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Catchments Newsletter

Integrated Catchment Management: sharing science and stories

Catchments - water, heritage, community and connections

Inside this issue

MAIN PHOTO: DEVIL'S MATCHSTICK, A LICHEN THAT LIVES IN IRISH BOGS. PHOTO FROM 'TAPESTRY OF LIGHT - IRELAND'S BOGS AND WETLANDS AS NEVER SEEN BEFORE' BY TINA CLAFFEY. SEE PAGE 9.

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Editorial

"Water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such." **preamble to the Water Framework Directive**

When thinking about water and catchments, it's the connections that are important; connections between the sources of pollution, the pathways pollution takes, and the water that ends up as the receptor – but also connections between the people, places and natural environment within a catchment.

Most people are proud of their local heritage, and for some this can be castles, history books and old place names, for others it can be the wonderful wildlife and nature that is unique to their area. Understanding how rivers, lakes, landscapes and the people, plants and animals living around them are connected, is what Integrated Catchment Management is all about. It is also why we started the Catchments Newsletter - so we could share science and stories about water, and connections to it. To protect our water as a heritage, we need to understand its importance, both scientifically, and culturally, and to share stories about this understanding with others.

The Catchments Unit has been very busy over the last few years deepening our understanding of the physical processes and connections between the sources, pathways and receptors of pollution in our catchments. Doing this work has allowed us to identify possible 'Critical Source Areas', or hot spots for pollutants, and we're delighted that on page 4, you can read about plans for 30 new Agricultural Sustainability Advisors that will now bring this work forward to find solutions to the issues. These advisors will work within a partnership structure involving Teagasc, the Co-Ops, and the Waters and Communities Office to promote sustainable practices on farms across the country. Local authorities – with the technical support of the Environmental Protection Agency – will identify risk areas at local level, allowing the advisors to focus on areas where they can make the most difference to environmental outcomes.

In another wonderful example of community engagement across the country, in August this year The Heritage Council organised this year's National Heritage week around the theme of "It's in Your Nature". As part of this, they had a collaboration with the Local Authority Waters and Communities Office for Water Heritage Day which took place on August 27th, and was a great example of making connections and working with local communities involved with looking after their local waters. On page 5, Community Water Officer Karen Kennedy has a roundup from around the country of some of the great events that took place.

Two great books get a mention in this issue. You can read about 'Tapestry of Light – Ireland's bogs and wetlands as never seen before' on page 9, and on page 10, Jenni Roche, Coordinator of the Dublin Bay Biosphere writes about 'Dublin Bay – Nature and History'.

We also have stories about some other events that have taken place recently: EPA Climate Champion John Walsh, who bought his first electric car at 99 (page 11); Castleisland Community College who won the national Water Explorer competition (page 12); Delphi Lodge who together with the Moy Catchment Association had a children's fishing day (page 13); and volunteers in Clondalkin who cleaned up the River Carmac (page 13).

The National Water Forum / An Fóram Uisce Chair, Dr Tom Collins, has an article on page 14 with some of his thoughts on An Fóram, and the challenges facing Ireland. He also makes the point that a commitment to the common good is key – and includes a quote from ancient Greece that still resonates today:

"a state is something more than an investment; its purpose is not merely to provide a living but to make a life that is worthwhile" – Aristotle

After several months of public consultation, you can read about the collaborative approach to developing the next River Basin Management Plan in an article by Alan Walsh from the Waters and Communities Office on page 15.

On page 17, you can read about the role of a catchment scientist, and how their work can help local communities develop, and deliver, a vison of a better, healthier catchment for all.

Leading on from this, Mark Boyden describes some recent work done on The Nore Vision project (page 19), Hannah Hamilton has a great story about how Thomastown have developed their own Rivers Trust and made connections with all the key bodies looking after their river (page 21), and Greta McCarron has a piece on the development of a vision for Dundalk Bay that connects all the people living around it (page 22). We also have stories from the Dodder Defenders (page 24) and the new Cuan Beo Trust that is 'reconnecting the land and sea in Galway' (page 26).

Thomas Ryan from the IFA tells us about their Smart Farming initiative (page 28), Paddy Morris has an article on the new Farmland Pollinator Guidelines (page 30), and John Ballinger has a story form Duhallow's Raptor LIFE on battling invasive knotweed (page 31).

Finally, we have some science to finish this issue: you can read about the Shannon Estuary Bird Survey on page 32, how Mott McDonald's modelling of catchment management solutions has helped manage pesticides in a UK catchment on page 33, and how modelling work here in Ireland by Eva Mockler has indicated most nutrient losses to surface waters are from diffuse sources on page 35.

Collaborating, characterising and acting as catchment custodians

The next River Basin Management Plan will be published early next year. The last few years has seen immense work and progress by a huge range of bodies – the EPA, Departments of Housing and Agriculture, the new Waters and Community Office, all the local authorities and the more than 30 public bodies and agencies who attended our workshops during the characterisation process where collectively we tried to understand how our catchments work, and the connections within them.

It has been great to be able to get community feedback on the work being done, and it is a privilege to see the wonderful stories from all around the country about people who are stewards and custodians of their catchments, their communities, and our shared and wonderful natural heritage.

This Newsletter is telling stories from all around Ireland, and it will continue to do so – if you have a story, please do let us know. Seeing how much people care about their local catchment does make all the work that has been done feel so very worthwhile.

The connections made and collaborations of the last few years have laid a great foundation for the 2nd Cycle of the Water Framework Directive. Next year, the River Basin Management Plan will be published, and the next chapter of the story starts – working together to deliver better outcomes and improvements on the ground, based on the best available science.

By working together, we have done so much more than we could individually. It's up to us all to continue in this work so we can deliver on the ideal articulated by Aristotle – to make 'a life that is worthwhile' for all the communities of people, plants animals and fish that live in our wonderful catchments.

And finally, a word of thanks - to all of those who have submitted or shared a story, or helped us with data or ideas for how we could improve our science, and everyone who has worked so hard over the last few years – thank you. Special mention and thanks also goes to Donal Daly, founder of the Catchments Unit, who retired in September. Donal laid fantastic foundations for the work that is now ahead of us, and we hope he will continue to participate in other ways.

Jenny Deakin and Paddy Morris, EPA Catchments Unit

Minister Michael Creed T.D. and Minster Eoghan Murphy T.D. launch the 'Sustainability Support and Advisory Programme' to improve water quality

The Minister for Agriculture, Food and the Marine, Mr. Michael Creed T.D., and the Minister for Housing, Planning and Local Government, Mr. Eoghan Murphy T.D., together with Jim Woulfe, Chairperson of Dairy Industry Ireland, have launched an innovative collaboration between Government and industry to promote and encourage sustainable farming while meeting stringent water quality requirements.

The 'Sustainability Support and Advisory Programme' is a new approach to achieving improvement in water quality involving the establishment and joint funding of a resource of 30 Agricultural Sustainability Advisors.

Commenting at the launch, Minister Murphy and Minister Creed stated: "We are delighted to be launching the Sustainability Support and Advisory Programme today. This initiative is another demonstration of the Government's commitment to delivering on the environmental challenges we face. It will be a further step towards putting yet more substance behind our green credentials".

Welcoming the Programme, Minister Creed said "This Programme shows that the ongoing development of the agricultural sector, which is critically important to rural communities, and enhanced environmental outcomes can be achieved concurrently".

The Programme supports the goals of the Food Wise 2025 strategy, facilitating increased productivity hand-in-hand with a more sustainable sector. This sustainability and efficiency will be achieved through improved nutrient management with more targeted use of fertiliser, better farmyard practice, more widespread use of sustainability approaches developed by Teagasc and the development of new approaches in critical source areas.

Through a commitment from both Departments and support by industry, the 30 Advisors will work within a unified partnership structure which encompasses Teagasc, the Co-ops and LAWCO – the Local Authority Water and Communities Office.

The new Sustainability Advisors will proactively advise and work with farmers to protect and improve water quality. The Programme will draw on the experience and resources of key sectoral and industry stakeholders including the two Departments, the local authorities, the Dairy Co-ops, Teagasc, Bord Bia and the farm organisations.

Speaking about the cross-sectoral approach, Minister Murphy commented: "this is an example of all stakeholders – public and private – coming together with a unified approach, using their considerable expertise and resources to address the complex, cross-cutting challenge of protecting our water bodies on which we all depend"

According to Dairy Industry Ireland Chairperson, Jim Woulfe, "Ireland's grass-fed dairy production has an excellent reputation worldwide. Maintaining and strengthening that reputation in the years ahead is imperative, especially in light of post-quota dairy expansion and for the 18,000 dairy-farming families whose livelihoods depend on milk production – improved sustainability performance is key to this.'

Professor Gerry Boyle of Teagasc commented that "the objective of this new approach is to encourage and support behavioural change, facilitate knowledge transfer and achieve better on-farm environmental outcomes. These features are regarded as cornerstones of the drive towards better farming practices".

The Programme directly addresses these challenges and will be a key measure in the Department of Housing, Planning and Local Government's final River Basin Management Plan.

Under the Programme, the new team will promote on-farm sustainability best practice to all farmers. In addition, local authorities – with the technical support of the Environmental Protection Agency – will identify risk areas at local level. Teagasc and the Co-ops, working with the farm organisations at local level, will then provide advice and support to farmers in managing on-farm risks. The Co-ops will support sustainability best practice through their structures, promoting best farm practice and nutrient management processes across all their suppliers.

The Programme has the potential to strengthen delivery of Ireland's obligations under the Water Framework Directive. It is part of a new approach to River Basin Management Planning for the 2018 – 2021 cycle. This new approach includes the development of a much-strengthened evidence base to understand the full range of pressures affecting water quality and the development of the programmes of measures needed to deliver improvements. Over time, the Programme will also address on-farm climate change and biodiversity strategies.

The Programme will be jointly funded by both Departments, Teagasc, local authorities and the Dairy Co-ops on a trial basis for four years to 2021.

River Basin Management Planning:

River Basin Management Planning takes an integrated approach to the protection, improvement and sustainable management of the water environment. The Plans set out the framework for ensuring that Ireland's water environment is protected and improved, in line with the objectives of the Water Framework Directive.

Ireland's River Basin Management Plan for 2018-2021 will be published by Minister Eoghan Murphy in early 2018. The plan will identify the measures that Ireland will put in place to protect and improve water quality.

The most recent water quality report published by EPA in 2017 shows that only 57% of rivers, 46% of lakes, 31% of transitional and 79% of coastal waters are meeting the requirements of the Water Framework Directive. 91% of groundwater bodies meet the required water quality standards for groundwater.

The Water Framework Directive requires that all water bodies, with some exceptions, must be restored to good status by 2027 at the latest.

Overall, the quality of surface waters has remained relatively static since 2007 to 2009. Some have improved while others have dis-improved. However Ireland has not met the planned national target of a 13 per cent improvement in water quality anticipated in the first River Basin Management Plan for the period 2009 to 2015.

Many complex factors can affect water quality and measures across a range of sectors will be needed to deliver improvement in most cases. Therefore, the collaborative response by both Departments, local authorities, the Dairy Co-ops, Teagasc and Bord Bia is the most effective means to address our shared water quality challenge.

This press release was originally published on November 29th 2017 on MerrionStreet.ie – The Irish Government News Service.

Water Heritage Day: a celebration of water during National Heritage Week 2017

National Heritage Week is held over the last week of August each year and is coordinated by The Heritage Council. The aim is to raise awareness and provide education on our natural, built and cultural heritage, thereby encouraging its conservation and preservation. Many of the events that take place during Heritage Week are supported by national and community organisations and are free to attend.

This year's theme 'It's in Your Nature' encouraged us all to get outdoors and enjoy Ireland's natural heritage. 'Wild Child Day' on Wednesday 23rd August encouraged children to take part in a range of exciting activities like pond dipping, bug workshops and forest walks. Water Heritage Day took place on Sunday 27th August, and was a collaboration between the Local Authority Waters and Communities Office and the Heritage Council. Water Heritage Day provided an opportunity to focus on water heritage with activities and events held across the entire country that involved boating, fishing, walking, wildlife and much more. Community Water Officers in collaboration with Heritage Officers worked with local community groups to organise and support events to 'Celebrate Water'. These events provided an opportunity for young and old to explore and learn about their local water catchments – springs, holy wells, rivers, lakes and coasts. Communities right across Ireland have deep rooted associations with their local waters and there is so much to discover and explore as water journeys through the landscape from source to sea. Many of the beautiful places in Ireland are connected to our rivers, lakes and coasts, and these have provided enjoyment and inspiration for local communities and visitors through generations.

Some of the events supported by Community Water Officers included: nature walks along rivers, lakes and coastlines; river exploration safaris; river family fun days; heritage walks and talks along canals; catchment bus tours from source to sea; photography exhibitions; visits to community wetlands; farm biodiversity walks; boating trips and seafood festivals.

Water Heritage Day 2017 proved a very successful collaboration between Community Water Officers and Heritage Officers and the feedback from those who attended and participated in events has been very positive.

The EU Water Framework Directive states that 'water is a heritage which must be protected, defended and treated as such', and we hope to continue to celebrate water, and all its heritage, during National Heritage Week 2018.

Karen Kennedy, Local Authority Waters and Communities Office

www.heritageweek.ie

LOOPED GUIDED BIRD AND PHOTOGRAPHY WALK ALONG THE DODDER TALLAGHT, CO. DUBLIN

BROADMEADOW RIVER FAMILY FUN DAY, ASHBOURNE CO. MEATH

KICK SAMPLE, ASHBOURNE

ESKE CATCHMENT BUS TOUR

NEWS AND EVENTS

WELLS AND SPRINGS OF INISHOWEN

FARMING FOR NATURE MOUNTALLEN, IN CO. ROSCOMMON

CARRICK-ON-SHANNON WATER HERITAGE DAY

NEWS AND EVENTS

SLIGO TOWN - NATURE, WATER AND POETRY

NATURE WALK ALONG THE RIVER BARROW

LÚNASA FIONNUISCE AGUS FEITHIDÍ

NEWS AND EVENTS

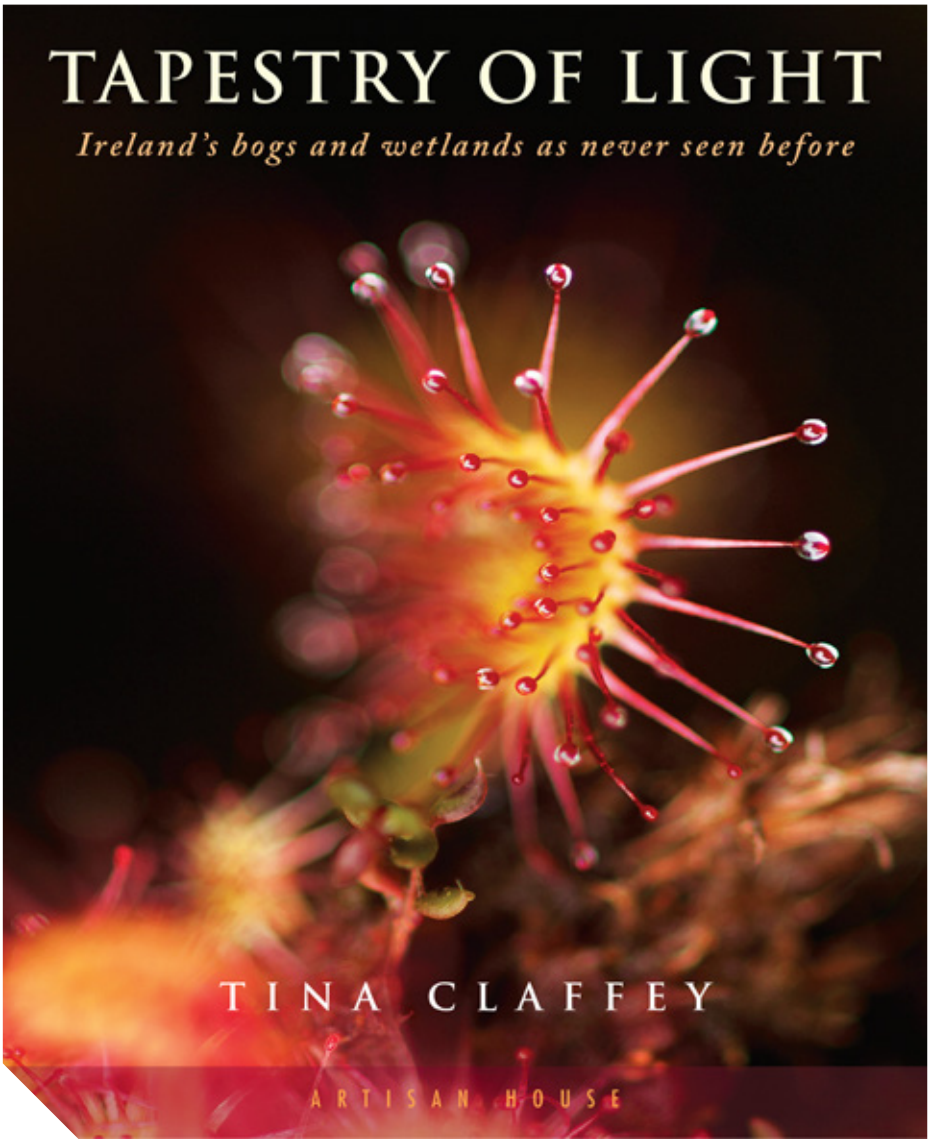
CUAN BEO FESTIVAL - RECONNECTING THE LAND AND SEA, KINVARA, CO. GALWAY - TASTE THE ATLANTIC - A SEAFOOD JOURNEY

SHANNON WETLANDS RESTORATION PROJECT

ALLIE RIVER LISDOONVARNA

MULKEAR RIVER ANNACOTTY

Tapestry of Light - Ireland's bogs and wetlands as never seen before



Tapestry of Light

Silver netting of the dawn,
Embroidered through the silent night,
Woven into dewy webs,
Suspended tapestry of light.
Cobwebs greet the morning air,
Strings of priceless jewels glistening,
Veiling gateway, bush and tree,
Lending wonder to our waking.
Nature's gift holds me enthralled,
Treasure of the dawning day,
Till the fairy breezes call,
tealing all my dreams away

© JOHN SHEAHAN

FOUR-SPOTTED CHASER - A DRAGONFLY FOUND ON IRELAND'S BOGS

Tapestry of Light – Ireland's bogs and wetlands as never seen before by Tina Claffey and published by Artisan House Connemara was launched on Thursday, 12th October, 2017 in Tailor's Hall, Dublin.

