harm to human health, and there is an associated groundwater WFD threshold value of 37.5 mg/l NO³.

In 2016 the mean nitrate concentration exceeded the Irish groundwater WFD threshold value concentration of 37.5 mg/l NO³ at six of the EPA WFD monitoring sites, with two sites having mean concentrations greater than the Drinking Water Standard⁴. Where concentrations are greater than the drinking water standard then treatment or blending to reduce the concentration is necessary before using as a drinking water supply. Exceedance of the threshold value indicates action may be required to avoid exceeding the drinking water standard.

Groundwater can be an important pathway for the movement of phosphorus from diffuse and small point sources to water ecosystems, particularly in catchments with thin soils or where bedrock outcrops at the surface. The Irish groundwater WFD threshold value of 0.035 mg/l P is considered when assessing the contribution of phosphorus in groundwater to surface waters. (7.7%) of EPA WFD groundwater sites were in breach of their respective threshold values for nitrate phosphate in 2016⁴.

Escherichia coli (E. coli) is a bacterium used as an indicator of faecal

contamination of water. It is detected widely in groundwater in Ireland (found at 42% of EPA WFD groundwater monitoring sites in 2016⁴). Its detection is an indication of contamination of groundwater by faecal matter and that pathogens (disease causing organisms) may be present. This highlights the necessity for testing of drinking water supplies from groundwater for microbial contamination, and for the provision of adequate treatment. This is particularly relevant for households and other private supplies which may not have treatment in place for microbial contaminants. The EPA recommends that all drinking water supplies are monitored at least once a year for E. coli, with greater frequencies required depending on the supply type.



Groundwater level and quality monitoring sites in the Ryewater Catchment, Co. Meath, on the EPA WFD groundwater network

³ <u>http://www.epa.ie/pubs/reports/water/waterqua/</u> waterqualityinireland2010-2015.html

⁴ <u>http://www.epa.ie/pubs/reports/water/waterqua/</u> waterqualityin2016.html

Integrated Catchment Management: sharing science and stories



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There may be other localised water quality issues for groundwater, for example pesticides or hydrocarbons like oil, diesel or petrol. Sites that are polluted from point sources may impact on groundwater immediately downhill from the pollution source. Smaller sites generally do not have an impact at a groundwater body scale. Large point sources potentially impacting on groundwater are assessed based on site specific data collected as part of site characterisation, or regulatory data from licenced sites submitted to the Office of Environmental Enforcement of the EPA as discussed below.

During dry periods, water levels can fall below the shallow wells in particular, resulting in dry wells. Large wells abstracting significant quantities of groundwater could impact on surface water ecosystems by reducing the flow of water to them. However, at a WFD groundwater body scale there have been few issues with quantity of groundwater in Ireland as discussed below.



Mean nitrate concentrations in 2016 at EPA groundwater monitoring sites. Source: Water Quality in Ireland 2016: an indicators report.

Groundwater WFD Status

WFD status classification for groundwater is based on five chemical and four quantitative tests developed to assess whether the WFD objectives are met. The chemical tests investigate water quality impacts by looking for:

- evidence of saline or other intrusions
- exceedances of quality standards and thresholds that would result in failure to achieve the environmental objectives of associated
 - surface waters
 - groundwater- dependent terrestrial ecosystems
 - or drinking water protected areas
- evidence of deteriorating trends in quality (general chemical test)

The quantitative tests investigate over-abstraction of groundwater by looking for:

- evidence of saline or other intrusions due to change in groundwater levels,
- impacts on the environmental objectives of associated surface waters and groundwater-dependent terrestrial ecosystems due to alterations in groundwater levels,
- exceedence of the available groundwater resource by the longterm annual abstraction through assessing water balances.

The current WFD groundwater status (2010 to 2015) is based on monitoring data for the EPA WFD groundwater monitoring network. It also considered information from the surface water WFD status assessments, and assessment of licenced sites from the Office of Environmental Enforcement of the EPA.

The picture of the groundwater quality status based on area is good. 99% of the area of the country is at Good status and less than 1% is at Poor status. 45 of the 513 groundwater bodies are at Poor status.

Thirty-six of these failed the general chemical test. These poor status bodies make up a small area nationally as most are small waterbodies delineated for waste and industrial licenced sites and historic mines. There was an increase in the number of poor status GWB for this test from the previous assessment. This was due to improved information and technical approach rather than due to deterioration. Nine water bodies failed due to the impact of groundwater quality on surface water ecology with groundwater contributing more than 50% of the load to cause a breach of the river phosphate Environmental Quality Standard.

One waterbody was at poor quantitative status due to the impact of drainage on a Groundwater Dependent Terrestrial Ecosystem (GWDTE).

Groundwater Characterisation

The characterisation process for groundwater looked for evidence of impact across the areas outlined above for the groundwater status classification. While the structure of the status tests was used as a guide for characterisation, the approach was expanded to use evidence and forms of assessment additional to those used for status assessment. The aim was to determine the risk of failing to meet the objectives for each waterbody. The contribution of nutrients from groundwater to surface waterbodies was particularly focused on.

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Groundwater contribution of phosphate to rivers

The connection between each river and the groundwater body or bodies contributing water to them was assessed. Where the surface water ecological status was at risk or review and phosphorus was the significant issue then the associated groundwater bodies were assessed.

Several elements were included in the assessment to determine if the groundwater contribution to surface water was likely to be significant including:

- Groundwater phosphate concentrations
- Groundwater phosphate trends
- Surface waterbody risk
- Surface waterbody significant pressure
- Aquifer characteristics
- Pollution Impact Potential maps generated using the Catchment Characterisation Tool and the modelled loadings per hectare via the groundwater pathway from the SLAM model ^{5,6}, (Mockler et al. 2016, 2017)

These details were assessed the combination of each groundwater body with each overlying surface water body. The assessment

was repeated several times for most groundwater bodies as they intersected with multiple surface waterbody catchments. The groundwater quality information, aquifer characteristics, and the LAM model results in particular were used to determine if a significant contribution from each groundwater body to surface water was likely.

The following table shows the groundwater risk assigned when related to the surface water risk and the likely significance of phosphate (P) via the groundwater pathway to surface water.

⁵ Mockler et al. (2016). Nutrient load apportionment to support the identification of appropriate water framework directive measures. Mockler, Eva M., Deakin, Jenny, Archbold, Marie A., Daly, Donal, Bruen, Michael. Biology and Environment: Proceedings of the Royal Irish Academy Vol. 116B, No. 3 (2016), pp. 245-263.

⁶ Mockler et al. (2017). Sources of nitrogen and phosphorus emissions to Irish rivers and coastal waters: Estimates from a nutrient load apportionment framework. Mockler, Eva M., Deakin, Jenny, Archbold, Marie A., Gill, Laurence, Daly, Donal, Bruen, Michael. Science of the Total Environment 601–602 (2017) 326–339.

		Significant groundwater P contribution likely	Significant groundwater P contribution possible	Significant groundwater P contribution not likely
Surface water risk	At Risk	At Risk	Review	Not at Risk
	Review	Review	Review/Not at Risk	Not at Risk
	Not at Risk	Not at Risk	Not at Risk	Not at Risk

Surface water is the receptor for phosphate so the groundwater bodies are not At Risk for this assessment if the associated river waterbodies are not at Risk. An exception was when there was a significant upward trend in Groundwater P concentrations that could contribute to river waterbodies becoming less than good status.