Tapestry of Light is a stunningly beautiful book containing Tina Claffey's unique perspective of the flora and fauna of the unspoilt raised bogs and wet woodlands of the Irish midlands. The habitat value of raised bogs arises from their rich diversity of flora such as bog-rosemary, cranberries, lichens and sundews, all of which thrive in the sphagnum mosses which also support a wide variety of fauna, including butterflies, moths, dragonflies, frogs and spiders.

The foreword to Tapestry of Light is by geologist, botanist and broadcaster, Dr John Feehan.
The title 'Tapestry of Light' is taken from the eponymous poem by John Sheahan. John's poetry is included in the book.

Tina's interest in her home area and in particular the bogs and wetlands, she attributes to the influence of her father, to whom the book is dedicated, and to time spent in Botswana photographing pristine wilderness. 'On my return to Ireland, I felt quite lost for some time but then I went on a field walk led by John Feehan in Killaun Bog. That walk was an epiphany for me. Here on my doorstep was a wilderness with as much significance as the Kalahari desert'.

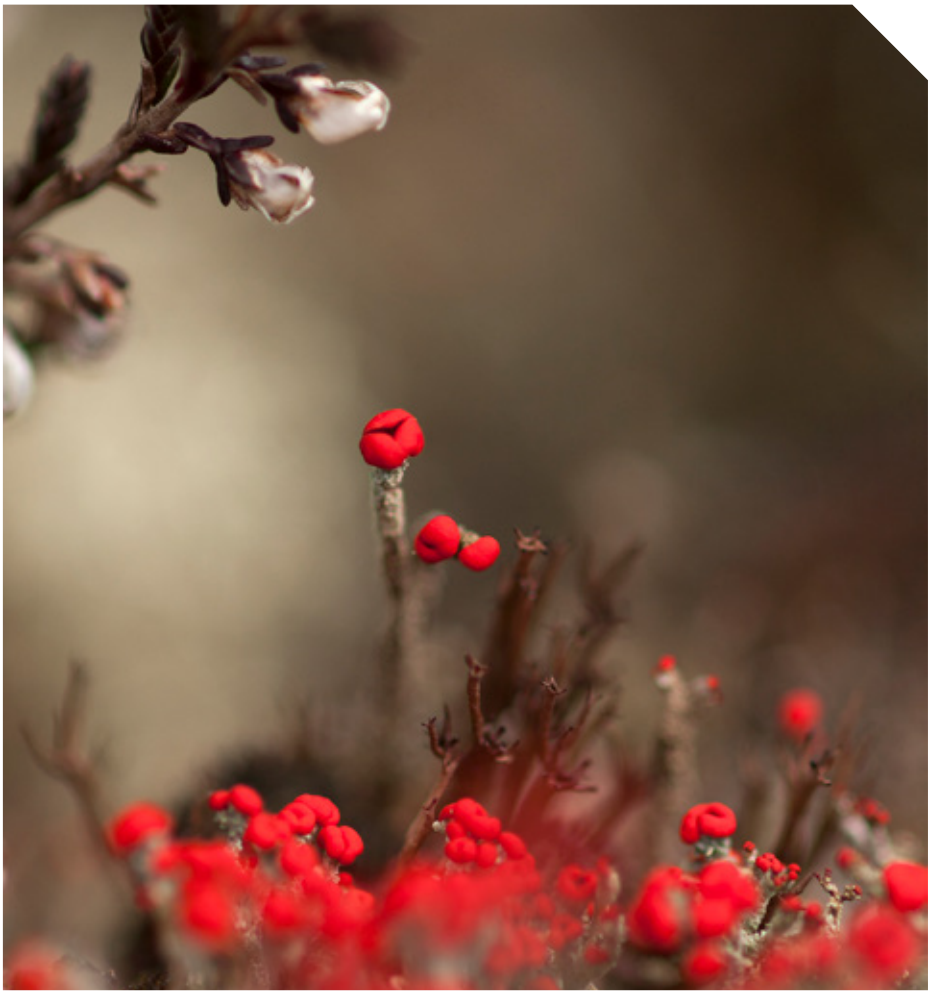
Matthijs Schouten, ecologist and founder of the Dutch Foundation for the Conservation of Irish Bogs, launched the book, saying 'Never before have I seen the magic of bogs captured so beautifully as in this book. The photographs and poems lead us into a truly enchanted world'.

Matthijs Schouten is Professor of restoration ecology at Wageningen University and also an adjunct professor at UCC, he became known as "the father of bog conservation in Ireland" and was knighted in 2004 by Queen Beatrix of the Netherlands for the prominent role he played in bringing the fate of Irish bogs to international attention. The foundation raised sufficient funds in the late 1980s to purchase three endangered sites – Scragh Bog, in Co Westmeath; Cummeragh River bog, in Co Kerry, and Clochar na gCon bog, in Co Galway – and gifted them to the Irish nation.

The book is available in two editions, a standard hardback edition and a special limited edition of 75 copies which contains gatefolds and an original print signed, dated and numbered by Tina Claffey which is suitable for framing.

www.tinaclaffey.com

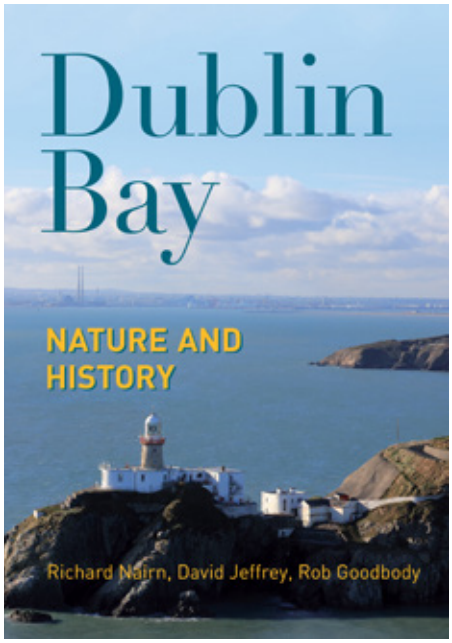
ALL PHOTOS © TINA CLAFFEY



DEVIL'S MATCHSTICK, A LICHEN THAT LIVES ON IRELAND'S BOGS. LIKE ALL LICHEN, DEVIL'S MATCHSTICK IS ACTUALLY TWO ORGANISMS WORKING TOGETHER: A FUNGUS AND AN ALGAE IN A SYMBIOTIC RELATIONSHIP.

Dublin Bay – Nature and History

On the fringe of Dublin's hive of human activity, a miraculous coastal ecosystem carries on as it has done since the last Ice Age. Beaches, saltmarshes, rocky shores, cliffs, islands and offshore sandbanks all support millions of tiny creatures and thousands of migratory birds from as far afield as Arctic Canada and tropical Africa. Nature is intimately linked with the people whose lives unfold around it, and over a million people have direct access to Dublin Bay. We need to understand how we are affecting its ecosystem, from the disturbance of birds to dredging of shipping channels and the longer-term implications of climate change.



A new book to aid in this understanding, Dublin Bay - Nature and History, was launched on November 2nd 2017, and was supported by both Dublin Port Company and Dublin Bay Biosphere Partnership. The purpose of UNESCO Biospheres is to inspire a positive future by connecting people and nature today. I'm delighted that Dublin Bay Biosphere Partnership can support this kind of work, which shares the authors' extensive knowledge and helps to strengthen the connection between people and nature in Dublin Bay. On a personal note, I was taught by one of the authors, Professor David Jeffrey. Some time ago now, when I was an undergraduate student at Trinity College, Professor Jeffrey brought my class to North Bull Island. That journey was my first experience of the fascinating ecology of Dublin Bay and helped to set me on the path to my present role.

David Jeffrey's research was crucial in the designation of the "first generation" UNESCO Biosphere Reserve at North Bull Island in 1981, which helped people to recognise the amazing diversity of nature that makes North Bull Island its home. In 2015, the UNESCO Biosphere designation was extended to the whole of Dublin Bay.

Richard Nairn has a comprehensive knowledge of ecology, nature conservation and environmental management in Ireland and has swum, fished, sailed and walked throughout Dublin Bay. Richard and David are perfectly complemented by Rob Goodbody, a geographer and planner with an excellent knowledge of the built and cultural heritage of Dublin Bay. It is all three authors' understanding of the connections between these different strands of history that make this book special. Through their scholarship and multidisciplinary approach, this book tells the story of Dublin Bay in an engaging, accessible and visually beautiful way.

The development of the port city has been mirrored by major changes in the coastal environment. You can learn how the creation of Dublin Port caused the formation of Bull Island, or how the cockles and mussels immortalised in 'Molly Malone' caused typhoid fever throughout the city. The human and natural components of the bay have learned to coexist and, in some cases, even to depend on each other. The bay has stretched its arms widely to embrace countless generations of Dubliners: it is a life support system, an economic asset and an invaluable recreational resource. This new look at a familiar seascape authoritatively explains its importance to the past, present and future of our city and country. I have no doubt that this book will be an invaluable resource for any reader who wishes to know this place more intimately, from students and researchers, to members of the local communities who use the Bay.

About Dublin Bay Biosphere

Dublin Bay Biosphere is part of a worldwide network of 672 UNESCO Biospheres. Biospheres represent a unique tool for international co-operation through sharing knowledge, exchanging experiences, building capacity and promoting best practices. All Biospheres have three aims:

- To conserve biodiversity and cultural diversity
- To foster sustainable development
- To generate knowledge, which underpins the other two aims.

Dublin Bay - Nature and History is a superb example of the third aim of UNESCO Biospheres – to generate knowledge in order to support conservation and sustainable development.

Jenni Roche, Coordinator, Dublin Bay Biosphere Partnership

www.dublinbaybiosphere.ie

John Walsh, Climate Champion

In August 2017, Dorothy Stewart and Micheál Ó Cinnéide from the EPA had the privilege of visiting John Walsh at his home in Mountain Road, overlooking Clonmel, County Tipperary. He welcomed us warmly and we had a marvellous chat about his family history, his decades of work with Bulmers in Clonmel, and his cycling trip to Lourdes.

At the age of 99, John decided he needed a car, but he was concerned about the environment, so he bought a Nissan Leaf. He was shown driving his electric vehicle on the recent RTE programme 'Too Old To Drive'. As John told us:

"I was not entirely happy doing the programme, as I realised it would show me as car dependent. In fact, a bike was my primary mode of local transport until I reached 99. Since then, I do need the car for social contact and to get to where I can safely walk. The walking is the only serious problem, as the footpath on the busy Mountain Road was merged with the carriageway".

It was clear that John has a great sense of energy and charisma. He embraces life and is open to change. When we asked him if he would like to be named as a Climate Champion for the EPA, he smiled and said he would be delighted, so long as there aren't too many speeches involved!

John's life-long commitment to being active and to looking after the environment is an inspiration and at almost 102 years old is testament to the health and well-being benefits that accrue from active engagement with green and blue spaces.

Working together with An Taisce and other agencies, we can encourage more Climate Champions like John in towns and villages throughout Ireland.

Micheál Ó Cinnéide, Director, EPA

www.climateambassador.ie
www.coolplanetexperience.org

CLIMATE AMBASSADOR

MICHEÁL Ó CINNÉIDE, JOHN WALSH AND DOROTHY STEWART

Castleisland Community College represent Ireland

THE WINNING STUDENTS FROM CASTLEISLAND COMMUNITY COLLEGE RECEIVE THEIR WATER EXPLORER AWARD

Transition year students of Castleisland Community College won the national Water Explorer competition in Dublin. The award honours the pupils for their outstanding efforts in acting to protect and conserve our fresh water and for excelling in awareness raising and community outreach. Environmentalist Duncan Stewart was one of three judges assessing the students during their presentation. It was followed by questions and answers where the student's initiative and presentation style was judged.

STUDENTS EXPLORING THE RIVER MAINE

Throughout the course of the year the students completed 26 challenges relating to water such as making water pumps, a clean-up of the River Maine, testing the water quality of the River Maine, learning about the connection of climate change with water scarcity in the developing world, and presenting workshops to junior classes and the local primary school. The students also learnt practical ways of saving water both at home and in school, which may come in handy if water charges are introduced! They examined the area of secret water and learnt how much water it takes to produce various items - for example, a cup of tea takes 140 litres and a t-shirt takes 2,500 litres when you take account of all the water used in all aspects of production. The programme is cross-curricular and involves all subject areas. It is a balance of project based learning, practical challenges, competition and fun. The students have developed the skills of teamwork, public speaking, Information Technology and report writing.

Their success did not end there as they also represented Ireland in an International Showcase in London, on October 18th 2017. HSBC bank, who fund the competition, invited the students on an all-expenses paid trip to Dublin. The national winners from all the various countries that participated teleconferenced from the HSBC bank in their own country with the bank headquarters in London. The achievements of each individual country were mentioned, highlighting to students the difference they have made.

Doreen Killington, Castleisland Community College

www.waterexplorer.org

Delphi Lodge hosts children's fishing day

Delphi Lodge, a historic fishing lodge in County Mayo, held its now annual end of season staff and children's day on Saturday 30th of September.

Local children as well as a group of children from the Mayo area enjoyed a wonderful days fishing in this fabulous fishery and many of them had an experience they'll never forget while managing to land their first salmon.

Michael Wade and his staff then hosted a wonderful outdoor lunch in front of the lodge where everyone got to recall their fishing experiences that morning. To round off the day, David McEvoy who manages the fishery and estate then demonstrated to the visiting children how the salmon are tagged, recorded and gave a brief demonstration on the lifecycle of salmon and the science used in recording their journey to sea and eventual return.

The Moy River Trust would like to thank Delphi Lodge for their support of our Children's angling initiative.

AN ANGLER AT DELPHI LODGE CATCHES A SALMON

River Camac Community Clean-up

On October 7th, 2017, a large community clean-up was held along the River Camac in Clondalkin to promote awareness of the biodiversity, heritage and amenity value of the River Camac. Members of Clondalkin Tidy Towns, Friends of the Camac and the Waters and Communities Office were joined for the clean-up along the banks of river and surrounding park areas by volunteers from Clondalkin Localise, Church of the Latter-day Saints, Integrated Volunteering Skills and Training Agency (IVOSTA), Clondalkin Scouts and local schools. Invaluable assistance was also provided on the day by Dublin Civil Defence.