Groundwater contribution to transitional and coastal waters

Where transitional and coastal waters had impacts potentially caused by nitrogen the contribution from groundwater was assessed. This looked at:

- The proportion of water coming from groundwater using the recharge⁷ to groundwater
- Nitrate concentration for the groups of groundwater bodies in the catchment
- The nitrate concentrations in rivers associated with the groundwater bodies in the catchment

This information was used to compare estimated loads of nitrogen via the groundwater pathway to surface water in the catchment. These were compared with the other surface water inputs by the EPA Catchments Unit to determine the significance of the groundwater load.

Overall Risk

Significant Issue	Number of Groundwater Bodies At Risk
Phosphate contribution to associated Surface Water Bodies	33
Chemicals from Industrial Licenced Sites	18
Ammonia from Waste Licenced Sites	13
Contamination from Historic Mines	5
Average nitrate concentrations in a monitoring point > 37.5 mg/l NO3	5
Phosphorus contribution to Groundwater Dependent Terrestrial Ecosystems (GWDTE)	2
Quantitative impact on GWDTE	1



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Almost half of the At Risk classification for groundwater bodies are due to the contribution of phosphorus to At Risk surface water bodies. Measures to address the surface water significant pressures will address pressures on the groundwater bodies⁸.

Most the remaining groundwater bodies At Risk of not achieving their environmental objectives are related to point sources (waste and industrial licenced sites and historic mines). Measures to remediate the problems are managed through the EPA's licence enforcement process⁵.

Anthony Mannix, EPA Catchments Unit

⁷ Recharge is the movement of water from rainfall down through the subsurface to the water table.

⁸ <u>https://www.housing.gov.ie/water/water-quality/river-basin-management-plans/river-basin-management-plan-2018-2021-0</u>

River Basin Management Plan 2018-2021

On 17 April 2018, the Minister for Housing, Planning and Local Government, Eoghan Murphy, T.D., launched the River Basin Management Plan (RBMP) for Ireland 2018-2021. The Plan sets out a national approach to protecting Ireland's water bodies over the next four years, outlining key actions in areas such as agriculture, wastewater treatment, source protection and resource management. The Plan aims to achieve water quality improvements in 726 water bodies, with improvements in Water Framework Directive water quality status in 152 water bodies. It is the culmination of three years' consultation, collaboration and innovation.

Water quality has stood still over the past decade. Planned improvements to the status of 13% of our waters were not achieved during the first river basin management planning cycle. Our growing population and economy are placing increasing pressures on our water resources. Meanwhile, the challenges in protecting water quality are increasingly complex in countries like ours with developed economies.

It is essential, therefore, that we take strong steps. This secondcycle Plan takes an innovative, new approach to protecting, improving and sustainably managing our aquatic environment. It's highly reliant on cross-sectoral collaboration and marks a fundamental change in how the State engages with people, communities and organisations in addressing these challenges.

One of the most positive aspects of the Plan's development was the strong public and civic participation during the consultation process. The Minister and his Department greatly appreciate the efforts of all those who contributed to the over 2,000 submissions made or who attended the 122 public meetings. Their views had a significant influence on the Plan.

A clear message from the consultation process was the need to improve communication and stakeholder engagement throughout implementation. New working arrangements and measures, including governance and implementation structures, the Local Authority Waters and Communities Office: (www.watersandcommunities.ie) and An Fóram Uisce (www. nationalwaterforum.ie), will help bring citizens to the heart of water policy and water quality protection.



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Minister Murphy and An Fóram Uisce

Through partnership with local authorities and the EPA, the second-cycle Plan has a much improved evidence base on the state of our aquatic environment. This has helped shape new national policies and initiatives, and to target measures at local level to maximise their effectiveness.

The new governance structures will also facilitate a more coherent "whole of Government" approach to addressing complex, cross-cutting challenges and developing solutions. Collaborative measures have been developed in areas such as agriculture; public and private water services (water supply and waste water treatment); forestry; peat extraction; flood protection; and the interface between planning and water quality protection.

While the Plan is a strong foundation for long-term improvements, full and effective implementation is critical. This is especially the case given the scale of the challenge and the short timeframe for achieving the Plan's expected outcomes. Actions at catchment level, by interested people, communities and organisations, are central. The Minister and his Department are committed to seeing this work supported and recognised.

The new Plan is a fresh opportunity for people to work more closely and effectively than ever before in the area of water quality. It is only by working together and discovering how we can all play our part that we can safeguard this most vital resource.

Department of Housing, Planning and Local Government

Learn More:

More information, including some videos looking at the Plan, are available on the Department of Housing, Planning and Local Government's website:

www.housing.gov.ie/water/water-quality/river-basin-managementplans/river-basin-management-plan-2018-2021

The Local Authority Waters Programme Catchment Assessment Team

Alan Walsh tells us how the new Catchment Assessment Team will be working in Priority Areas for Action across the country.

Ireland's River Basin Management Plan 2018 – 2021 was launched in April 2018, setting out measures to be implemented over the next four years, and a new approach for the protection and management of our rivers, lakes, estuaries and coastal waters.

This new approach will involve closer collaboration between Local



Courtesy of Ruairí Ó'Conchuir, Community Water Officer



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Authorities and state agencies. Underpinning this second cycle River Basin Management Plan (RBMP) is a strong evidence base resulting from the characterisation work undertaken by the EPA, Inland Fisheries Ireland and Local Authorities.

This new collaborative approach builds on statutory requirements for implementation of the EU Water Framework Directive (WFD) in Ireland. Two years ago, the Waters and Communities Office was set up as a shared service to help our 31 Local Authorities with their responsibilities for regional coordination around WFD activities and public engagement in the development and implementation of River Basin Management Plans.

The Local Authority Waters Programme Catchment Assessment Team

To implement the River Basin Management Plan, a new team of 35 scientists with a wide range of technical expertise have been recruited under the Local Authority Waters Programme. These will be called the Catchment Assessment Team and they will assist Local Authorities with implementing the measures set out in the RBMP, and to support ongoing WFD activities.

The new Catchment Assessment Team is a sister organisation to the Waters & Communities Office, and both are part of the Local Authority Waters Programme Office which is led by Kilkenny and Tipperary County Councils. The Catchment Assessment Team will work closely with our 31 Local Authorities, the Waters & Communities Office, the EPA, other WFD implementing bodies, and the 30 advisors in the new Agricultural Sustainability Support and Advice Programme (ASSAP).

There will be five regional Catchment Assessment Teams, with a Senior Catchment Scientist and 6 support staff in each region. These teams are being hired and trained during Summer 2018.

Five Senior Catchment Scientists are now in place;

- Martina Smith in the Border Region, based in Monaghan;
- Bernie White in the West Region, based in Galway;
- Margaret Keegan in the Midlands East Region, based in Dublin;

- Maeve Ryan in the South-West Region, based in Limerick; and
- Ruth Hennessy in the South-East Region, based in Clonmel.

The five regional teams will be completing Local Catchment Assessments in each of the 190 Areas for Action (containing 726 water bodies) between 2018 and 2021. They will recommend measures to improve water quality in these areas, and they will collaborate with and support public bodies, stakeholders and pressure owners to implement these measures. Better water quality will bring multiple benefits for the community and their environment.