THE RIVER CAMAC PHOTO: © TOMMY KEOGH

Unfortunately, as it is often the case in urban areas, the Camac River is subject to littering, dumping and graffiti and this initiative hopes to reduce and eliminate the ongoing incidents of fly-tipping and dumping along the river corridor by promoting the amenity value of the river in the hope of further enhancing the spirit of stewardship of the river by the local community. A special thank you goes to the Clondalkin Leisure Centre & the Roma Cafe for providing hospitality to all the volunteers after the clean-up.

An educational day will also follow to further develop the sense of responsibility amongst locals to protect and develop their river. Funding for this project is through the Anti-Dumping and Anti-Graffiti Initiative Second Phase, from the Department of Communications, Climate Action and Environment. This project was also supported by South Dublin County Council.

Sinead Hurson, Community Water Officer, Local Authority Waters and Communities Office

VOLUNTEERS HELP CLEAN THE CARMAC. ALL PHOTOS © TOMMY KEOGH

The National Water Forum / An Fóram Uisce – working for the common good

If a country's waters are the prism through which a society's relationship with its environment can be assessed, then Ireland has a case to answer. An Fóram Uisce, established earlier this year, in its submission on the Draft River Basin Management Plan, noted with concern 'the continued and long term deterioration of the country's water bodies' and that 'this deterioration occurred despite an on-going significant investment programme aimed at improving the overall quality.'

According to the Draft Plan, about 50% of the at risk water bodies are impacted by agriculture; 10% are impacted by afforestation, and 10% by peat extraction. The majority of water bodies are therefore impacted by direct land use activities.

So, could it be argued that the Irish water quality problem is essentially a land use issue?

If so, we need to be looking at land use as the primary issue, with deteriorating water quality being merely symptomatic of deeper systemic issues – which of themselves may pose an even bigger challenge than water protection.

In 2014, researchers in Sheffield University warned that UK soils had 'only 100 harvests left in them.' Echoing this warning, Michael Gove, the UK environment secretary, in a speech delivered in October 2017, stated that the UK is 30 to 40 years away from the 'fundamental eradication of soil fertility' in parts of the country. At the parliamentary launch of the Sustainable Soils Alliance (SSA) he stated that:

'Countries can withstand coups d'état, wars and conflict but no country can withstand the loss of its soil fertility. If you have heavy machines churning the soil and impacting it, if you drench it in chemicals that improve yields but in the long term undercut the future fertility of the soil, you can increase yields year on year but ultimately you really are cutting the ground away from beneath your own feet. Farmers know that.' (The Guardian, 25th October, 2017)

As Ireland's biggest indigenous industry, a thriving and secure agriculture and food sector are pivotal to the well-being of the country as a whole. It is imperative that the economic potential of the sector is optimised while its long-term future is secured through more sustainable methods.

The environmental pressures of ongoing intensification, as evidenced most obviously in deteriorating water quality, point to the need for a different model of agricultural production and to different incentivisation approaches which reward farmers whose production systems meet sustainability criteria.

The impacts to water that arise from disturbances of peat include siltation and high ammonium concentrations. What is sometimes referred to as 'peat harvesting' in Ireland is probably more accurately described as 'peat extraction.' The ongoing practice of peat extraction in Ireland needs urgent review, considering its impact on water bodies, on the large-scale destruction of the productive capacity of the 'cut away' sites; on alternative uses for such sites and on the social and economic impact and cost of the cessation of peat extraction.

Much of Ireland's afforested land is land that is marginal, frequently close to some of Ireland's remaining pristine water bodies and abutting many of the country's water bodies as a whole. In total about 730,000 hectares are under forestry in Ireland, about 10% of the total land area of the country. While the forestry sector in Ireland generally needs to look in great detail at its impact on water quality, there is a particular responsibility on the state here by virtue of the fact that such a large proportion - 336,000ha's (54%) - of Ireland's afforested land is in public ownership.

It is to be hoped that imaginative approaches with regard to all these sectors might not only reverse the current negative impact of each of the three on water quality but that they could be, individually and in concert , marshalled to contribute in a positive way to the achievement of water quality goals.

In this regard, the Smart Farming initiative led jointly by the IFA and the EPA is particularly relevant, aiming as it does to show how farm incomes can be maintained and grown while strict environmental criteria are being adhered to. Similarly, initiatives currently under way led by the dairy co-ops call attention to the synergy between clean production systems and commercial goals where it comes to dairy production. Likewise, projects which involve the planting of river banks with indigenous trees and vegetation are a further example of such regenerative innovations.

An Fóram Uisce consists of all the relevant non-governmental stakeholders with a concern with water quality. Its task is to advise the Minister on objectives, approaches and initiatives relevant to the attainment of good status in our close to 5000 water bodies. In doing this it will attempt to take on board the sometimes different or competing interests of the stakeholders which make up An Fóram while never departing from the core objective of water quality enhancement.

An Fóram must constantly challenge itself to bring added value to this national project, complementing and critiquing the work of the many statutory bodies with a role in this field. Its diverse, interdisciplinary composition lends it a particular strength in this regard. So, it can contribute to the debate and the decision making on priorities; heighten public awareness of the water quality challenge through the many organisations represented on it; secure organisational buy-in or stakeholder consensus on conservation initiatives which might otherwise encounter public resistance, and point to policy options which might not otherwise arise.

But there is also a sense that An Fóram must be inspired by higher ideals. These may be concerned with a commitment to the 'common good' and to ideals of democracy which can be traced back to Aristotle's ancient Greece. As Aristotle saw it, 'a state is something more than an investment; its purpose is not merely to provide a living but to make a life that is worthwhile" (Riesing, C.D., Aristotle's Common Good - A Historical Analysis of Aristotle's Politics; Portland State University; 2014). Worthwhileness was achieved where private, selfish aims were subordinated to those of the common, public good.

If An Fóram is to transcend the role of a mere brokerage function between competing interests, it must be motivated by such an ethos. Considering the stake which future generations have in the deliberations and decisions of the current one on environmental issues, this ethical imperative becomes all the more important.

Tom Collins, Chair, An Fóram Uisce

www.nationalwaterforum.ie

Developing the next River Basin Management Plan: a collaborative approach involving communities, stakeholders and public bodies

A River Basin Management Plan (RBMP) requires a clear understanding of what is happening in the rivers, lakes, groundwater, estuaries and beaches of the river basin district in question. The next Plan for Ireland will cover the entire country and set out plans and objectives for a four-year period of 2018 – 2021.

Under Article 14 of the EU Water Framework Directive (WFD) Member States are required 'to encourage the active involvement of all interested parties in the production, review and updating of river basin management plans', in six year cycles up to 2027. Such participation in Ireland is evident through the involvement of local communities and public agencies in the development of the current River Basin Management Plan for Ireland 2018 - 2021.

The draft Plan for Ireland was open for public consultation from February to August 2017. During that time, the Local Authority Waters and Communities Office (LAWCO) organised a total of 123 public meetings across the entire country to raise awareness about the draft plan and to encourage local communities to have their say on matters concerning their local waters and to make submissions on the draft Plan.

In total 956 local submissions were received covering a broad range of issues and interests. These submissions have been collated to assist the Department of Housing, Planning and Local Government in the development of the pending Plan, due to be published early 2018. Any issues raised at these public meetings that can be addressed at a local level will be referred to the relevant Local Authority and public agency for follow up.

Preamble parts 1 & 14 of the Water Framework Directive

Waters in the Community are under increasing pressure from the continuous growth in demand for sufficient quantities of good quality water for all purposes...confirming the need for action to protect Community waters in qualitative as well as in quantitative terms.

The success of this Directive relies on close cooperation and coherent action at Community, Member State and local level as well as on information, consultation and involvement of the public, including users.

A significant part in the process of developing river basin management plans is to understand the pressures impacting on all waterbodies so that specific measures can be identified and implemented to manage those pressures, i.e. 'the right measure in the right place'. The catchment characterisation process undertaken since 2015 by the Environmental Protection Agency (EPA) with the assistance of the Local Authorities and Inland Fisheries Ireland (IFI), amongst others, assessed the risk of a particular waterbody not meeting the objectives of the Water Framework Directive, and identified the Significant pressures that need to be addressed.

REGIONAL CATCHMENT ASSESSMENT WORKSHOP IN CORK

During the second half of 2017 the EPA and the Waters and Communities Office facilitated catchment assessment workshops in each of the five Water and Environment Management Regions (Border, Midlands & East, West, South East & South West). At these workshops, discussions took place on the nature of the pressures impacting on individual waterbodies, and the feasibility of restoring impacted waterboides. Staff from over 30 public bodies and organisations shared detailed scientific and technical knowledge on each catchment in the region. Attendees included staff from the following organisations: Local Authorities (staff and senior management); Local Authority Waters and Communities Office; Irish Water; Inland Fisheries Ireland; Forestry Service; Coillte; National Parks and Wildlife Service; Teagasc; Department of Housing, Planning and Local Government; Geological Survey of Ireland; National Federation of Group Water Schemes; Department of Agriculture, Food and the Marine; Marine Institute; Bord Iascaigh Mhara; Sea Fisheries Protection Authority; Waterways Ireland; ESB; Loughs Agency; LIFE project staff and local development companies.

ARTICLES

MAP OF AREAS FOR ACTION

PUBLIC INFORMATION DISPLAY FOR CORK COUNTY COUNCIL MEETING

These regional workshops provided a forum for public bodies and agencies to review and discuss the available information on each catchment, and input from their own areas of expertise, thus allowing for the capture of expert local knowledge to assist with the scientific basis for prioritising 'Areas for Action' on specific waterbodies. The reason for creating a priority list is to focus available resources during 2018-2021 for the 2nd cycle River Basin Management Plan.

At a local level, the recommended 'Areas for Action' in each county were presented to the elected members of Local Authorities, and put on public display. This provided an opportunity for feedback where it was felt that other areas should be prioritised over the period 2018 – 2021. All submissions received are reviewed in the first instance by Local Authority staff, and then brought forward to the Regional Operational Committees, where any amendments to the list of priority areas for action are considered. The aim is to ensure that River Basin Management Plan objectives are met, whilst also delivering maximum potential benefits to society.

The final list of priority 'Areas for Action' will then be brought forward to each of the five Regional Water and Environment Committees for approval. These regional committees are made up of Senior Management from the respective Local Authorities, the EPA and the Local Authority Waters and Communities Office, who provide a shared service across the five regions. It has been identified that additional resources will be required to focus on these 'Areas for Action' to support the ongoing activities of Local Authorities, public bodies and local communities. Recruitment is now underway for 35 scientific staff who will be based across the five regions. These staff will work on specific work programmes targeting the priority areas for action.

The River Basin Management Plan for Ireland 2018 – 2021 will be published in early 2018, and will include details of the significant pressures affecting our natural waters, along with a Programme of Measures to tackle those pressures. The development of this Plan for the 2nd Cycle of the Water Framework Directive has involved a robust scientific assessment process, participation by local communities, expert input from public agencies, and a submission from a broad range of stakeholders through the National Water Forum / An Fóram Uisce. Prior to this, in 2015 a public consultation on the 'Significant Water Management Issues in Ireland' was completed. In this way, scientific, technical and local information has been gathered and assessed to create a better understanding of the pressures on our rivers, lakes, estuaries, groundwater and coastal waters, whilst also highlighting the value local communities place on a healthy water environment.

Alan Walsh, Local Authority Waters and Communities Office

watersandcommunities.ie/areas-for-action

PRESENTATION TO MEMBERS OF THE PUBLIC BY TIPPERARY COUNTY COUNCIL

What is catchment science?

Catchment Science is the study of the connections and relationships between the physical landscape, ecosystems, and human activities within a water catchment.

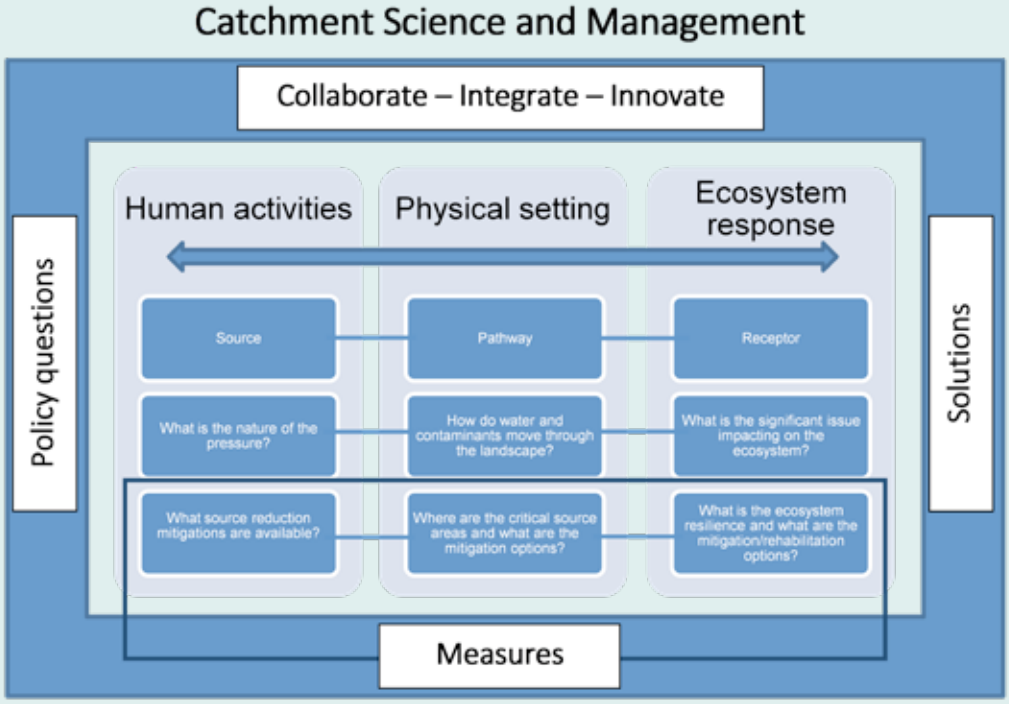


FIGURE 1: CATCHMENT SCIENCE AND MANAGEMENT NEXUS

Living in a catchment that has healthy water can help a community have a better quality of life – the water can make sure local people have high quality drinking water, support livelihoods like food production, facilitate recreational angling or water sports, and support local ecosystems, so plants, animals, fish and insects that depend on having healthy water can thrive and flourish.

To protect and improve our rivers, lakes and coastal waters, we need to understand how they flow through and are connected with the diverse landscapes that surround them, and what is causing pressures on their ability to support the communities, livelihoods and ecosystems that depend on them for clean and healthy water. This emerging field is called catchment science.

Catchment science is the study of the dynamic interactions between the physical catchment landscape, the ecosystems that sit within that landscape, and the human activities that can cause impacts to ecosystems in that landscape.

These three elements are all linked within the source pathway receptor framework (Figure 1). The fourth element in the catchment science and management nexus is the identification of efficient and effective mitigation measures based on this catchment science understanding. Understanding all the elements within the framework equally, and more importantly the linkages between them, is essential for carrying out the pressure-impact analyses which is central for identifying 'the right measure in the right place'.

The importance of the physical setting in understanding problems and identifying appropriate measures was not well developed in the last Water Framework Directive cycle, and in our experience, it is still missing right across the water sector. There is still an assumption that pressure equals impact, or in other words that only two elements of the framework (source and receptor) are needed to arrive at solutions. However, the physical landscape creates the pathway links between the human activities (sources) and the ecosystems (receptor). Where there is no pathway link between sources and receptors, there is no requirement for measures. This is a fundamental principle that underpins the way we need to address diffuse pressures, which are our greatest problem. The physical landscape also influences the inherent nature of the ecosystems that depend on it and therefore the types of rehabilitation or measures that may be required. There is a need therefore to strengthen our national capacity in understanding the physical setting. This is the main reason that the dominant scientific expertise within the Catchment Science and Management Unit when it was initially established in 2014 was physical science disciplines rather than biological sciences.