The Agricultural Sustainability Support and Advisory Programme

A key focus for the Catchment Assessment Team will be agriculture. Agriculture is the most significant pressure on 'At Risk' water bodies. The Catchment Assessment Team will work with another new collaborative initiative between state agencies and industry, the Agricultural Sustainability Support and Advisory Programme (ASSAP). ASSAP will focus on knowledge transfer and collaboration, encouraging behavioural change, best practice and more sustainable farming practices. Up to 5,000 farmers will receive support and advice from 30 Sustainability Advisors, 20 based with Teagasc and 10 with Co-ops. This support will focus on issues within the 190 prioritised catchment Areas for Action. In addition, 18,000 dairy farmers will receive advice on sustainable farming practices under the Dairy Sustainability Initiative.

The River Basin Management Plan 2018-2021 aims to achieve general water-quality improvements in 190 Areas for Action, which contain 726 water bodies prioritised for this cycle. However, given the complexities involved and the known difficulty in achieving status improvements due to time lags in natural recovery, and the interaction between multiple environmental pressures on water bodies, it is conservatively estimated that the actions outlined will likely result in 152 water bodies improving in status by 2021, with further improvements being made thereafter.

Alan Walsh, Communications, Local Authority Waters Programme

Local Catchment Assessments - the next step in characterising our catchments

Marie Archbold describes how the EPA Catchments Unit has led the development of guidance on how assessment of the significant pressures in Areas for Action will be completed. This will help identify any activities causing the significant pressures, and will be an important step in acting to manage these. Local Catchment Assessments are next step for Ireland in the characterisation process. The initial characterisation process, which has been the focus of the Catchments Unit to date, has identified the water bodies that are At Risk of not meeting their water quality objectives, what the impacts are, and what the pressures are at the pressure sector level (e.g. forestry or agriculture). In many of these water bodies, further characterisation is now required to figure out precisely what activities are causing the problems for each individual water body (e.g. a forest roadway or a leaking slurry tank, etc) and how best to get them addressed. Local catchment assessments are how this further characterisation will be carried out.

ARTICLES

Guidance on how to carry out Local Catchment Assessments (LCA) has been developed by a Working Group chaired by the EPA and was completed in June 2018. In total twenty-five working group members representing Local Authorities and Public Agencies worked together to develop the five volumes of content for the Guidance. The purpose of the Guidance is to act as a reference manual for organisations involved in undertaking Local Catchment assessments.

What are Local Catchment Assessments?

LCAs are an essential tool in helping us to target our resources, and select and implement the right measure in the right place. The assessment process has been designed to help us answer the following questions about our At Risk water bodies:

- What exactly is causing the unsatisfactory situation, for example, is it nitrogen, phosphorus, ammonium, sediment, or a combination causing the impact?
- Where, when and how exactly are the issues arising?
- What is the particular activity responsible for those impacts?
- How do we solve the problems?
- What strategies and measures are available?
- If the above is still not clear, what further assessment and specialist input is required?



Local Catchment Assessment Guidance on Further Characterisation



CPOCatchments

Catchment Science and Management Unit, Environmental Protection Agency



Cover of the Local Catchment Assessment Guidance

What will Local Catchment Assessments involve?

Different water bodies may require different approaches but overall the structure of LCAs will consist of:

- Undertaking a desk study as the starting point;
- Undertaking catchment walks, if needed;
- Collecting, assessing and recording relevant information and data collected during the catchment walk;
- · Concluding on the specific activities causing the impacts;
- Evaluating and proposing possible mitigation options;
- Undertaking or referring the mitigation actions to other public bodies.

What is a Catchment Walk?

A catchment walk is the 'boots on the ground' component of the Local Catchment Assessment where assessors will walk along, or in, rivers and beside lakes, using 'basic', common-sense interdisciplinary science and techniques, to help refine the exact location and nature of the problem activities, and the appropriate mitigation options to help fix them.

The interdisciplinary science collected during the catchment walks will include the following:

- Visual biological indicators, e.g. macroalgae;
- Instream field data such as conductivity, dissolved oxygen, pH, temperature;
- Noting direct pathways, e.g. pipes, cattle access points;
- Noting hydromorphological impacts, e.g. recent drainage, new excavations;
- Noting invasive species, e.g. Himalayan balsam, Japanese knotweed;
- Noting 'pathway' indicators, e.g. rushes, rock outcrops;
- Evaluating pathway interceptors, e.g. hedges, riparian zones.

By integrating this data, a clear story can be developed outlining how the catchment areas to water body functions, using the Source-Pathway-Receptor linkages. This catchment story helps pin point the significant pressure activities and target the right measure in the right place.

What does the Local Catchment Assessment Guidance cover?

The Guidance has been written to provide background information for the LCAs. It consists of five volumes and a brief overview of each volume is as follows:

Vol 1: Background, Process and Implementation

This Volume provides an overview of general catchment pressures, indicators and possible mitigation options and outlines what a LCA is and the various components involved in a LCA.

Integrated Catchment Management: sharing science and stories



ARTICLES

Volume 2: Pressures and Catchment Walks

Volume 2 provides a comprehensive overview of what to look for, or expect, when walking the catchment in relation to each significant pressure type. The significant pressures covered include Agriculture, Hydromorphology, Urban Wastewater Pressures, Diffuse and Small Point Urban Pressures, Forestry Pressures, Peatland Activities, Extractive Industry – Quarries, Mines Industrial Discharge Pressures and Invasive Species.

Volume 3: Observed Indicator Features and Catchments Walks

Volume 3 provides an overview of visual indicators for land drains, vegetation of natural drainage, biodiversity and karst landscape features, and guidance on how risk of water quality impact to groundwater can be screened using a simplified method for estimating zones of contributions of groundwater to natural springs and pumping wells.

Volume 4: Measured Indicator Parameters and Catchment Walks

Volume 4 provides an overview of field methods for the measurement of streamflow and water quality parameters that are indicative of specific environmental pressures. Parameters considered include measurement of streamflow and spring discharges, water temperature, dissolved oxygen, pH, specific electrical conductivity, turbidity, sediment, nutrients and biological indicators. It also outlines the equipment that can be used during the walks, and how monitoring and measurements are carried out.

Rapid Assessments

The biological indicators section introduces a new biological assessment tool called the Rapid Assessment designed to enable the assessor to confirm if a location along a river is clearly impacted or unimpacted. The approach enables the assessor to validate the level of impact quickly. Following a kick sample and rapid inspection (5-10 minutes duration expected), well documented deviations of biota for some common water quality issues prevalent in Irish rivers can be established (i.e. organic and nutrient enrichment, acidification or chemical pollution). The survey is intended to be undertaken in conjunction with catchment walks when recording other field observations and assessing relevant supporting physical and chemical criteria. As it utilises phototrophic indicators, the rapid assessment has most value during summer, when algae are often expected to be most prolific.

Volume 5: Catchment Walk Case Studies

This volume is intended to provide articles on relevant case studies and new supporting information for LCAs. This volume will evolve over time with new articles and documents circulated to add as they become available.

Next Steps:

Future updates of the Guidance are anticipated to capture the knowledge and experience gained from undertaking the LCAs. Please keep this in mind and contact us at catchments@epa.ie with any suggestions for future iterations.

Learn More:

Public bodies can request an electronic copy of the Local Catchment Assessments Guidance from catchments@epa.ie



Shanvolahan River, County Mayo - showing growth of sedges.



Heptageniidae - one of the indicator species used in local catchment assessments.

Marie Archbold, EPA Catchments Unit.

Significant Pressures: Agriculture

Agriculture is the most common land use in Ireland, covering approximately 65% of the country. Through the initial characterisation process, agriculture has been identified as the most prevalent significant pressure, impacting just over half (780) of all water bodies (1,452) that are At Risk of not achieving their water quality objectives (Table 1).

Table 1: Number of At Risk water bodies with agriculture as a significant pressure

Waterbody (WB)	Number of WBs	Number of At Risk WBs	Number of WBs with agricul- ture as a significant pressure	% of WBs with agri- culture as a significant pressure	% of At Risk WBs with agricul- ture as a significant pressure
River	3192	1178	629	19.7%	53.4%
Lake	818	132	80	9.8%	60.6%
Transitional	195	56	32	16.4%	57.1%
Coastal	111	13	8	7.2%	61.5%
Groundwater	513	73	31	6.0%	42.5%
	4020	1453	700	16 39/	F3 70/



Figure 1: Surface water bodies where agriculture is a significant pressure either alone or in combination with other pressures.

Water quality problems in water bodies impacted by agriculture

Almost half of the water bodies impacted by agriculture are at Moderate status (Figure 2), which means the level of contamination may not be too far away from the Good status target, although 60% of these waterbodies have at least one other significant pressure in addition to agriculture.

Ecological Status of 745 WB's At Risk from Agriculture with an Environmental Objective of Good



Ecological Status of 35 WB's At Risk from Agriculture with an Environmental Objective of High



Figure 2: WFD Status (2010-15) of At Risk water bodies with agriculture as a significant pressure.

The most common water quality problem arising from agriculture is excess nutrients, giving rise to eutrophication. Phosphorus is typically the issue for rivers and lakes, and too much nitrogen for estuaries and coastal waters. Excess ammonium may also be a problem in some waterbodies.

Figure 3 shows the annual average phosphorus concentrations in rivers from 2007 to 2017. The red line is the environmental quality standard (EQS). Mean concentrations below the line are typically required to support good ecological status. Rivers with agriculture as a significant pressure have a higher average phosphate (PO_4) concentration compared with the national average. Since 2012, there has been an increase in the phosphate concentrations in rivers with agriculture as a significant pressure. Additional action is going to be needed in these water bodies to reduce the phosphorus losses if Good status is to be achieved.





Figure 3: Average annual ortho-Phosphate and Ammonia concentrations in rivers from 2007 to 2017 for WFD monitored river waterbodies with agriculture as a significant pressure and all river waterbodies Not At Risk.

Nutrient sources and losses

Nutrient losses from agriculture can arise from discrete or point sources such as farmyards; or from diffuse sources such as spreading of chemical fertilisers or organic manures.

The initial characterisation process has highlighted that while improvements have been made with managing point sources, significant challenges remain with managing diffuse sources, which are typically more difficult to identify and manage than point sources.

The key to managing diffuse sources is to consider that different contaminants behave differently in the environment and reach water bodies along different flow pathways. The flow pathways are controlled by the soils, subsoils, bedrock and the presence/absence of drains and ditches. For example, diffuse phosphorus loss occurs most often via overland flow on poorly draining soils and subsoils, such as those found in parts of Cavan, Monaghan, Wexford, Limerick and Meath.

Nitrogen loss on the other hand, occurs in freely draining settings where it infiltrates first into groundwater, before discharging into linked river systems and traveling down to the estuaries and coastal waters. Cork, and parts of Tipperary, Kilkenny, Carlow and Wexford are particularly susceptible to nitrogen losses from agriculture.

As a result, different solutions or mitigation options will be required to tackle the different contaminants.

Possible Solutions

The mitigation actions will vary depending on

- 1) the contaminant impacting the water body, and
- 2) the pathway linking the contaminant from the agricultural activity to the water body.

Phosphorus mitigation actions are best targeted at intercepting the overland flow pathways. This is because it takes just a tiny fraction of the phosphorus that would normally be applied to land to cause a water quality problem, and source control measures will not

be effective enough on their own. Pathway control actions may include targeted planting of hedges and woodland along rivers, riparian buffer strips and constructed wetlands.

For nitrogen, the mitigation actions will need to be targeted at controlling the loss at source because the pathway into groundwater is more difficult to intercept. Source control actions include nutrient management planning in particular correcting soil pH and fertilizer placement technologies. Mobilisation control sources such as catch crops, use of clover, and precision application of fertiliser may reduce the mobility of the contaminant.

Sediment

Biological monitoring has identified excess fine sediment as an issue in some places. Fine sediment fills the spaces between larger gravels in the stream bed and can interfere with aquatic ecosystem functions, particularly in the more sensitive high status waters. Some species, like the endangered Freshwater Pearl Mussel, are especially sensitive to sediment. Sediment is also often the transport mechanism for chemicals and nutrients that are attached to the sediment particles.

Typical sources of sediment from agricultural activities include, runoff from ploughed or arable land and farm roadways, erosion of river banks at cattle access points, and land drainage and channel maintenance. Mitigation options might include livestock exclusion, fencing the riverbank, attenuation ponds and careful management of ditches and drainage.

The Next Steps

In the River Basin Management Plan 726 water bodies are being targeted in 190 Areas for Action, and agriculture has been identified as a significant pressure in almost half of these water bodies.

In these Areas for Action the Catchment Assessment Team has been established to undertake further assessment to determine precisely what and where the activities causing the problems are. The Catchment Assessment Team will work closely with thirty new specifically trained agricultural sustainability advisors from Teagasc and the dairy Co-ops to identify possible solutions, or mitigation options. The agricultural advisors will work with farmers to find the best farming practices and any suitable mitigation actions that can be implemented to prevent contamination occurring.

Undoubtedly, there is a lot of work ahead and the success of this process will depend on building partnerships, trust and learning from one another - both between organisations, and with the communities living in the Areas for Action. Individual organisations can achieve improvements in water quality, but by working together we will achieve more sustainable improvements.

Find out more:

You can view the individual water bodies where agriculture is a significant pressure on www.catchments.ie/maps

For planning and policy, including measures, see www.bit.ly/rbmp20182021

Significant Pressures: Hydromorphology

Hydromorphology is a relatively new discipline which is described in the Water Framework Directive. Hydromorphology is the study of physical form, condition and processes within a surface water body, that create and maintain habitat.

It stems from the term 'fluvial geomorphology', a discipline that focuses on the processes that operate in, for example, a river system (e.g. both water and sediment production and movement, erosion, deposition), and the features that these processes create (e.g. pools, riffles, sediment bars). As these processes create and maintain such features, this in turn will create and maintain habitats for invertebrates, fish and plants.

Modification of the hydromorphological characteristics of surface waters is estimated to be a significant pressure in 345 (24%) of the 1,460 waterbodies that are At Risk of not meeting their water quality objectives. This includes 329 river water bodies, 10 lakes and six estuaries nationally (Table 1). It is the 2nd most prevalent significant pressure within surface water bodies.

Table 1: Number of At Risk water bodieswith hydromorphological modificationas a significant pressure.

Waterbody (WB)	Number of WBs	Number of <i>At</i> <i>Risk</i> WBs	Number of WBs with Hymo as a significant pressure	% of WBs with Hymo as a significant pressure	% of <i>At Risk</i> WBs with Hymo as a significant pressure
River	3192	1178	329	10.3%	27.9%
Lake	818	132	10	1.2%	7.6%
Transitional	195	56	6	3.1%	10.7%
Coastal	111	13	0	0%	0%
Groundwater	513	73	0	0%	0%
	4829	1452	345	7.1%	23.8%



Figure 1: Surface water bodies where hydromorphological modification is a significant pressure either alone or in combination with other pressures.