The ideal catchment scientist has a firm knowledge and understanding of all the source, pathway receptor elements of catchments, a good grounding in appropriate measures, and most importantly, the capacity to integrate, analyse and synthesise that knowledge to gain new understanding for the purposes of answering relevant catchment science and management questions. Catchment science is a relatively new discipline however, and inevitably practitioners have different strengths and training across the elements. Examples of the types of disciplines applicable to each of the elements is provided in Table 1.

(BELOW) TABLE 1: EXAMPLES OF THE TYPES OF DISCIPLINES APPROPRIATE TO EACH OF THE THREE CATCHMENT SCIENCE ELEMENTS

Human Activities Source and Measures	Physical setting (Pathway)	Ecosystem response (Receptor)
Engineering	Earth science	Ecology
Agricultural science	Geology	Botany
Environmental science	Physical geography	Zoology
Forestry science	Hydrogeology	Limnology
	Geomorphology	Aquatic science
	Soil science	Biology
Communicating, building partnerships and encouraging understanding between different disciplines and sectors		

While practitioners can gain experience and training in elements they haven't studied in, and this is to be encouraged, it is more difficult for them to reach the same standard as someone with a relevant postgraduate degree, i.e. a physical landscape scientist is unlikely to be able to learn enough biology to match the skills and expertise of a biologist with a PhD; and similarly, a biologist is unlikely to be able to learn enough physical landscape science to match the skills and expertise of a geologist, or a soil scientist, or a geomorphologist, or a hydrogeologist with a PhD. This makes the ability to collaborate, integrate, drive innovation and clearly communicate between multiple disciplines that often have their own scientific jargon more important. The best catchment scientists are strong in their respective disciplines and score highly in their abilities to collaborate, integrate, innovate, and communicate their findings.

Suggesting solutions, helping build partnerships, and promoting understanding

Understanding the catchment, what are the significant pressures, and suggesting measures that will enhance the environment in these areas are only part of the catchment scientist's role in Integrated Catchment Management - helping others understand the outcomes of the catchment scientist's assessment is also key.

The first step in Integrated Catchment Management is building partnerships, which are vital when trying to implement measures that will often need significant buy-in from the local community. A key part of this work is developing and communicating a vision for the catchment, by asking the local community what is important to them. Catchment science can then help inform the local community and any government agencies involved in managing a catchment in deciding on what actions to take to help them achieve this vision. While they may not always be directly involved, the outcomes of characterisation by catchment scientists can be very useful in helping local communities decide what actions they should take.

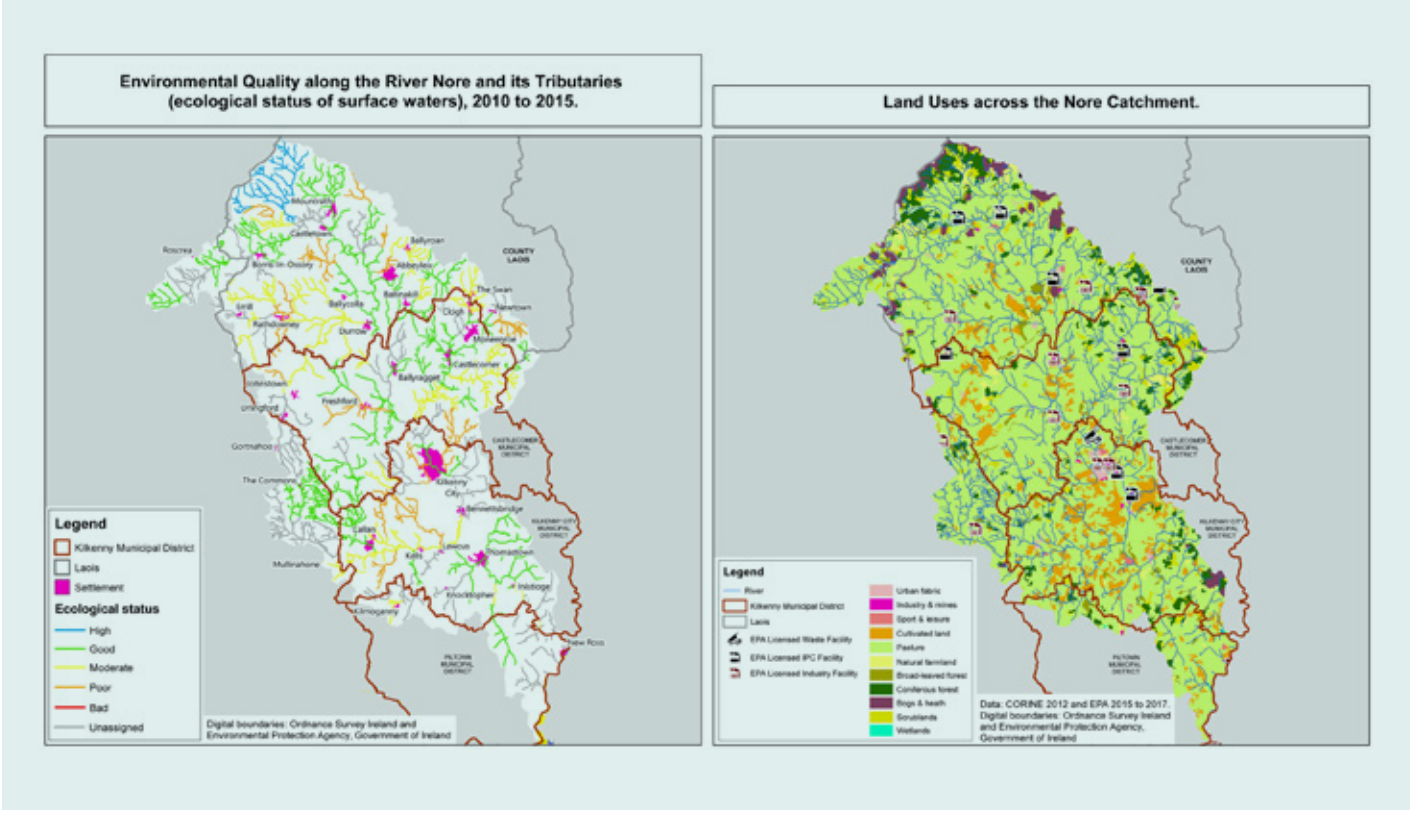
To sum it all up in one simple phrase... 'By working together we will achieve more'.

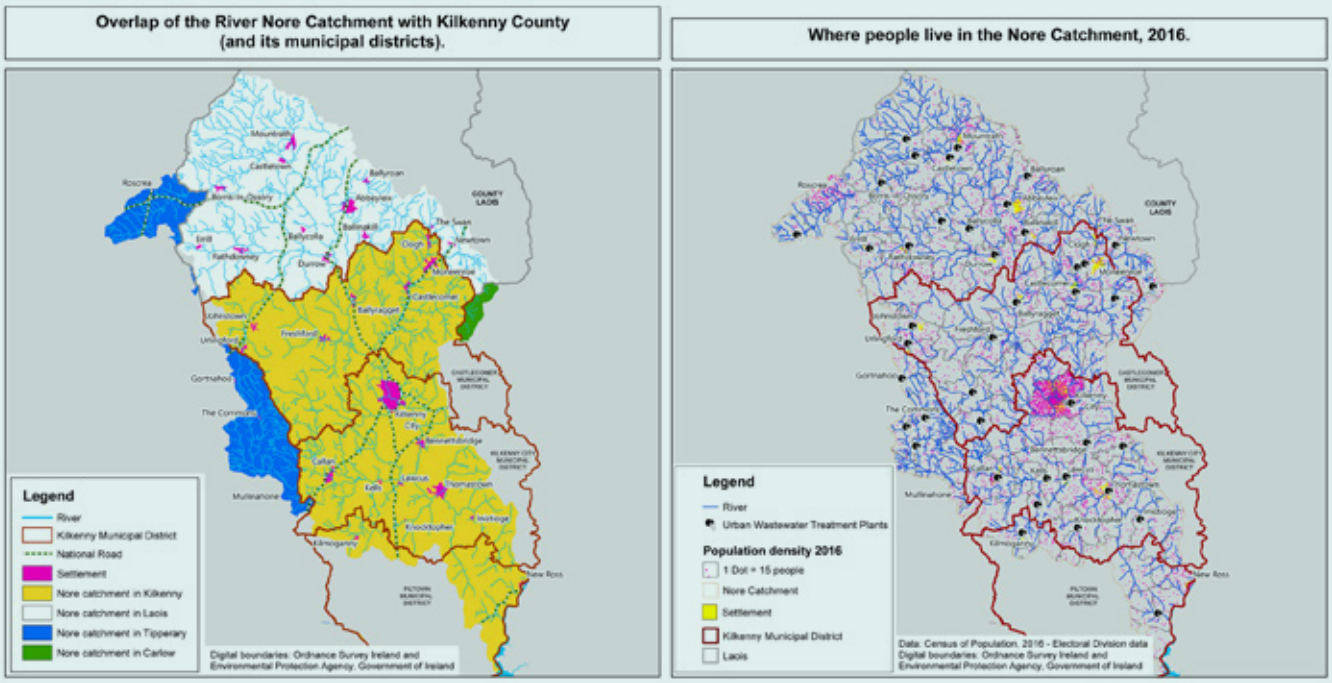
Jenny Deakin, EPA Catchments Unit

The 'Nore Vision' Project

How do you get from 'A' to 'B'? If 'A' is a catchment with deteriorating water quality and 'B' represents these problems rectified in perpetuity? This question has occupied the minds and the careers of a wide variety of extremely talented people over the past few decades; people drawn from State Agencies, Local Authorities, NGO's, Community & Voluntary sector, and just plain old concerned citizens.

With this question in mind, recent years have seen several seminal Integrated Catchment Management initiatives, including Duhallow Life (upper River Blackwater, Cork; directed by Dr Fran Igoe and his team), Ballinderry (Tyrone; Alan Keyes and Mark Horton), the Mulkear LIFE Project (Limerick/Tipperary; Ruairí Ó Conchúir and others), and with the Rivers Trusts approach being rolled out in places as diverse as Inishowen





(Donegal) and the River Maigue (Limerick).

Whatever the method in getting from that 'A' point to that 'B' point, it is clear that the people of a given catchment reside at the heart of achieving these objectives, which would not alone assist in meeting our Water Framework Directive obligations but would see an enhancement of biodiversity, human health, tourism and farm produce values.

The 'Nore Vision' Project, led by Kilkenny LEADER Partnership, seeks to harness the wide and existing efforts of established River Nore Catchment initiatives, including Keep Kilkenny Beautiful (Tidy Towns alliance), the River Nore Trust, the Thomastown Community Rivers Trust, Dinin River Riparian Rehabilitation Programme, and the Bregagh River Valley Biodiversity Project (amongst others), and to knit these into an over-arching catchment-wide vision and ensuing action plan.

The Nore's story is relatively typical: the catchment, of 2,500km^2, has 123 distinct Water Bodies with 49 of these (40%) at risk of failing to meet environmental objectives. The pressures include the 'usual suspects'; sewage infrastructure, agriculture and forestry, etc. How to motivate catchment citizens to 'up' their 'best-practice' game to address these problems? What are the costs? What are the benefits?

An inaugural stakeholder consultation, with 35 people representing a good cross-section of catchment interests in attendance, took place on October 17th 2017 at Springhill Court Hotel in Kilkenny. Following an opening presentation which included the provision of land use, population, and water quality maps, the evening was organised to ensure that individual tables contained mixing sectoral representatives to discuss, elicit, and produce responses to the following key provocative questions:

1. What is your interest in the River Nore & its catchment?
2. What concerns would you have for the River Nore & its catchment?
3. Within your lifetime, what do you want to see happen to the River Nore and its catchment?
4. What are the steps needed to achieve these goals (vision)?

This was a very effective approach as it ensured that anglers, farmers, kayakers, business people, and environmental NGO's were thrown in together to share concerns and arrive at (tentative) consensus of vision to report to the wider attendance. With this great start, 'The Nore Vision' seems a very worthy iteration of other ongoing efforts in catchments throughout Ireland and its progress will be followed with interest.

The event was facilitated by Dr Harriet Emerson (Adjust.ie) and Dr Caroline Crowley (Crowley Research) supported by Kilkenny LEADER Partnership staff - Declan Rice, CEO; Gabrielle Carroll, Enterprise & Project Officer; Mairead Rohan, Development Officer; J.J. Nolan, Business Development Manager; and Harry Everard, Rural Recreation Officer.

For further information:

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The Nore Vision
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087 610 1510

Mark Boyden, Streamscapes

Mark Boyden is Cathaoirleach of SWAN and Director of the 'StreamScapes' Aquatic & Biodiversity Education Project - www.streamscapes.ie

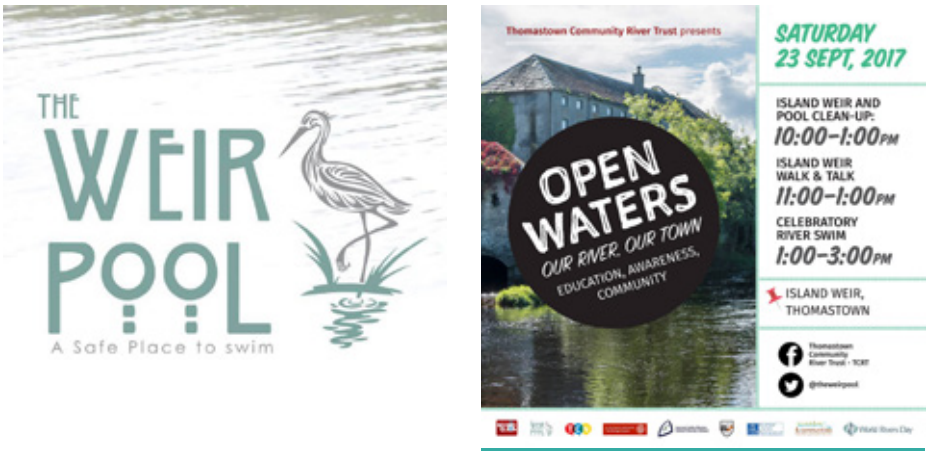
Open waters, open hearts in Thomastown

A Community River Trust in County Kilkenny is inspiring local love for its waterways. In the small kitchen of a converted mill on the banks of the River Nore, around 20 people are crammed together, eating sandwiches, warming their hands with mugs of tea, and contemplating the prospect of an autumnal dip in the chilly waters of Thomastown's Weir Pool. The collective enthusiasm for this wild swim is about as low as the water temperature, but a few brave souls are making a strong case. Will they do it?

The swim marks the grand finale of the 'Open Waters: Our River, Our Town' festival in Thomastown, Co. Kilkenny – a weekend of education, awareness and community that took place in celebration of World Rivers Day from 21st – 23rd September.

Transition Year pupils from the local secondary school, Grennan College, got involved in river walks to explore local ecology, learn about pollution and water sampling, and ask questions of staff members from the National Parks and Wildlife Service, Kilkenny County Council and Inland Fisheries Ireland (the Council's Environment Officers remarked on how engaged the pupils were). The public, meanwhile, was invited to come together for a free screening of the film 'River Blue' – an Irish premiere, no less – as well as a clean-up of the Weir Pool with the local Tidy Towns group and a tree planting ceremony.

There were also talks on topics including the development of a 'Nore Vision' – a long-term strategy for the future of the river, sustainable development, technological solutions for litter monitoring, community action and the value of nature, in addition to the bracing river swim – which did take place, in the end, as the shivering swimmers will testify.



THE WEIR POOL LOGO AND OPEN WATERS OUR RIVER, OUR TOWN LEAFLET BOTH HELPING RAISE AWARENESS OF THE WONDERFUL RIVER NORE AND THE WORK OF THOMASTOWN COMMUNITY RIVER TRUST

The festival was organised by the Thomastown Community River Trust, a voluntary group that came together in 2008 when a neglected v-shaped weir was breached in a flood and a popular local swimming area was lost. "When things are gone, people miss them," observes Shem Caulfield, a founder member of the Trust, who grew up on the river. "I'd thought a couple of letters to Ministers would be enough to get it fixed..." he smiles. "It was the start of a huge learning curve for us." Instead, the Trust found that there were many agencies involved in Ireland's rivers, each with its own remit, and opportunities for local voices to be heard were few and far between. "In my experience, in all the equations to do with rivers, there is no space for community," he says.

LOCALS AND VISITORS MAKING THE MOST OF THE RIVER AND THE WEIRPOOL

COMMUNITY WATER OFFICER ANN PHELAN AND LOCAL SCHOOLCHILDREN LEARNING ABOUT THEIR RIVER, AND THE WILDLIFE THAT LIVES IN IT

SCHOOLCHILDREN LEARNING ABOUT WHAT LIVES IN THEIR RIVER, AND HOW THE PARTICULAR SPECIES THAT LIVE IN A RIVER CAN INDICATE HOW HEALTHY IT IS

The following years were spent in meetings, negotiations and consultations with bodies including the Office of Public Works, Inland Fisheries Ireland, National Parks and Wildlife Service, Environmental Protection Agency, the Heritage Council and the Local Authority. "We did lots of talking, but there was no actual work being done. We needed to find a project where people can get out there on a Saturday and get their hands dirty."

From a walkway to The Weir Pool...

That first project saw the Trust work with local schools, the fishing club and Trails Kilkenny to develop a walkway along the river. This early success galvanised support for a more ambitious project – the re-instatement of The Weir Pool – that would once again provide a space for wild swimming, kayaking and water safety classes away from the currents of the main channel.

The Thomastown Community River Trust secured funding from the Kilkenny Leader Partnership for a feasibility study to examine the needs of local stakeholder groups, an archaeological survey was completed, and the design process commenced. "It was slow," recalls Shem. "Riverbed surveys were done and the designs had to be modelled for flow and water quality, which was a big cost. We eventually finalised the design, working with Inland Fisheries Ireland, the Office of Public Works, Kilkenny County Council and the National Parks and Wildlife Service, then we went looking for planning permission." The works commenced in 2014 and the Weir Pool was officially opened the following year. No concrete was used in the final construction, instead natural materials including rock and willow panels were employed, with willow saplings planted to improve the banks' resilience and provide a habitat for wildlife.

Taking the long road was worth the effort: the local community has warmly welcomed the Weir Pool and it is currently used for swimming lessons, the sub-aqua club, kayaking and canoeing, triathlon training and lifeguard training.

"I remember at the launch, a man said to me, 'This is fantastic! People will want to come here to live, people will make businesses here because of this place!' It was a great endorsement," says Shem. "Our aim is to promote personal responsibility for our waterways. We want to see people become advocates for their river. When you're swimming in it, you want it to be clean, you want it to be safe. That's where it starts. We want the Weir Pool to be an outdoor classroom for everyone."

Community engagement has become a buzzword for State agencies and academics, but what does it really mean? In practice, consultation initiatives to secure the all-important social license to operate can often feel like one-way streets designed to inform people about decisions that have already been made, rather than opportunities to empower locals to take part in a genuinely participatory process.

So when a community comes together of its own volition to inspire its people to love their river, it's something to celebrate. Duly, the 'Open Waters' festival received support from the Heritage Council, Inland Fisheries Ireland, Kilkenny Leader Partnership, Kilkenny County Council and the Local Authority Waters and Communities Office, among others.

"One of the greatest achievements of our group is in building relationships with those bodies and agencies and the remarkable people in them," says Shem. "Structurally, they are risk averse. But we managed to build trust and bring them into a space where they could play a bit with ideas. That to me is something to shout about. We've got community in the equation now."

Hannah Hamilton

Hannah Hamilton is the owner of éirewild, a consultancy that helps businesses make space for nature. She is also the Executive Coordinator to the Irish Forum on Natural Capital.

www.facebook.com/ThomastownCommunityRiverTrust

Creating a vision for Dundalk Bay Rivers

Dundalk Bay is an important area for shellfish, wetland birds and a range of marine and coastal habitats including vegetated shingle and saltmarsh, and because of this it is designated as a Special Area of Conservation (SAC).

The rivers that flow into Dundalk Bay rise in most of the neighbouring counties: The Flurry in Co. Down; the Kilcurry and Castletown in Co. Armagh; the Fane in Co. Monaghan; the Gylde in Counties Cavan and Monaghan; and the Dee in County Meath. The catchment covers an area of approximately 1,600km^2 with a population of 117,000 in the Republic of Ireland, so creating a vision for the rivers of Dundalk Bay could be rather a challenge!

Under the guidance of Mark Horton of the Ballinderry Rivers Trust, and with the assistance of Alec Rolston from Dundalk IT, the border region Community Water Officers and their trusty leader Bernie O'Flaherty decided to take on this very challenge. We used the community engagement methodologies developed by the Ballinderry Rivers Trust called the RIPPLE methodology: Rivers Involving People, Places and Leading by Example. During the month of March this year the Local Authority Waters and Communities Office organised seven community meetings, which were held in four counties encompassing the catchment.

On arrival at a meeting the participants were given a name tag and assigned to a table (this ensured that special interest groups could not dominate discussions at any table). After a welcome and introduction to the evening each table created a poster to display their memories of their local rivers, lakes and coastlines. They were given an opportunity to share these memories with everyone.

We then asked each table to create a poster with their 'vision' for their rivers. Each table was given magazines to help prompt ideas for this vision, and to assist in the creation of their posters. After 15 minutes, each table was asked to present their poster and their key vision items to the rest of the room.

From this everyone was asked to identify the actions required to deliver this vision, who and what organisations might be needed to carry it out, and if they would like to have a part in the development of the vision.

FIGURE 1: DUNDALK BAY VISION MEETINGS - 117 PEOPLE ATTENDED THE MEETINGS IN TOTAL; 77 MEN AND 40 WOMEN

An advisory group formed of members of staff from Cavan, Monaghan, Armagh and Louth County councils, Inland Fisheries Ireland representation, Lough's Agency, Northern Ireland Environment Agency and Dundalk Institute of Technology has been set up to act as a steering group to the project.

When all the meetings were completed, we created a spreadsheet showing all the vision items and actions identified at each meeting and this information was collated into thematic areas. The breakdown of action points is shown in Figure 4.

Mark Horton, Bernie O'Flaherty and Gretta McCarron met in the Fire Station in Monaghan to collate all the vision points and supporting actions into a draft Vision for Dundalk Bay Rivers which was presented to the community for ratification in Carrickmacross Workhouse on 21st September.

Vision items:

- Protect and improve the water quality of our rivers, lakes and coastal waters
- Protect and improve habitats and biodiversity of our aquatic ecosystems and adjacent areas
- Learn more about our water environment and the role we can play in its protection and improvement
- A water environment and community that is more resilient to climate change
- Sustainable recreation and tourism along our waterways and loughs that provides benefits for the community, environment and local economy

A TABLE PRESENTING THEIR VISION

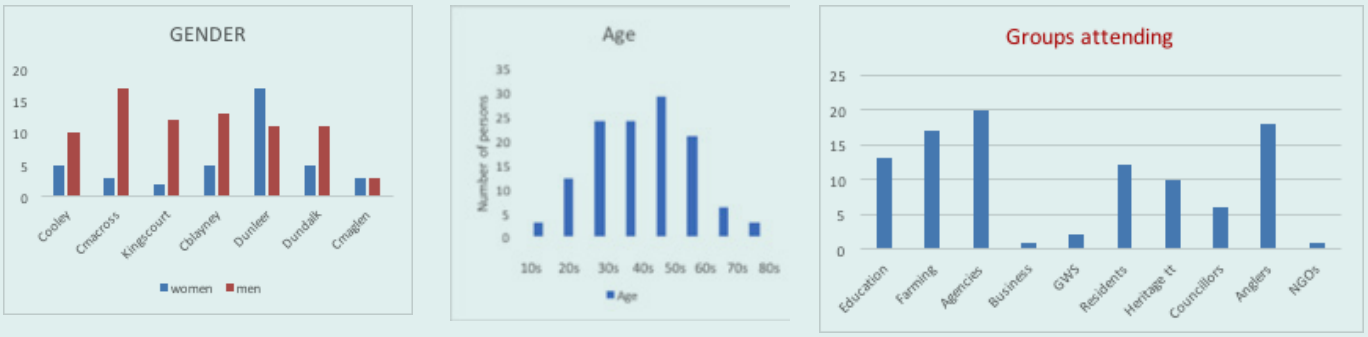


FIGURE 2: AGE, GENDER AND GROUPS REPRESENTED AT THE MEETINGS TO CREATE A VISION FOR DUNDALK BAY RIVERS

The ratification meeting was well attended and the draft vision was welcomed by all present, although they did request some small changes which were added.

We were delighted to have Mr Ken Whelan as a guest speaker at our Vision ratification event when he gave us an inspiring presentation on the need to protect our rivers. He spoke of how the rivers were managed in the past and of our future challenges not least of which is the impacts of climate change. Ken recommends a multi-agency approach to rebuild catchments including bogs, wetlands, improved farm management practice, along with the Waters and Communities Office encouraging environmental stewardship within communities. It is important to manage extreme low water as well as extreme high water. Describing a river as 'a living breathing creature', Ken believes we need to engender pride in our rivers, loughs and waterways.

It is wonderful to have a community vision for our rivers of Dundalk Bay - but of course now the real work has to begin. The next step for our vision is to break down the ideas identified into quick wins versus more challenging longer-term actions, and to develop partnerships to bring about the required actions.

The overarching aim of this project would be to develop a Dundalk Bay Rivers Trust, but we are realistic, and firmly believe we need to walk before we can run. We have several different groups keen to deliver projects in their own local catchment, so we will support these groups in the first instance, and build on each success to help drive our communities vision further.

Bernie O'Flaherty, Gretta McCarron, Karen Kennedy, Jimmy McVeigh (Local Authority Waters and Communities Office) with support from Mark Horton (Rivers Trust) and Alec Rolston (Dundalk IT)

Kingscourt Poster comments	Vision points	what needs to happen
ducation through community projects	Access to lakes for angling	parking, rights of way, facilities
naking our water 'pristine'		goodwill from landowners
ollow up on Cormey River project		Insurance should be provided to farm
iver bank restoration		
More tourists		
o dumping		
More wildlife	New WWTP for Kingscourt	Finance to be made available
ess algae		
ood ecological status		
etter access	Improve and repair instream habitats	Coiite to be made aware of issues
atchm and release	Riverbank restoration Cormey River	Fallen trees prevent fish passing
outh angling programmes		bank erosion at forest park
allyhoe, Muff, ervey, Whitewood,		survey, identify sites, maintenance
ormaddy access issues		
nore promotion of angling tourism	Car wash monitoring	LA must enforce water pollution act
valking and running along rivers		
nore water quality awareness for business		
ehabilitation post-drainage	Clean water	prevent pollution through education
veir at Drumin on White river fish cannot pass		

FIGURE 3: SOME OF THE COMMENTS, VISION POINTS AND ACTIONS FROM KINGSCOURT

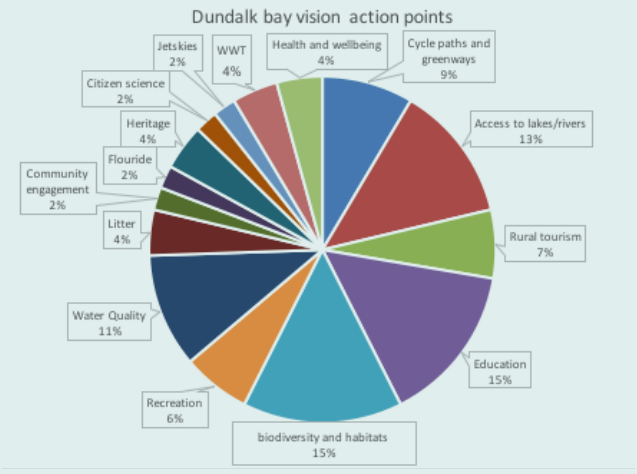


FIGURE 4: VISION POINTS WERE COLLATED INTO THEMATIC AREAS TO HELP CREATE A DRAFT VISION FOR DUNDALK BAY RIVERS

KEN WHELAN AND MARK HORTON AT THE MEETING WHERE THE VISION WAS AGREED

The Dodder Gathering 2017 - inspiring a positive future by connecting people and nature

Dublin City Council's Parks and Landscape Services and its Water Framework Directive Office along with the Local Authority Waters and Communities Office and Dodder Action hosted the three-day Inaugural Dodder Gathering in March/April 2017 at the Hive in Herbert Park, which was attended by approximately 400 people. The event opened for schools on Friday 31st March for an education day. This was followed by a networking summit for local community groups and businesses from source to sea on the river on the Saturday morning, with interactive displays on wildlife in the afternoon. Sunday was dedicated to family fun where people could enjoy the amenities and wildlife along the River Dodder.

DODDER DEFENDERS - SCHOOLCHILDREN FROM THE DODDER CATCHMENT OUTSIDE DUBLIN CITY COUNCIL OFFICES

What inspired the Dodder Gathering?

The Dodder Gathering 2017 was initiated through a request by Dodder Action to understand the current practices and policy effecting the management of the River Dodder. This event coincided with the implementation of Dublin City's Biodiversity Action Plan. The event provided a platform for submissions for the draft River Basin Management Plan and increased awareness and education regarding river water quality. The lower reaches of the Dodder are situated in the UNESCO Dublin Bay Biosphere which aims to manage areas of outstanding biodiversity by promoting a balanced relationship between people and nature.

Educational Day

Eight schools sent students to the educational day from their green school committees and environmental forums. In the morning, primary school students visited a range of learning stations depicting the water cycle, the use of macroinvertebrates (insects) from river water to identify water quality, homes as sources of everyday river pollution, the Dodder's Biodiversity and the "Web of Life". Experts from Dublin City Council's Biodiversity, Water Framework Directive, Pollution Control and Central Laboratory Office along with Dodder Action, An Taisce Green Schools and the Local Authority Waters and Communities Office, interacted with small groups doing demonstrations, quizzes and experiments. After this the children went for a walk examining the wildlife in the park with OWLS the Children's Nature Charity. In remembrance of the first Dodder Gathering they planted a Strawberry Tree (Arbutus unedo), which will now form part of the Park's Tree Trail. In September after completing some take home activities, the primary school pupils were awarded Dodder Defender Certificates, at a formal presentation in Civic Offices, by Councillor Patrick Costello, who was deputising for the Lord Mayor, in recognition of their promise to be defenders of the River Dodder and their commitment to inform their peers of the amenity and biodiversity of the river.

In the afternoon, secondary school students visited similar interactive displays, with the addition of John Staunton, Dodder Action, giving a riveting photographic account of his life experience and history of the river. They undertook a "Bioblitz challenge" competing against each other in a timed countdown to identify the greatest variety of trees, birds, macroinvertebrates and threats to Biodiversity in the Park. They also took a water sample from the River Dodder which was sent to the Central Laboratory for testing. The results of the water testing were forwarded to the schools after the event. All schools were given supportive

LEARNING ABOUT WHAT LIVES IN THE RIVER DODDER

educational packs relating to submissions for An Gáisce, Young Scientists Exhibition and EcoUNESCO Young Environmentalist Awards.

Taking action for the Dodder together

On the Saturday morning, a networking summit was held for representatives from local community groups from source to sea on the Dodder. This summit consisted of presentations from Dublin City Council on topics ranging from the water quality, flood defences, landscape management of Herbert Park and litter prevention. South Dublin County Council demonstrated the high nature value areas of the

NETWORKING SUMMIT FOR LOCAL PEOPLE, ORGANISATIONS AND AGENCIES WHO ARE INVOLVED WITH LOOKING AFTER THE RIVER DODDER

LOCAL SCHOOLCHILDREN HAD A GREAT OPPORTUNITY TO LEARN ABOUT THEIR LOCAL RIVER

DODDER ANGLERS DEMONSTRATE THE SKILL AND PATIENCE NEEDED TO CATCH A FISH

Dodder Linear Park and Dun Laoghaire Rathdown County Council spoke on how polluting household water can be misconnected to the river. The value of angling to the river was encouraged by Inland Fisheries Ireland. The Environmental Protection Agency spoke on Citizen Science and the National Parks and Wildlife Service clarified their role, responsibilities and wildlife legislation. The Waters and Communities Office gave a talk on the value of community participation in relation to water protection and management.

Catchment Custodians

After the information session, participants gathered to discuss the river, what it means to them, what concerns they had and what actions needed to be carried out to promote and protect the river. The discussion was held in an informal café style session using maps of the river which allowed people to foster new relations and establish their role as custodians of the catchment.