What is hydromorphological modification?

Hydromorphological modification means change to the physical habitat, and/or a water bodies' natural functioning caused by, for example, channelisation which is the dredging and straightening of rivers, land drainage, or hard infrastructure such as dams, weirs, barriers, locks, embankments, culverts, piers, ports and sea walls. A variety of issues cause hydromorphological modification to be a significant pressure (Table 2).

Status of water bodies impacted by hydromorphological modification

Half of water bodies impacted by hydromorphological modification are at Moderate status (Figure 2) and may not be too far away from the Good status target, but it is difficult to know at present what measures to take as the relationships between hydromorphology and ecological status are not clear cut. Further work is needed to achieve a greater understanding of the impacts from hydromorphological modification. It is anticipated that as our knowledge and understanding of hydromorphological pressures improves, the extent of the impacts identified across the country will change.





Ecological Status of 43 WB's *At Risk* from Hydromorphological Change with an Environmental



Figure 2: WFD Status (2010-15) of At Risk water bodies with hydromorphological modification as a significant pressure.

Improving hydromorphological assessment methods and tools

The EPA is currently developing the evidence base to identify the physical conditions necessary to support ecological status. This evidence base will facilitate the design of improved mitigation measures. A number of new assessment tools are also under development, as noted by the River Basin Management Plan 2018-2021.

The Morphological Quality Index (MQI), an Italian fluvial geomorphological assessment, was recommended as a best

practice method by the EU funded FP7 REFORM project (www.reformrivers.eu) and is being adapted for use in Irish conditions. The assessment considers multiple scales, and assesses a river's morphological condition and processes, and its response to physical pressures, allowing for the identification of significant pressures.

The MQI assessment has been trialled in the Suir catchment and is being rolled out nationally during 2018 and 2019. The output of this assessment will provide both an understanding of the hydromorphological condition of our river water bodies, the identification of significant hydromorphological pressures and support the identification of measures.

The EPA has also enhanced the use of GIS for assessing the hydromorphology of lakes, transitional waters and coastal waters bodies, with the output contributing to our understanding of hydromorphology and supporting the identification of both significant hydromorphological pressures and measures.

Inland Fisheries Ireland (IFI) are identifying the location and extent of barriers (e.g. dams and weirs) along rivers which may be impacting on a range of migratory species. Barrier assessment tools are being developed, and a national barrier inventory is being created with barriers ranked according to the risk they pose to fish migration.

OPW and IFI have developed best practice guidance for the maintenance of channels within arterial drainage schemes to minimise the impact on water quality.

The Department of Housing Planning and Local Government is developing best practice technical planning guidance for managing physical modifications in rivers.

Find out more:

You can view the individual water bodies where hydromorphology is a significant pressure on www.catchments.ie/maps

For planning and policy, including measures, see www.bit.ly/rbmp20182021

Hydromorphological pressure	Example of impacts
Channelisation (e.g. widening, deepening, straightening, removal of in-channel obstructions (i.e. trees), removal of in-channel and riparian vegetation)	 Modification of the river bed, bank and riparian area. Modification of the stream network. Alteration of the natural flow and sediment regime. Increasing the level of fine sediment (silt/clay) entering a river. Degradation of physical habitat. Disconnection to the floodplain.
Bank protection (e.g. walls, gabions, rip rap)	Impede the lateral movement (i.e. erosion) of a river.
Flood protection (e.g. walls, embankments)	Impede the lateral movement (i.e. erosion) of the river.Disconnection to the floodplain.
Dams, barriers, locks and weirs	Impede the movement of water, sediment and aquatic species (notably fish).Alteration of the natural flow and sediment regime.
Culverts	• Impede the movement of water, sediment and aquatic species (notably fish) along the river.
Land drainage	• Alteration of the natural flow and sediment regime due to the increase in connectivity of drains to the river network.

Table 2: Hydromorphological pressures affecting rivers and examples of associated impacts

Significant Pressures: Peat

Peat extraction for commercial or domestic purposes, and modification or drainage of peatlands for other uses such as forestry or agriculture, has been identified as a significant pressure in 119 (8%) water bodies that are At Risk of not meeting their water quality objectives (Table 1, Figure 1). This is the sixth most prevalent significant pressure type in river water bodies.

Table 1: Number of At Risk water bodies with peat as a significant pressure

Waterbody (WB)	Num- ber of WBs	Num- ber of <i>At Risk</i> WBS	Number of Wbs with peat as a sig- nificant pres- sure	% of WBs with peat as a significant pressure	% of At Risk WBs with peat as a significant pressure
River	3192	1178	115	3.6%	9.8%
Lake	818	132	3	0.4%	2.3%
Transitional	195	56	0	0%	0%
Coastal	111	13	0	0%	0%
Groundwater	513	73	1	0.2%	1.4%
	4829	1452	119	2.5%	8.2%



Figure 1: Surface water bodies where peat is a significant pressure either alone or in combination with other pressures.

Impacts on water quality and habitat from Peat

The main impacts on water quality and river habitat arising from peat extraction and drainage include the release of ammonium and fine-grained suspended sediments, and physical alteration of aquatic habitats.

There is evidence from targeted water quality monitoring data that ammonium concentrations downstream of modified peatlands can be very high, and can exceed the environmental quality standard of 0.065 mg/l that is required to support Good Ecological Status. The mean ammonium concentration over the last cycle (2010-2015) in water bodies impacted by peat was 0.08 mg/l. We also know from the biological monitoring programme that there is excess suspended sediment in some places, which can build up on stream beds and clog stream gravels, impacting on fish spawning and invertebrate habitats.

Water bodies that are impacted by peatlands are most commonly at Moderate status for those waterbodies with an Environmental Objective of "Good" status and at Good status for those sites with an Environmental Objective of High status (Figure 2), however, the majority of 'At Risk' Waterbodies with Peat as a significant pressure have additional pressures associated with them.



Ecological Status of 103 WB's At Risk from Peat with an Environmental Objective of Good

Ecological Status of 16 WB's *At Risk* from Peat with an Environmental Objective of High



Figure 2: WFD Status (2010-15) of At Risk water bodies with peat as a significant pressure.



How do the problems arise?

The most likely situations for generation of suspended sediment from peat are:

- Mechanised peat extraction where milling, drying and harrowing, and peat harvesting creates loose peat particles which can be washed and blown into streams;
- Installation of drainage channels in peat which results in flow pathways for sediment reaching water bodies; and,
- Erosion following heavy rainfall.

The ammonium arises from lowering the water table in the peat when it is drained, which breaks down the peat and releases ammonium. Further research is required to precisely understand this process, and the combined impacts of ammonium, pH and dissolved organic carbon on the aquatic environment.

Drainage of peatlands also results in changes to the hydromorphological condition of rivers, for example, modification of the channel bed and riparian area, river channel diversions altering the river network, increasing the connectivity of land drains to the river network, and altering the flow and sediment regime.

Possible Solutions

The mitigation actions for impacts from peatlands include the use of settling ponds to prevent sediment reaching stream channels, and blocking drainage channels and rewetting to prevent losses of ammonium and sediment, and improve hydromorphological condition. These actions also have multiple benefits for biodiversity, climate change and natural flood water retention.