In the afternoon, there were interactive displays on wildlife, the wonders of water and river stories. The Herpetological Society of Ireland brought a Mexican Salamander or Axolotl which fascinated the children. BirdWatch Ireland showcased their bird tracker and INVAS Biosecurity were on hand to show specimens of invasive species that can damage our waterways and how they can be prevented and controlled. An Taisce Clean Coasts were promoting their #2MinuteBeachClean and their Think Before You Flush campaigns. Coastwatch Ireland had an array of beach shells on display and they talked about marine litter, marine conservation and successfully enlisted volunteers for their annual coast watch survey. The Irish Wildlife Trust had animal artefacts on display which were there to discuss conservation of our wildlife and habitats. The Dublin City Councils Biodiversity/Biosphere road show highlighted where to see nature in the City.

Celebrating a river

The family fun day on the Sunday proved to be a great success with a large number of people coming out to enjoy the activities. The morning started with pond dipping led by OWLS which attracted children of all ages. People then returned to the Hive, where there was face painting, wildlife displays, river insects identification demonstrating the good water quality status of the Dodder, fly casting demonstrations and angling lessons.

The historic and wildlife walk topics ranged from fishy stories by the Dodder Anglers, to an informative native Irish tree trail walk by Dublin City Council Parks. Local historian Don McEntee enthused the audience with an illustrated history of the industrial heritage of the river. Staff from the Local Authority Waters and Communities Office encouraged people to have their voices heard in the management of their river by submitting their views on the draft River Basin Management Plan.

This three-day inaugural Dodder Gathering is the start of a collective and collaborative management approach between communities and agencies in the management of the River Dodder. Together we aim to inspire a positive future by connecting people and nature together.

The organisers of the Dodder Gathering would like to thank all the community groups who attended, speakers, local authority staff, state bodies, Non-Governmental Organisations and businesses who helped to make the Dodder Gathering an overwhelming success. Thanks also to the people who came out in such numbers to the event. Finally, a special mention for the inspiring students from Rathfarnham Educate Together National School, Scoil Naomh Pádraig, Ballyroan, St Patrick's Boys National School, Ringsend, St Killian's Deutsche Schule, Alexandra College Dublin, High School Rathgar, St Mac Dara's Community College Templeogue and Colaiste Íosagáin who demonstrated that they will defend the river for future generations using their love of science, culture and environmental action.

Averil Gannon, Water Framework Directive Office, Dublin City Council, Niamh Ni Cholmain, Biodiversity Facilitator for Community Engagement, Dublin City Council and Sinead Hurson, Local Authority Waters and Communities Office

www.dublincity.ie/main-menu-services-water-waste-and-environment/water-framework-directive

www.watersandcommunities.ie

www.dodderaction.org

Cuan Beo: reconnecting the land and the sea in Galway

Growing concern about the demise of water quality in South Galway Bay and its consequences for the quality of life in local rural villages motivated residents and businesses to come together to form Cuan Beo, a local community group.

Cuan Beo aims to work with locals to highlight the connection between water quality and quality of life.

Cuan Beo was established with the support of Bord Iascaigh Mhara's Fisheries Local Action Group (FLAG) West as a not-for-profit company with a mission of improving the quality of life, environment, economy and heritage around Galway Bay and to help develop local resources in a sustainable way. It has taken inspiration from organisations such as Burren Beo, which has had significant impact on land management in the Burren region of south Galway and north Clare.

Centred in the Kinvara Enterprise Centre, Cuan Beo is playing an active role in marine activities from Oranmore in Co Galway to Blackhead in Co Clare and surrounding catchments. Their activities focus on the belief that water and water quality underpins the economic and social fabric of the region. According to Diarmuid Kelly, Chariman of Cuan Beo, 'our aim is to raise awareness of those living in the catchment of Galway Bay, and indeed those governing it, that life quality and water quality are inextricably linked'.

To achieve this outcome, Cuan Beo has set about organising educational, heritage and resource management events to highlight the importance of protecting water quality and the marine natural resource. 'The importance of water quality to the coastal economy and livelihoods of those living in coastal communities is often overlooked' says Kelly, 'The tag line of Cuan Beo is 'reconnecting the land and the sea'. We want to help people make connections between how routine actions on land has consequences at sea. We want to connect those living inland with those in coastal communities who rely on the sea for their livelihoods. These connections have existed for millennia but have somehow eroded in recent times. Cuan Beo wishes to re-establish this connection between land and sea for the benefit of existing and future generations'.

Rather than establish new events and festivals linked to the sea, the approach used by Cuan Beo is to support existing local events such as Cruinniu na mBad in Kinvara and the Clarinbridge Oyster Festival. The Cuan Beo 'Festival Stage' and the Cuan Beo 'Taste the Atlantic' Stage were hugely popular at this years' Cruinniu na mBad Festival. Hundreds of local, national and international visitors dropped by our stages. We had an excellent line up of speakers highlighting the importance of the aquatic and maritime resources in Galway Bay and many enjoyed the fantastic seafood available at the Taste the Atlantic Stage which was available throughout the festival. As the Cruinniu na mBad Festival coincided with National Heritage Week and Water Heritage Day, Cuan Beo, with funding from the Waters and Communities Office, organised a presentation by Professor Noel Wilkins on the heritage of the Native Oyster in Galway Bay followed by a Questions and Answers session with the popular local author.

In advance of the Clarinbridge Oyster Festival, Cuan Beo organised the Native Oyster Workshop 2017 (NOW17) which brought together Native Oyster Fishermen from the 8 remaining oyster fisheries in Ireland with the relevant Government agencies responsible for their management and protection. There is growing concern about the demise of the native oyster fisheries across Ireland and the aim of the Native Oyster Workshop was to develop a plan towards the restoration of these fisheries. The workshop heard that the Native Oyster fisheries have been in decline for the past 200 years and are currently at an all-time low. Factors such as poor water quality, absence of fishery management plans, complex governance structures and overfishing have all contributed. While a lot of work and time is required, the workshop heard that restoration efforts have been quite successful in Kerry and parts of Connemara

GALWAY HOOKERS

NATIVE FLAT OYSTER (OSTREA EDULIS)

BACK ROW, LEFT TO RIGHT, OLIVER TULLY, MARINE INSTITUTE, SÉAMUS BREATHNACH, FLAG WEST, DAVE KRAUSE, COLM O'DOWD,THOMAS CONNOLLY, MICHAEL BROGAN, GERRY O'HALLORA. FRONT ROW, LEFT TO RIGHT: MARY MULLINS, CLLR. EILEEN MANNION, CATHAOIRLEACH OF COUNTY GALWAY, SEÁN KYNE TD, MINISTER OF STATE AT THE DEPARTMENT OF RURAL AND COMMUNITY DEVELOPMENT AND THE DEPARTMENT OF COMMUNICATIONS, CLIMATE ACTION AND ENVIRONMENT WITH RESPONSIBILITY FOR NATURAL RESOURCES, COMMUNITY AFFAIRS, AND DIGITAL DEVELOPMENT, DIARMUID KELLY

through several effective management practices specific to the native oyster.

An action plan was agreed at the workshop to create a national working group in the coming weeks. The group would not just lobby for simplification in governance but also to address assessment and up-skilling of existing co-op management in each area and the provision of support and assistance in developing management plans for each fishery. Bord Iascaigh Mhara agreed to coordinate the establishment of this working group.

The day-long event concluded with the official launch of Cuan Beo, by Councillor Eileen Mannion Caothairlaoch of County Galway. The launch was also attended by Seán Kyne TD, Minister of State at the Department of Rural and Community Development and the Department of Communications, Climate Action and Environment with responsibility for Natural Resources, Community Affairs, and Digital Development. Several other local elected representatives attended including Ann Rabbit TD and local councillors Martina Kinnane and Peter Feeney. The Waters and Communities Office Regional Coordinator, Ray Spain, confirmed on the evening that the local catchment which includes the River Clarin is a priority for actions to be taken to improve the water quality.

Niall Sabongi from Klaw Restaurant Dublin held a masterclass in oyster tasting with a selection of native oysters from the various fisheries across Ireland and the event was concluded with a lecture highlighting the importance of the oyster in Galway Bay from pre-historic times (4000BC) to the present day by local archaeologist and historian, Michael Gibbons.

Looking forward, Cuan Beo intends to build its membership, knowledge and capacity to support the sustainable development of resources in the coastal communities of south Galway and north Clare. Cuan Beo is a voluntary organisation and relies on funding from our many sponsors. 'While we ensure value for money from all our work, we do put emphasis on putting the money we raise to work locally and by engaging local businesses to carry out work' says Kelly. 91% of the funding Cuan Beo has raised to date has been spent in County Galway and County Clare. We would like to acknowledge and thank Fisheries Local Action Group West, the Marine Institute, the Galway County Council Agenda 21, Gastronomy 2018, Waters and Communities amongst other for their continued financial support.

Colm O'Dowd and Diarmuid Kelly, Cuan Beo

www.cuanbeo.com

NIALL SABONGI, KLAW RESTAURANT DUBLIN, AND SOME NATIVE OYSTERS

Smart Farming - addressing the dual challenges of improving farm returns while enhancing the rural environment

What is Smart Farming?

Smart Farming is a voluntary resource efficiency programme led by the Irish Farmers' Association (IFA) in conjunction with the Environmental Protection Agency (EPA).

The programme collates existing knowledge and expertise from Ireland's leading academic and advisory bodies, state agencies and technical institutions. It communicates this knowledge in a targeted way, to deliver on the double dividend of improving farm returns and enhancing the rural environment through better resource management.

The development of the Smart Farming resource efficiency programme and identification of the eight focus areas (Figure 1) of the programme were strongly influenced by Teagasc research.

This research and Four Well-Beings of Community Sustainability (Figure 2) continue to be at the centre of all Smart Farming's activities. This community sustainability model advocates that society can have a long-term positive impact on the wider environment and their own well-being when environmental needs are better aligned with the economic, social and cultural needs of individuals, in this case – farmers. Thus, Smart Farming is focused on improving farm returns and enhancing the environment by operating through accepted cultural communication norms such as discussion groups, IFA branches and purchasing groups.

FIGURE 2: FOUR WELL-BEINGS OF COMMUNITY SUSTAINABILITY

Smart Farming – improving farm returns

Each farmer who participates in the Smart Farming programme receives a Resource Efficiency Assessment (REA) of their farm, which is also called a cost saving study. These assessments are completed by a qualified agronomist who has a minimum level 8 qualification and is an agricultural science graduate.

In preparation for the Resource Efficiency Assessments, the participating farmers submit the following information to the Smart Farming agronomist:

- House & farm electricity & fuel bills (heating & diesel) for the previous 12 months
- Results of any soil samples that may have been taken in recent years and the farm map showing where soil samples were taken
- Any Nutrient Management Plan completed in the last 2 – 3 years
- Copy of the most recent Basic Payment Scheme application form (without details of the value of the Basic Payment, as this is not required)
- Copy of BPS Maps sent from the Department of Agriculture, Food and the Marine
- Land Parcel Identification Numbers
- Water:
  - Water bills for previous 12 months (if using water supply other than own well)
  - Results of any water quality tests
- Feed - dockets for the previous 12 months
- Results of the most recent silage tests

Using this information, the Smart Farming agronomist prepares a draft desktop Assessment, which focuses on identifying average cost savings on each participating farm of €5,000. This is delivered by concentrating on the eight themes of soil fertility, inputs and waste, grassland, feed, energy, machinery, time management and water - as identified in Figure 1.

FIGURE 1: SMART FARMING FOCUS AREAS

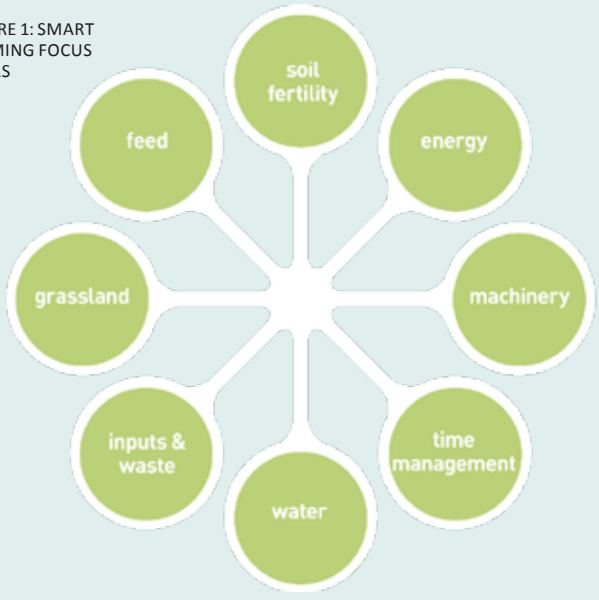


FIGURE 4: THE STAKEHOLDERS THAT COLLABORATE TO MAKE THE SMART FARMING DIFFERENCE

The net cost savings identified often require an initial investment. For example, an expenditure on lime may be required to address underlying soil pH issues, in order to maximise grass growth and reduce more expensive concentrate requirements. Therefore, the cost savings identified in the draft Resource Efficiency Assessment will also include the likely payback period, so that the farmer can determine whether it is reasonable when considered against the investment required.

The agronomist then completes a farm walk with each participating farmer. This is used to examine the information provided and to get a more complete understanding of particular areas of farm management including the grassland reseeding plan, approach to feed purchasing, energy management and nutrient management.

The Resource Efficiency Assessment is then finalised and discussed with the participating farmers in advance of the Assessment being disseminated to the host farmer's discussion group, IFA branch or purchasing group.

At the discussion group meeting, the completed Assessment is presented by the Smart Farming agronomist and the host farmer. Robust and challenging exchanges usually take place during which the recommendations in the Resource Efficiency Assessment are questioned and debated.

Smart Farming – enhancing the environment

As part of the Resource Efficiency Assessments, participating farmers receive a suite of environmental indicators for their farms.

A carbon reduction strategy for each farm is developed by using the Carbon Navigator (Figure 3) decision support tool developed by Teagasc and Bord Bia. The Carbon Navigator provides an estimate of greenhouse gas emission reductions that can be delivered on each participating farm, by achieving the targets which are set.

Soil tests are also taken and a nutrient management plan for each participating farm is completed, using the Teagasc Online Nutrient Management Planning tool. Maps are generated which indicate the existing soil fertility levels, as well as the liming and fertiliser requirements.

FIGURE 3: TEAGASC AND BORD BIA CARBON NAVIGATOR

FIGURE 5: IFA NATIONAL ENVIRONMENT COMMITTEE ON WATER MINI-CATCHMENTS STUDY TRIP AND PLANNING MEETING IN TEAGASC JOHNSTOWN CASTLE.

The quality of the water from the domestic water well and quality of the silage are also analysed. Recommendations are provided regarding feed management strategies based on the results of the silage tests.

Smart Farming – stakeholders collaborating to make a difference

A unique aspect of Smart Farming is the enthusiastic willingness of farmers, representative organisations, academia, advisory bodies, technical institutions and state agencies (Figure 4) to collaborate and share their knowledge and expertise in a targeted way to deliver change. The focus of all this collaboration is a desire to improve farm incomes and enhance the rural environment, through better resource management.

Smart Farming experts from these organisations continue to significantly enhance the efficacy and standard of resource efficiency messages communicated to farmers. These individuals devised and developed the scientific, agronomic and economic content of each of the eight themes on the Smart Farming website, www.smarttfarming.ie

They also contributed to a comprehensive Smart Farming guide, which provides top-tips on how to save money on feed, fertiliser, energy and water bills; as well as ideas on reducing waste and the environmental impact.

Smart Farming – farmers making the real difference

The most important part of the Smart Farming programme is that farmers themselves continue to lead the programme's evolution.

The National Environment Committee (Figure 5) of the Irish Farmers' Association, which comprises of farmer representatives from every county in Ireland, has taken an adaptive leadership approach when developing this programme and dealing with the agri-environmental challenges facing the sector.

They recognise the issues in terms of air, water, soils, climate and other areas within farming and have moved beyond a standard enforcement and compliance approach. The Committee established the eight focus areas (Figure 1) of the Smart Farming programme; expanded the initial cost saving focus of the programme to incorporate environmental indicators; proofed the guide and all national communications; as well as participated in the studies. They also supported the Smart Farming Programme Leader and Manager in continuing the collaboration with others to deliver on better resource management, which will improve farm returns while enhancing the rural environment.

Smart Farming results for 2017

In October 2017, Smart Farming's Progress Report 2017 was published. Figure 6 provides a summary of the results, with the average cost savings target of €5,000 being exceeded by 74% and the target to identify greenhouse gas emissions reductions of 5-7% also being exceeded.

Are you ready to take the Smart Farming challenge?

Are you ready to take the Smart Farming challenge? We are currently recruiting farmers, who may be interested in taking part in 2018. Let's talk - smartfarming@ifa.ie and 01-4260343

Thomas Ryan, IFA

You can watch Smart Farmer Andrew McHugh make a presentation to the Citizens Assembly meeting on Climate Change on the Smart Farming website: www.smartfarming.ie/case-studies/andrew-mchugh/ - we'll be including details of Andrew's Case Study in the next Catchments Newsletter.

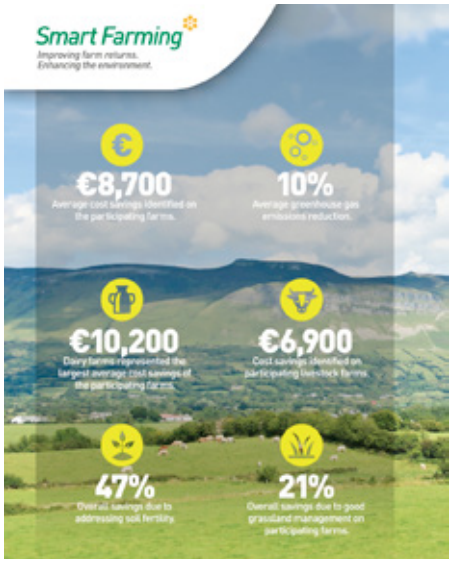


FIGURE 6: SUMMARY OF THE RESULTS FROM THE 2017 SMART FARMING PROGRAMME

'Farmland Guidelines: Actions to help Pollinators' aims to get Ireland's farmland buzzing again

The All-Ireland Pollinator Plan's 'Farmland Guidelines: Actions to help Pollinators', which offers evidence-based actions farmers can take to help protect bees and enhance the livelihoods of farmers who rely on their invaluable pollination service was launched on September 20th at the Ploughing Championships by Minister of State at Department of Agriculture, Food and the Marine Andrew Doyle TD.

The Farmland Guidelines detail five ways to help make farmland more pollinator friendly:

1. Maintain native flowering hedgerows
2. Allow wildflowers to grow around the farm
3. Provide nesting places for wild bees.
4. Minimise artificial fertiliser use
5. Reduce pesticide inputs

Pollinators – our bees, bumblebees, hoverflies and other pollinating insects – have suffered huge declines in recent decades, with many now at risk of extinction. To address these declines and to try create an Ireland where pollinators can survive and thrive, the All-Ireland Pollinator Plan was launched in 2015. The All-Ireland Pollinator Plan is a shared plan with over 80 partner organisations, and has received support and funding from Bord Bia and the Heritage Council.

People often think the honeybee is solely responsible for all pollination, but in actual fact most is carried out by wild bees. In Ireland, we have 1 honeybee species, 20 bumblebee species and 77 solitary bees. 'Unfortunately, Irish pollinators are in decline, with one third of our 97 wild bee species threatened with extinction,' according to Dr Úna FitzPatrick, from the National Biodiversity Data Centre, who is responsible for coordinating the All-Ireland Pollinator Plan. 'In order to produce the Farmland Guidelines, we worked with farming organisations and went through an extensive consultation phase with farmers to come up with straightforward, evidence-based actions to help our native bees.'

One of the main reasons for bee declines is hunger – there are simply not enough wildflowers in our landscapes today to provide enough food for bees. Bees rely entirely on nectar and pollen for food, which makes them our most important insect pollinators. A lack of safe nest sites, pesticides, and climate change also negatively impact bee survival.

"The All-Ireland Pollinator Plan is not just about conserving bees but is also about protecting the livelihood of farmers and growers who rely on their 'free' pollinator service, which allows consumers to buy Irish fruit and vegetables at an affordable price" Dr Fitzpatrick continued. "Not only do pollinators contribute to the Irish economy directly through crop pollination, they also contribute to our landscape and our 'green' image that is so vital to marketing our agricultural produce abroad. Some 78% of our wild plants benefit from insect pollination, so without healthy populations of wild bees, the Irish landscape would be a much different - less beautiful - place. This indirect value of pollinators to branding Irish products and to our agricultural export business is enormous."

MINISTER OF STATE AT THE DEPARTMENT OF AGRICULTURE, FOOD AND THE MARINE, ANDREW DOYLE TD LAUNCHING THE FARMLAND GUIDELINES AT THE PLOUGHING CHAMPIONSHIPS ON SEPTEMBER 20TH 2017. PICTURED WITH CATHERINE KEENA, TEAGASC; UNA FITZPATRICK, COORDINATOR OF THE ALL IRELAND POLLINATOR PLAN; GERRY RYAN, PRESIDENT OF THE FEDERATION OF IRISH BEEKEEPER ASSOCIATIONS; PROF. JANE STOUT, TRINITY COLLEGE DUBLIN AND DEPUTY CHAIR OF THE ALL IRELAND POLLINATOR PLAN; AND TARA MCCARTHY, CEO, BORD BIA.

The new Farmland Guidelines have been developed in collaboration with Bord Bia and specifically Origin Green, the national sustainability programme for the Irish food and drink industry. Farmers who are certified to one of the Bord Bia Sustainable Quality Assurance schemes are members of the Origin Green programme. Each week, a team of over 100 Bord Bia Quality Assurance auditors undertake approximately 800 inspections on beef and dairy farms around Ireland. These inspections include compiling data on the sustainability of each farm. Over 160,000 assessments have been carried out to date, looking at responsible farm management measures including biodiversity, the use of water, energy, feed and fertiliser. Bord Bia has worked with the National Biodiversity Data Centre to incorporate elements of the All-Ireland Pollinator Plan into their new Sustainable Quality Assurance schemes. Actions identified to help pollinators will contribute towards a farmer's sustainability criteria.

The Farmland Guidelines are available for download at www.pollinators.ie along with lots of tips and other resources on how to help.

Paddy Morris, EPA Catchments Unit

Battling the invaders in Duhallow

There is a war being fought across Duhallow to control the alien invasive plant species Japanese knotweed. IRD Duhallow's RaptorLIFE project has committed a huge amount of time into trying to eradicate this plant within Duhallow (located in North Cork and East Kerry). RaptorLIFE is a 4.5 year programme (2015-19), whose overarching objective is to bring local communities together to achieve a better environment for everyone within the region. They are doing this by connecting and restoring upland habitats for hen harrier and merlin, as well as freshwater habitats for Atlantic salmon and brook lamprey. A large part of this restoration work involves the control of invasive species.

TREATING KNOTWEED BESIDE A ROAD

The invasive plant, Japanese knotweed is now common across Ireland, particularly along rivers, roads and on waste ground. It blocks routes used by wildlife to disperse, damages flood defence structures and leaves riverbanks exposed to erosion when it dies back in winter. Not only an environmental problem, Japanese knotweed can seriously damage houses, buildings, and infrastructure by growing through concrete, tarmac and other hard surfaces. For example, knotweed costs the UK economy an estimated £166 (€186) million per year for treatment and home devaluations.

INJECTING WEED KILLER DIRECTLY INTO THE STEM OF JAPANESE KNOTWEED

The spread of Japanese knotweed is a global problem and whether it can be eradicated in Ireland is debatable. Eradicating invasive species is an attainable goal if new infestations are detected early. However, eradication might not be feasible when populations are large and widespread. A more realistic management goal for knotweed could be to control the plant by reducing its density and abundance to a level that does not compromise the integrity of the ecosystem and allows native species to thrive. In this case, control strategies must strike a balance between the ecological impacts of allowing invasive species to spread and the economic considerations of control measures. The UK is trialling a number of novel control methods including the introduction of a tiny sap-sucking psyllid bug, which has been found to inhibit the growth of Japanese knotweed, leaving it weakened and less able to exploit its invasive abilities.

In 2016, RaptorLIFE treated 367 stands of knotweed on Duhallow roads and riverbanks. In 2017, this effort was significantly increased with 644 stands of knotweed treated. Knotweed can be controlled successfully through the application of appropriate herbicides (typically glyphosate); however, eradication of the plant usually takes several years depending on the size of the infestation. Data on successful eradications in Ireland is limited so RaptorLIFE are trialling a number of methods and recording important information about each stand including its size, location, method of treatment, and the proportion of the stand that died following treatment. While the 2017 data is still being collated, preliminary results show that the proportion of the stand killed following treatment in 2016 varied between 50 to 100%, with spraying more effective than the stem injection method. While RaptorLIFE have won this years' battle against knotweed, whether they win the war is another story.

JAPANESE KNOTWEED

RaptorLIFE would like to acknowledge and thank all of the landowners, supporters and volunteers for their assistance with the project to date.

If you would like further information or to participate as a volunteer, you can contact them on Tel: 029-606 33; Email john.ballinger@irdduhallow.com; Website www.duhallowlife.com/raptor-life or Facebook www.facebook.com/IRDDuhallowLifeProject/

John Ballinger, RaptorLIFE Project Scientist

RaptorLIFE is an EU LIFE+ project delivered with the contribution of the LIFE financial instrument of the European Union.

Comprehensive bird survey being undertaken along Shannon Estuary

The most comprehensive bird population and habitat survey ever undertaken on the Shannon Estuary has been underway since May 2017. This work is being completed as part of the Strategic Integrated Framework Plan for the Shannon Estuary.

Some of the birds that will be in the survey include bar-tailed godwit, cormorant, curlew, dunlin, greenshank, golden plover, grey plover, knot, lapwing, pintail, ringed plover, wigeon, shelduck, shoveler and scaup.

The survey commenced in May 2017 and is being carried out in accordance with the EU Birds Directive, which dictates that an assessment of any such development requires that the most up-to-date comprehensive geospatial data on bird populations is available.

One of the broad objectives of this plan for the Shannon Estuary is "to establish an evidence-based approach to identifying areas for future development to ensure that proposals will work in harmony with the designated European sites". The plan identified Strategic Development Locations for marine-related industry and Areas of Opportunity for aquaculture and renewable energy generation. Appropriate Assessment of any future development requires that the most up-to-date comprehensive geospatial data on bird populations is available.

As part of the implementation of the plan, a comprehensive survey of the entire River Shannon and Fergus Estuaries SPA (Site Code: 004077) is being undertaken to establish the baseline bird usage across the site over the 2017 to 2018 period.

The year-long study is being undertaken by McCarthy Keville O'Sullivan on behalf of the Shannon Estuary Strategic Infrastructure Framework Plan (SIFP) Steering Group, comprising stakeholders engaged in the development and management of Ireland's largest and deepest estuary.

Clare County Council, Kerry County Council and Limerick City & County Council, the region's local authorities, have joined with Shannon Group and Shannon Foynes Port Company in promoting 'Deep Water Marine Investment Opportunities' on 1,220 hectares of land at 6 Strategic Development Locations deemed appropriate for marine-related investment. The sites, which are zoned for marine-related industry in Regional and Local statutory development plans, include Moneypoint (280Ha), Innismurry/Cahericon (65Ha) in Clare, Askeaton (98Ha), Foynes Island (40Ha), and Foynes Port and adjoining lands (186Ha) in Limerick, and Tarbert - Ballylongford Landbank (550Ha) in Kerry.

THE SHANNON ESTUARY STRATEGIC INTEGRATED FRAMEWORK PLAN

The proposed bird usage survey area stretches from Limerick City to where the Shannon Estuary meets the Atlantic Ocean in West Clare and North Kerry. The survey began during May 2017 and is being carried out in accordance with the EU Birds Directive which dictates that an assessment of any such development requires that the most up-to-date comprehensive geospatial data on bird populations is available.

Surveys such as the Irish Wetland Bird Survey (I-WeBS) are among the longest-running of the national wildlife monitoring schemes in Ireland and is highly dependent on the input of volunteers and staff of National Parks and Wildlife Service (NWPS). While such surveys have been carried out in the Shannon Estuary in the past a review of these surveys has indicated there are significant data gaps which need to be filled. Many area of the estuary have achieved inadequate or poor coverage during I-WeBS with only one season covered. Therefore, it is critical that an adequate baseline is acquired in order to provide investor confidence and inform future development.

The Shannon Estuary features 500km^2 of navigable water running from Kerry Head and Loop Head as far as Limerick City, a distance of 100km. The Estuary is Ireland's premier deepwater port routinely catering for ships up to 200,000 deadweight tonnage (dwt) with key ports at Limerick and Foynes and direct connectivity to all major international shipping lanes. It is home to several large industrial sites, including ESB Moneypoint, Aughinish Alumina, Tarbert Power Station, Shannon International Airport and NORA Fuel Reserve.

www.shannonestuary.ie

Pesticides - modelling catchment management solutions

Throughout the UK, water companies are detecting pesticide concentrations above the regulatory drinking water standard in surface waters supplying their reservoirs and river intakes. Conventional water treatment can readily remove many pesticides but requires advanced treatment which has varying levels of effectiveness. With the Water Framework Directive discouraging additional treatment and encouraging up-stream thinking, catchment management is widely being considered as the solution to reducing pesticide concentrations.

AGRICULTURAL LAND IN ONE OF THE UK CATCHMENTS MODELLED IN THIS STUDY

Water quality monitoring in rivers and surface water abstractions throughout the UK reveals a widespread problem with pesticides such as MCPA, 2;4-D, metaldehyde, quinmerac and clopyralid occurring above the 0.1µg/l EU drinking water standard. Pesticides are used widely, particularly in agriculture, forestry, horticulture, transportation, amenity, and industry, so a proactive approach is needed to tackle the issue and prevent exceedances being recorded in drinking water supplies.

Given these recorded concentrations, water companies are taking action to meet these obligations set by the EU, and adhere to Article 7 of the Water Framework Directive to improve the quality of water used for public supply without commissioning additional treatment.

Catchment management can reduce the need for water treatment; improving the water environment and allowing water companies to meet their obligations in a cost-effective way. To ensure catchment initiatives deliver the maximum possible benefit to water companies and the environment we need to determine the sources of diffuse pesticide pollution and which areas of the catchment are contributing the most.

We have been working with UK water companies and regulators over the past seven years to help answer three key questions:

1. Will catchment management measures reduce diffuse pollution from agriculture in surface water sources?
2. If so, where will catchment management be most effective, and
3. What type of control measures and mechanisms should be promoted?

Approach

We developed a modelling approach to assess the effectiveness of catchment management for reducing pesticide concentrations at surface water intakes. We built robust catchment-specific models, calibrated for hydrology and water quality, and used these to simulate scenarios to test the potential effectiveness of targeted catchment management interventions.

Stage 1 – Catchment conceptualisation

We started each catchment study by taking a holistic approach to understanding the catchment and its water quality, integrating data on hydrology, hydrogeology, water quality and agronomy. We walked the catchments, and talked to local agronomists/agricultural advisors and stakeholders to build up an appreciation of each catchment. From this, we developed a conceptual understanding of each catchment, and sensitivity maps to help focus the modelling efforts. We use sensitivity maps to identify the locations of land uses and soil types that have the highest risk of pesticide runoff (and an example is shown Figure 1).

Stage 2 – Model build and calibration

Where the catchment conceptualisation indicates that the source of the water quality problem is likely to be derived from a specific subcatchment, we have used source apportionment analysis and simple reservoir balance models to determine if this is the case. This analysis provides a simple, cost-effective way to assess the likelihood of achieving regulatory compliance by targeting the problem subcatchment.

Where a more detailed approach is required we have used the Soil and Water Assessment Tool (SWAT) (http://swat.tamu.edu/) to simulate catchment hydrology and pesticide transport. SWAT predicts the impact of land management practices on water, sediment and agricultural chemical yields in large complex watersheds with varying soils, land use and management conditions over long periods of time. We use data on topography, soils, land use, geology, climate, cropping, water management, and pesticide properties in the catchment models. The hydrology of the models is calibrated against recorded flow data from gauging stations, and water quality is calibrated to pesticide monitoring data (an example is shown in Figure 2).