Regulation of extraction

Large-scale peat-extractive industries from areas above 50 hectares are required to hold an Integrated Pollution Control (IPC) licence from the EPA for their activities. Bord na Móna currently owns or controls 7% of the peatlands of Ireland and is the largest



Figure 3: Average annual total ammonia concentrations in rivers from 2007 to 2017 for all WFD monitored rivers with agriculture as a significant pressure (left) and all WFD monitored rivers that are Not At Risk (right). peat extraction operator. Environmental Impact Assessment (EIA) and Appropriate Assessment under the Habitats Directive will be mandatory in the consideration of licence applications.

Next Steps

The Catchment Assessment Team will undertake Local Catchment Assessments in the Areas for Action to identify precisely which activities in peat are impacting water quality. They will work together with the operators of peatlands to implement appropriate mitigation actions. They will be guided by The National Peatlands Strategy which states as a principal that "Policies and decisions relating to the use of peatlands shall take full consideration of potential impacts on water quality and the attainment by the State of mandatory water quality standards".

In addition, Bord na Móna have a Sustainability 2030 Strategy which addresses the long-term rehabilitation of its cutaway bogs. Many bogs will cease peat production for energy generation under these plans and will become available for rehabilitation. Bord na Móna expects to rehabilitate 9,000 hectares of cutaway bogs across 25 peatlands by 2021 and will look to implement best available measures to further reduce water quality impacts. These measures are expected to improve water quality over time in 12 associated water bodies.

There is on-going research into peatlands including 'The Living Bog' EU Life Project (2016-2020) which is focused on restoration and conservation of twelve raised bog SACs. The 2018 EPA Research Call also included a topic on evaluating mitigation strategies for improving water quality from drained peatlands.

Find out more:

You can view the individual water bodies where peat is a significant pressure on www.catchments.ie/maps

For planning and policy, including measures, see www.bit.ly/rbmp20182021



Peat extraction using a railway for transport.

Issue 9: Winter 2018

SIGNIFICANT PRESSURES

Significant Pressures: Forestry

Forestry has been identified as the fourth most prevalent significant pressure, impacting 238 waterbodies or 16% of the 1,460 At Risk water bodies (Table 1).

Forestry is a significant pressure in 51 (40%) of the 127 At Risk water bodies with a high ecological status objective.

Table 1: Number of At Risk water bodies with forestry as a significant pressure (SP-For)

Waterbody (WB)	Number of WBs	Number of At Risk WBs	Number of WBs with forestry as a significant pressure	% of WBs with for- estry as a significant pressure	% of <i>At Risk</i> WBs with forestry as a significant pressure
River	3192	1178	215	6.7%	18.3%
Lake	818	132	18	2.2%	13.6%
Transitional	195	56	0	0%	0%
Coastal	111	13	0	0%	0%
Groundwater	513	73	0	1.0%	6.8%
	4829	1452	238	4.9%	16.4%

At Risk Water Bodies where Forestry is a Significant Pressure



Water quality problems in water bodies impacted by forestry

Over 20% of these water bodies have a High Status Environmental Objective and most are only one category away from their target of Good (61%) or High status (90%) (Figure 2). Over 60% of these water bodies have one or more other significant pressures in addition to forestry.





Ecological Status of 51 WB's At Risk from Forestry with an Environmental Objective of High



Figure 2: WFD Status (2010-15) of At Risk water bodies with forestry as a significant pressure.

The most common water quality problems arising from forestry relate to the release of sediment and nutrients to the aquatic environment, and impacts from acidification. Forestry may also give rise to modified stream flow regimes caused by associated land drainage.

Sediment Sources and losses

Biological monitoring data indicates that excess fine sediment is an issue in some water bodies. Fine sediment fills the spaces between larger gravels in the stream bed and can interfere with aquatic ecosystem functions, particularly in the more sensitive high status waters where forestry has been identified as a significant pressure in 40% of At Risk water bodies. Juvenile individuals of the critically endangered Freshwater Pearl Mussel are particularly sensitive to fine sediment, and inappropriately planned and managed forestry activities can act as a source within relevant catchments. Sediment is also often the transport mechanism for chemicals and nutrients that are attached to the sediment particles.

Typical sources of sediment from forestry activities include thinning and clear-felling, pathways created by machine rutting on clear-fell sites, site preparation for afforestation, road construction associated

Figure 1: Surface water bodies where forestry is a significant pressure, either alone or in combination with other pressures.



with forestry activities, and inappropriate forest drainage.

Nutrient sources and losses

Nutrient losses give rise to eutrophication in our water bodies. The key nutrients causing impact from forestry are phosphorus and ammonium. Too much phosphorus loss is typically the issue for rivers and lakes. Phosphorus losses from forestry can arise from the decomposition of brash left on former conifer clear-fell sites on peat (including brash mats created to protect soil from machine passage during harvesting and extraction), fertilisation application during forest establishment (if applied), and inappropriately managed aerial fertilisation, an operation that requires licensing under the Forestry Regulations 2017.

Ammonium losses can occur where peatlands have been planted. Both drainage and tree roots result in lowering the water table in peatlands. The lowering of the water table allows the peat to break down, causing the release of ammonium. Further research is required to precisely understand this process, and the combined impacts of ammonium, pH and dissolved organic carbon on the aquatic environment. Nutrient enrichment caused by the breakdown of deadwood on peat can also impact water bodies. The recently introduced Land Types for Afforestation procedure removes many peat sites from afforestation.

Pesticides Sources and losses

Herbicides have a significant impact on aquatic ecology and a small amount can cause a disproportionate amount of damage. Herbicides are used in some afforested sites to manage vegetation competition. They can impact water bodies as run-off if they are applied inappropriately.

Physical Alteration of habitat

Physical alteration of habitat refers to the physical modification, or damage to habitat, and the alteration of a water bodies' natural functioning. In terms of forestry, physical alteration is caused mainly by the associated land drainage that can give rise to modified stream flow regimes.

Acidification Sources and Losses

Many of Ireland's older forests are located on upland and peatland areas where the soils are naturally acidic. Conifer species dominate these forests as they are best adapted to exposed sites and acid soils. However, these conifer plantations can increase site acidity by capturing and concentrating airborne pollutants, which are subsequently washed into surface waters.

These acid sensitive areas are in Clare, Galway, Donegal, Kerry, Offaly, Sligo and Wicklow. Water bodies in these areas are more likely to be impacted by acidification, which in turn impacts the aquatic ecology.

Possible Solutions

The mitigation actions will vary depending on the issue.

For sediment, mitigation actions include increased water setback widths, the creation of native woodland buffers, the installation of silt fences and silt traps, and the slow-water damming of drains.

These actions can also be beneficial in mitigation of impacts from

nutrients. Other ways to manage nutrient run-off include site-specific evaluation of fertiliser needs followed by careful application, and brash management on clear-felled sites over peat.

Mitigations of the impacts of herbicide include water setback widths and careful application that considers the weather conditions, along with preparation, storage and disposal of pesticide containers. In highly sensitive sites or part of sites, non-herbicide methods such as mats and mulches could be utilised instead.

For physical alterations of habitat, the EPA is currently developing the evidence base to identify the physical conditions necessary to support good and high ecological status. This evidence base will facilitate the design of improved mitigation measures.

Under the long-established DAFM/EPA Acid Sensitivity Protocol, applications for afforestation licensing on sites located within the designated acid sensitive areas require water samplingwith the level of calcium carbonate dictating whether afforestation can proceed from the perspective of surface water acidification. With the agreement of the EPA, applications for Native Woodland Establishment can be processed by DAFM without the need for water sampling since February 2013, in recognition of the wider range of water-related ecosystem services such woodlands deliver.

The Next Steps

Forestry and Water: Achieving the Objectives and Priorities under Ireland's River Basin Management Plan 2018-2021 sets out various forests and water measures the DAFM is utilising to protect and enhance water quality. These range from recent legislation, a revised felling and reforestation policy, the Land Types for Afforestation procedure and the Environmental Requirements for Afforestation.

Support measures include the promotion of agroforestry and 'neighbourwoods' and the application of the Native Woodland Scheme with Woodlands of Ireland and other partners. This scheme includes funding for the creation of new native woodlands and for native woodland conservation, including conversion from conifer forests to native woodland in key water-sensitive areas. Forests & Water also sets out a series of mobilisation mechanisms to make the most of these measures, such as coordination with WFD partners, changes to its application system, and a protocol for handling acute forestry and water incidents.

Most recently, the DAFM released its Woodland Environmental Fund, which is aimed at channelling corporate sponsorship to landowners who engage in native woodland creation to maximise various ecosystem services, including the protection and enhancement of water quality. The Department is also currently preparing the Plan for Forests & Freshwater Pearl Mussel in Ireland, following recent public consultation.

Find out more:

For planning and policy, including measures, see www.bit.ly/rbmp20182021

See DAFM's 'Forests & Water' and 'draft Plan for Forests and Freshwater Pearl Mussel in Ireland', available at www.bit.ly/forestsandwater

You can view the individual water bodies where forestry is a significant pressure on www.catchments.ie/maps

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SIGNIFICANT PRESSURES

Significant Pressures: Urban Waste Water

Urban Waste Water Treatment Plants and agglomeration networks (UWW) have been identified as a significant pressure in 20 % (291) of all water bodies that have been determined as being At Risk of not achieving their WFD objectives.

Of these 291 water bodies, 250 are rivers, 15 are lakes, 23 are transitional waters and three are coastal waters (Table 1).

Six of these water bodies have High Environmental Status (HES) objectives. One of these water bodies, Island_030 in Galway is impacted only by UWW while the remaining HES water bodies are impacted by multiple pressures (Figure 1).

Water quality problems in water bodies impacted by Urban Waste Water

Direct discharge of nutrients from urban waste water treatment plants and discharge from combined storm overflows (CSOs) or storm water overflows (SWOs) are the most common water quality problems associated with urban waste water. Emissions of elevated concentrations of phosphorus and ammonia from UWW impact rivers and lakes while emissions of nitrogen and phosphorus impacts transitional and coastal waters while elevated concentrations of microbes impact bathing and shellfish waters.

Table 1. Number of At Risk water bodieswith Urban Waste Water (UWW) as asignificant pressure

Waterbody (WB)	Number of WBs	Number of <i>At</i> <i>Risk</i> WBs	Number of WBs with UWW as a significant pressure	% of WBs with UWW as a significant pressure	% of At Risk WBs with UWW as a significant pressure
River	3192	1178	250	7.8%	21.2%
Lake	818	132	15	1.8%	11.4%
Transitional	195	56	23	11.8%	41.1%
Coastal	111	13	3	2.7%	23.1%
Groundwater	513	73	0	0%	0%
	4829	1452	291	6%	20%





Figure 1. WFD Status (2010-15) of At Risk water bodies with urban waste water as a significant pressure.



Figure 2. Surface water bodies where urban waste water is a significant pressure either alone or in combination with other pressures.



Possible Solutions and the Next Steps

The River Basin Management Plan (RBMP) outlines the actions that will address the release of nutrients from urban waste water in the 2^{nd} RBMP Cycle. These actions include a ≤ 1.7 billion investment by Irish Water in waste water projects, programmes and asset maintenance including ≤ 12 million for expenditure on smaller plants which have been identified as significant pressures. In addition, drainage areas plans will be completed for 44 urban areas by 2021. Although this will not directly translate to water quality improvements by 2021, it will help prioritise areas where leaking sewers and misconnections are an issue and where effort should be targeted next.

Find out more:

You can view the individual water bodies where urban waste water is a significant pressure on www.catchments.ie/maps

You can view a map of sewage treatment locations in Ireland on gis.epa.ie/EPAMaps/SewageTreatment

For planning and policy, including measures, see www.bit.ly/rbmp20182021

Significant Pressures: Invasive Species

Invasive species are a significant pressure impacting 42 or 1.8% of the 1,460 At Risk water bodies. This total of 42 is made up of 7 river and 35 lake water bodies.

Invasive species are non-native species introduced outside their natural range that threaten ecosystems, habitats and native species with environmental or socio-economic harm. Currently 37 species have been identified across the EU as a high priority for management, and nine of these occur in Ireland.

The river basin public consultations on significant watermanagement issues in 2015 identified Invasive Aquatic Species (IAS) as a significant issue for water management. For example, two species that pose a threat to aquatic ecosystems when present in riparian zones — Japanese knotweed and Himalayan balsam — have been recorded throughout a significant proportion of the countryside by the National Biodiversity Data Centre.

The impact of invasive species was not assessed in detail because the available information is limited. However, information on their presence at EPA biological monitoring sites and data from the local authorities and IFI were used. EPA monitoring and local knowledge from local authorities and IFI has confirmed the widespread presence of IAS nationally.

The potential impacts of IAS include the alteration of eco-systems

(by causing bank erosion, for example), inhibition of access to water bodies, hindrance of land development and, in some cases, potential human health impacts.

Measures for dealing with IAS will include monitoring, surveillance, early-warning protocols, rapid response, control and bio-security. The Department of Culture, Heritage and the Gaeltacht, and the Heritage Council funds the National Biodiversity Data Centre so it can collate and disseminate surveillance information, including early warnings on the risks and/or discovery of IAS.

There will be a critical role to play in IAS data gathering and management for the new Local Authority Water Catchment Assessment Teams. Local Catchment Assessment guidance developed by the EPA includes the identification of aquatic IAS among the principal components of the assessment methodology and these Assessments will be key datasets in building a national picture of the presence of IAS.

To manage invasive alien species, a catchment-based approach is essential – these species need to be removed in the upper reaches of a catchment first, followed by work downstream so they cannot re-propagate themselves by using the water for transport. IFI, the NBDC, and the NPWS are beginning to work with communities and stakeholder groups, especially through LAWCO, to help build capacity and skills for IAS control and management. The availability of trained and committed community and stakeholder groups can provide valuable resources (e.g. citizen science, volunteers, IAS champions in clubs) to supplement public bodies' efforts in the areas of IAS monitoring, surveillance, early-warning systems, rapid response, control and bio-security.

Table 1. Number of At Risk water bodies with invasive alien species (IAS) as a significant pressure

Waterbody (WB)	Number of WBs	Number of At Risk WBs	Number of WBs with IAS as a significant pressure	% of WBs with IAS as a significant pressure	% of <i>At</i> <i>Risk</i> WBs with IAS as a significant pressure
River	3192	1178	7	0.2%	0.6%
Lake	818	132	35	4.3%	26.5%
Transitional	195	56	0	0%	0%
Coastal	111	13	0	0%	0%
Groundwater	513	73	0	0%	0%
	4829	1452	42	0.9%	2.9%

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SIGNIFICANT PRESSURES



Species with an Environmental Objective of High



Figure 1. WFD Status (2010-15) of At Risk water bodies with Invasive Species as a significant pressure.

Find out more:

You can view the individual water bodies where invasive species are a significant pressure on www.catchments.ie/maps

For planning and policy, including measures, see www.bit.ly/rbmp20182021

For information and data about biodiversity, including invasive species, see the National Biodiversity Data Centre's website www.biodiversityireland.ie

Invasive Species Ireland is a collaborative partnership funded by the National Parks and Wildlife Service and the Northern Ireland Environment Agency - see www.invasivespeciesireland.com



Giant Hogweed, an invasive species (Photo Fran Igoe).



Figure 2. Water bodies where invasive species are a significant pressure either alone or in combination with other pressures.



Alan Moore and volunteers removing Himalayan balsam from the Suir Blueway, a project which organised in conjunction with the Waters and Communities Office.



RECENT PUBLICATIONS

Recent Publications

National Hydrometric Monitoring Programme 2018-2021

The EPA has recently published a new National Hydrometric Monitoring Programme for 2018-2021 to coordinate the collection and analysis of information on the levels and flows of water in rivers and lakes in Ireland.

The programme will consist of a total of 559 flow estimation and lake level monitoring stations which will capture the flows draining 69% of the land area in the state. There are 503 stations measuring river flow, and 56 measuring lake levels. The EPA and local authorities will operate 264 of these stations, with the remaining stations operated by the OPW, ESB and Waterways Ireland.



National Hydrometric Monitoring Programme 2018-2021



River flow and lake level stations

- EPA/LA
- ESB
- OPW

This monitoring programme is required:

- to provide a trusted dataset to inform licencing and enforcement decisions. Inaccurate flow estimation would result in either environmental damage or unnecessary over-regulation;
- to provide the evidence base for environmental flow (e-flow) and future abstraction impact assessment. This will require a baseline dataset that is representative of regional variations across the country;
- to underpin implementation of the Water Framework Directive in Ireland. Characterisation and status assessment work in terms of loading volumes and critical source areas cannot be

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RECENT PUBLICATIONS

completed without locally accurate flow estimates;

- to monitor the national and local impact of climate change on the temporal variation of flows and levels in Irish rivers and lakes. Historically, there was an implied understanding in our approach to water resource management that past flows and levels would could be used to predict future flows and levels. However, best current estimates indicate that there may be significant changes in the flow regime of rivers and lakes in coming years, particularly in the south of the country. A representative network accurately measuring such changes is an absolute necessity to identify and quantify such changes. Without this information, the impacts of such changes cannot be effectively managed and mitigated;
- to provide an adequate long-term dataset to support integrated flood and drought management. Climate models predict increases in both flooding and drought in Ireland. A comprehensive hydrometric network geared towards capturing both high and low river flow and lake levels is necessary to plan for and actively manage such events;
- to assess the environmental carrying capacity of urban areas and in catchments generally. County development and local area plans require water resource information so that these are built on a sound evidence base in terms of estimating the level of development that a region can support in terms of water supply and waste water disposal.

The programme has been prepared through a consultative approach with national stakeholders involved in the collection of such data including the local authorities (through the CCMA), the OPW, the ESB, Waterways Ireland, the Marine Institute, Inland Fisheries Ireland, Irish Water and the Northern Ireland Environment Agency. Other stakeholders who contributed to the formulation of the programme include Met Éireann, the Geological Survey of Ireland, and academics involved in hydrological research. The development of the programme included an international review of hydrometric operations in Scotland, Wales and New Zealand and incorporates learnings from these countries.



Surface water levels and flows, and groundwater levels are available on www.epa.ie/hydronet

This network will facilitate the collection of accurate, nationally representative data which will support an evidence-based and efficient approach to the management of our shared water

resources. The integrated nature of the programme is a good example of joined up public sector management and inter-agency collaboration. The programme will be synchronised with River Basin Management Plan cycles and will be reviewed in 6 year cycles from 2021 onward.

Learn More:

Read the National Hydrometric Programme 2018-2021 report: <u>http://www.epa.ie/pubs/reports/water/flows/</u> nationalhydrometricprogramme2018-2021/

Up-to-date flow and water level data can be accessed through www.epa.ie/hydronet

Water Quality in 2016 – an indicators report



The EPA published 'Water Quality in 2016' in June this year. The 16 indicators in the report provide information on the quality of Ireland's rivers, lakes, estuaries, beaches and groundwaters. These indicators will help identify the right actions for the protection and improvement of water quality in Ireland, and will help track progress with the implementation of the recent National River Basin Management Plan 2018-2021.

The indicators present the current state and trends in water quality for each water category. The report supplements the information provided in the EPA's Water Quality in Ireland reports, which are published every three years.

Some key points from the report include:

 an additional 1% of river water bodies (23 water bodies) falling below good status, as compared with the results in the last Water Quality in Ireland Report. This result indicates an increasing challenge in meeting the objectives of the recently published River Basin Management Plan;



RECENT PUBLICATIONS

- a slight increase in pristine river sites, up to 23 from the 21 sites reported in the last EPA Water Quality in Ireland Report. This increase, however, comes against a backdrop of a 10-fold decline in the number of these high quality sites from over 500 in the 1980s;
- continued eradication of serious pollution five seriously polluted river water bodies in 2014–2016 compared to 91 water bodies in the late 1980s;
- 31 fish kills were reported in 2016 compared with 23 in 2015. Longer term, there is a reducing trend in the number of fish kills.
- the presence of faecal contamination in over 40% of national groundwater monitoring sites. This result highlights the need for homeowners to check and if necessary treat their well water before consumption.

www.bit.ly/epaindicators2016

Agricultural Catchments Programme -Phase 2 Report

Better water quality and supporting the production of high-quality food are the twin aims of the Agricultural Catchments Programme. (ACP) Funded by the Department of Agriculture, Food and the Marine and run by Teagasc, for nearly ten years ACP staff have been working with 300 farmers across six catchments in Ireland. A multi-disciplinary team is evaluating both the environmental and economic effects of the Nitrates Directive, and developing sciencebased solutions for Ireland's water quality challenges.

The ACP's Phase 2 Report, which covers the period 2012-2015, was published at the start of 2018. Phase 3 of the ACP will run until the end of 2019.





Overarching conclusion

The overarching conclusion of the ACP's work to date is that the implementation of the Nitrates Regulations by Irish farmers has improved water protection against pollution caused by nitrogen (N) and phosphorus (P) from agricultural sources. Further improving nutrient management on Irish farms by supporting farmers' nutrient management decisions, is the single change that can do most to help farmers protect and improve water quality.



Challenges

Insofar as the ACP approach and key strengths have found evidence for improved water protection, the programme has also identified remaining challenges and also provided considerations for potential solutions.

Increasing farm output while meeting water quality targets poses substantial challenges for Irish farmers and the country in general. The ACP approach, which uses high-resolution economic and environmental data gathered over successive years, is well suited to play an important part in providing the evidence to support the drive towards both environmental and economic sustainability on Irish farms.

Acknowledgements

The ACP is built on a partnership with farmers and integrates research with advice to deliver excellent science. The trust that has been built between the ACP team and the farmers in the six catchments is the essential element of its success. We wish to thank the DAFM, the catchment farmers, colleagues in Teagasc and all who continue to support the programme.

Further information

This report seeks to clearly communicate the scientific findings from Phase 2 of the ACP and their policy implications. The report including an executive summary is available on our website www.teagasc.ie/agcatchments

Tom O'Connell, Teagasc Agricultural Catchments Programme Communications Officer

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