Stage 3 – Catchment management scenarios

Using the calibrated models, we simulate a series of catchment management scenarios, including no pesticide applications in specific areas of the catchment, and reduction of pesticide application rates. We use the results to determine which scenario is most effective at reducing pesticide concentrations, and which areas of the catchment contributes the most pesticide at the drinking water source. An example is shown in Figure 3, in which the model results suggest that implementing catchment management in the target areas shown could reduce metaldehyde concentrations in the reservoir by more than 95%.

We have found that, while the greatest relative reductions in pesticide concentration are predicted for interventions in high risk areas, these are often relatively small areas of the catchment, and measures are required over much larger areas to achieve the regulatory limit.

Outcomes

Our clients use the results of our investigations to inform the conceptualisation of pesticide risks in their catchments and to quantify the potential benefits of implementing targeted control measures. Following on from this, results have been used in business planning, including justifying employing catchment advisors to work with farmers.

Based on the outputs of the model scenario outputs, Anglian Water have implemented their Slug It Out campaign [1] to encourage farmers to use an alternative to metaldehyde in the natural catchments of their reservoirs. This initiative has had great success, with 100% uptake in the catchments.

[1] www.anglianwater.co.uk/environment/our-commitment/our-plans/slug-it-out.aspx

ARTICLES

For Severn Trent Water our investigations have built on the modelling and included an ecosystems services appraisal and cost-benefit analysis. We used Environment Agency and UK Water Industry Research (UKWIR) tools to calculate benefit-cost ratios for the potential interventions and make recommendations on which to implement.

Catchment management techniques and policies continue to evolve, and so we are continuing to develop our approach. Our current work includes:

- Integrating the SWAT model with groundwater models to simulate nitrate transport.
- Updating the SWAT models to include new data, including feedback from catchment advisors, to increase our confidence in the results.
- Integrating the SWAT models into a cloud-based platform to forecast elevated pesticide concentrations and inform abstraction management.
- Considering natural flood risk management alongside water quality management.

James Knightbridge, Nicola Nineham, Frances Elwell, Fintan McGivern and Paul Kelly, Catchment Management, Mott MacDonald

Acknowledgements

Anglian Water Services Limited, Severn Trent Water Limited

Mott MacDonald is a multidisciplinary engineering, scientific, management and international development consultancy with offices in 150 different countries worldwide including Cork and Dublin in Ireland.

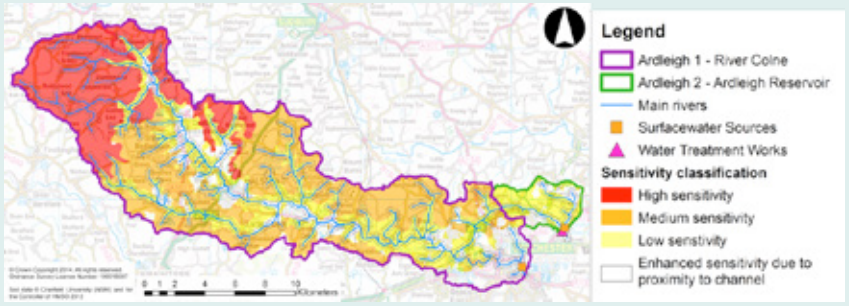


FIGURE 1: SENSITIVITY MAPS FOR PESTICIDE RUNOFF

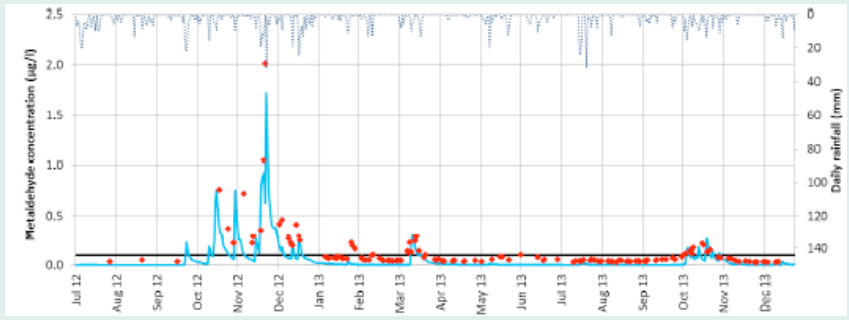


FIGURE 2: PESTICIDE CALIBRATION AGAINST RECORDED DATA

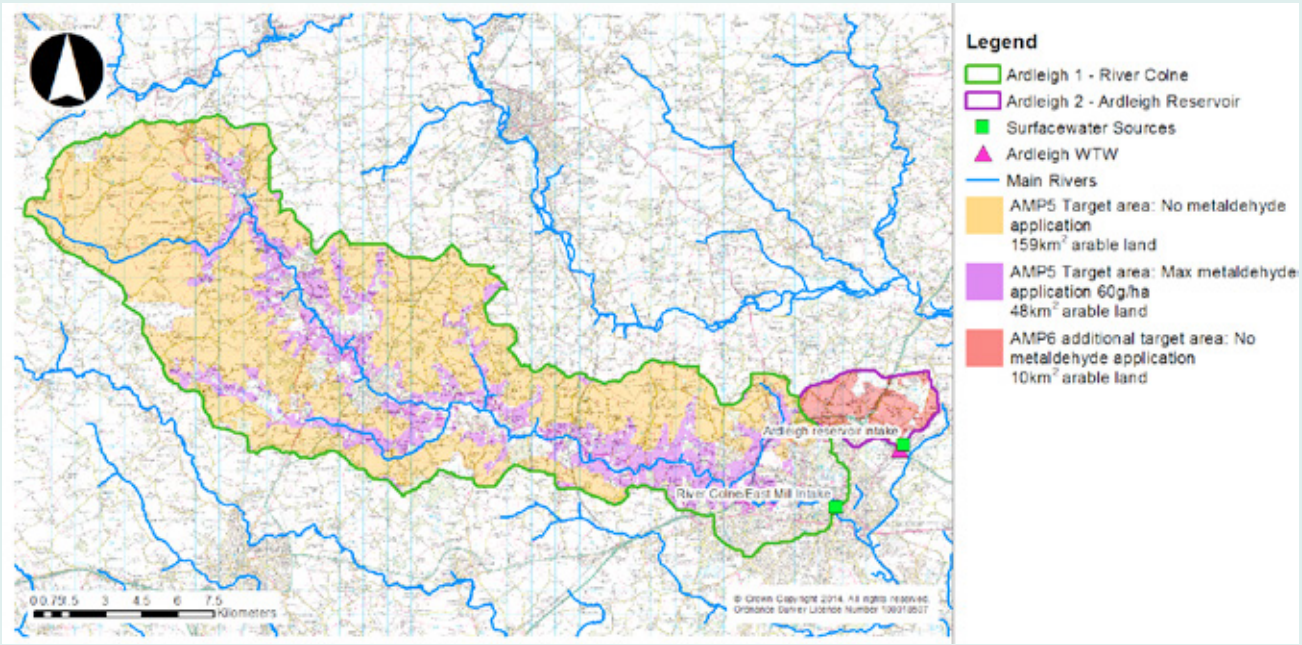


FIGURE 3: CATCHMENT MANAGEMENT TARGET AREAS

Nutrient modelling indicates most nutrient losses to surface waters are from diffuse sources

New estimates indicate that diffuse sources outweigh point sources in most sub-catchments. The main cause of unsatisfactory water quality in Ireland is excess phosphorus and nitrogen emissions that can come from sewage discharges, agricultural land, and other sources. Recent EPA-funded research, the CatchmentTools project, has produced estimates of the nutrient losses to Irish surface waters from nine main sources using geospatial modelling. The sources were grouped into point discharges (municipal wastewater treatment plants, industry and septic tank systems) and non-point, or diffuse, sources (pasture, arable, diffuse urban, forests, peatlands, and deposition on water). The results were used by the EPA Catchments Unit to support the identification of significant pressures for the development of the River Basin Management Plan.

Main sources of phosphorus and nitrogen in Irish rivers

These new estimates indicate that over 50% of phosphorus and over 80% of nitrogen losses to surface water are from 'non-point' sources.

The main sources of phosphorus are municipal wastewater discharges and agriculture, with the relative contributions varying by region (Figure 1). The clear dominance of wastewater in the East (78%) reflects the distribution of the population, which is clustered around Dublin. Pasture is the main diffuse source of phosphorus, contributing up to 47% at regional level. In these estimates, however, runoff from farmyards are included in the 'diffuse' pasture category even though they are point sources. Forests and peatlands were estimated to contribute up to 13% and 23%, respectively, of phosphorus emissions in some regions, whereas contributions from septic tank systems and regulated discharges (i.e. industrial discharges) were low across all regions, representing less than 3% of phosphorus emissions.

Agriculture is the main source of nitrogen in Irish rivers, which is typically the case across Europe (Bøgestrand et al., 2005). Contributions from wastewater were low in all regions (less than 7%) except for the East (33%), the latter due to the high proportion of the population living in this region (Figure 1).

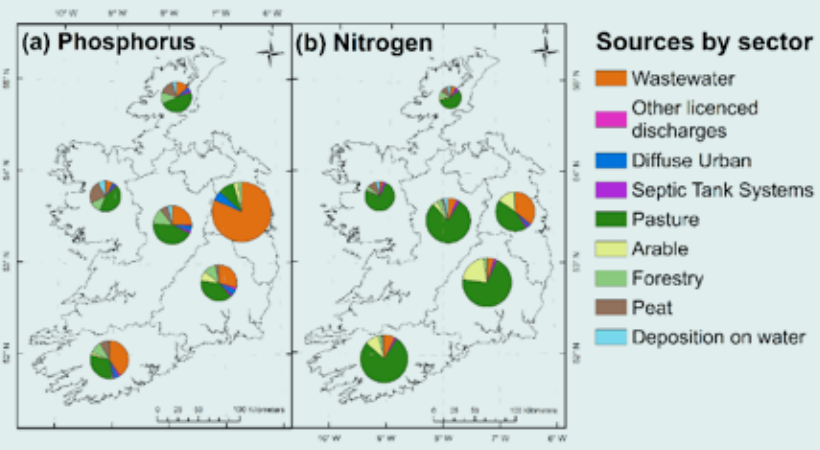


FIGURE 1: LOAD APPORTIONMENT OF (A) PHOSPHORUS AND (B) NITROGEN EMISSIONS TO WATER BY REGION. THE SIZE OF THE PIE INDICATES THE RELATIVE TOTAL NUTRIENT EMISSIONS.

Further details on the methods, assumptions and testing of the Source Load Apportionment Model (SLAM) that was developed to produce these results are in Mockler et al. (2017).

Diffuse sources outweigh point sources in over 90% of sub-catchments

Point sources are generally located in urban areas where the associated wastewater and industrial discharges drive high levels of emission. In fact, looking at a local scale, when we examine the 583 subcatchments across Ireland, only 8% of these are dominated by point sources and these typically impact estuaries and coastal waters of towns and cities (Figure 2). In the remaining areas, a high percentage of phosphorus and nitrogen emissions to water are from pasture. This reflects the fact that farmland covers ~65% of the land surface of Ireland. For phosphorus, these areas typically coincide with agricultural lands with poorly draining soils. For nitrogen, however, agricultural intensity has a dominant impact, with most emissions coming from the East and South of the country reflecting the coincidence of higher intensity agricultural land on more freely draining soils.

Although 30% of population use septic tank systems, these contribute less than 3% of total annual nitrogen and phosphorus loads. However, the treatment efficiency from septic tank systems varies widely and underperforming systems have the potential to cause impact in small streams, particularly in areas of poorly draining soils and subsoils during low flow periods, when there is little baseflow for dilution (Archbold et al., 2010; Withers et al., 2012). In areas with a high density of septic tank systems (over 19 per km^2), their contributions to annual nutrient loads can be up to 22% for phosphorus and 13% for nitrogen (Gill and Mockler, 2016).

Supporting Catchment Characterisation

Catchment management can be supported by modelling at a range of scales and levels, all of which can reduce the resources required to analyse substantial amounts of information. The Source Load Apportionment Model results were one of the many datasets included in the EPA's Water Framework Directive characterisation process for the second cycle of the Directive, that informed 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.

Where chemical and ecological monitoring data, local knowledge or other information indicated that excess nutrients were impacting on a water

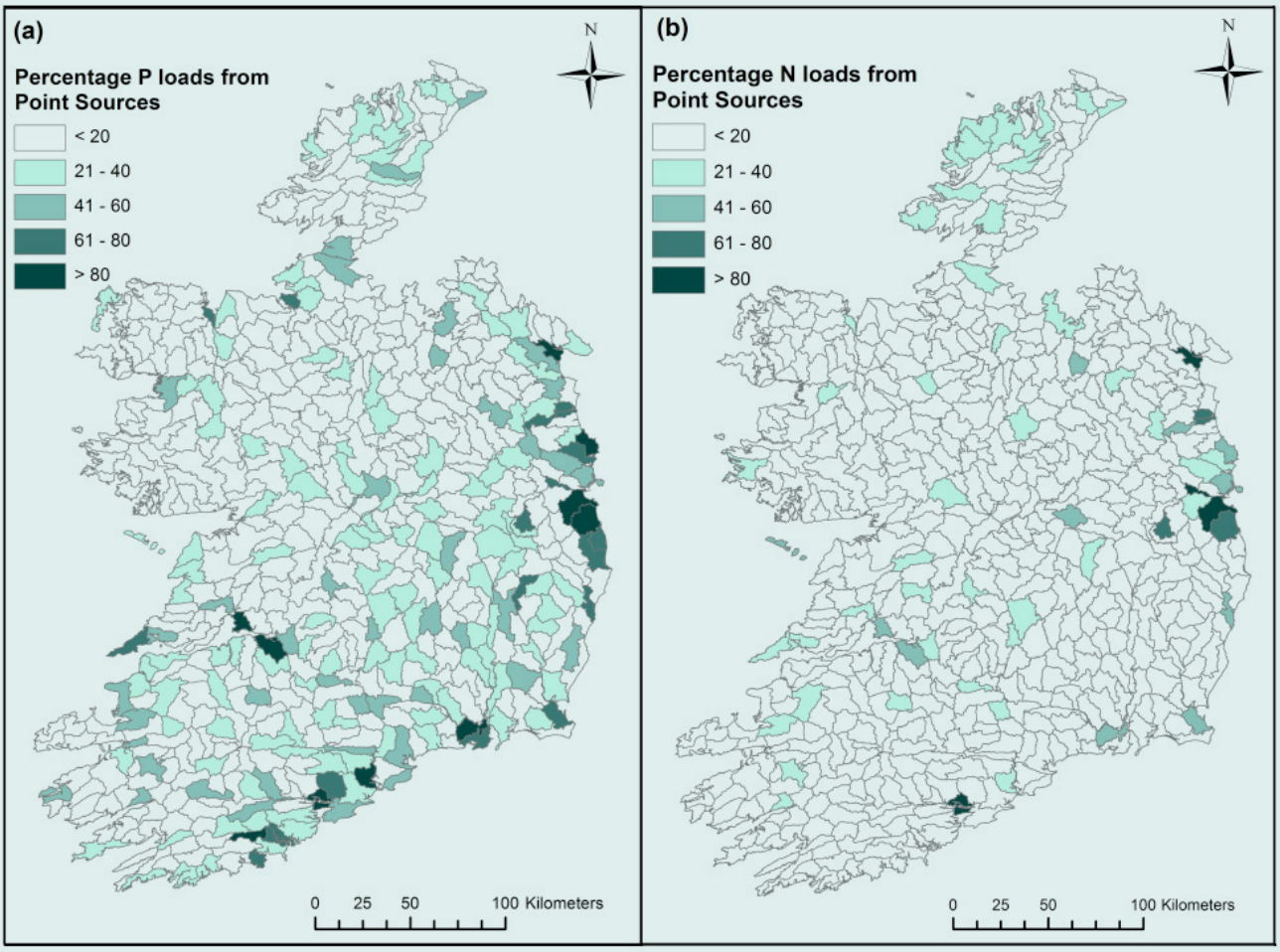


FIGURE 2: PERCENTAGE CONTRIBUTIONS FROM POINT SOURCES FOR PHOSPHORUS (A) AND NITROGEN (B) FOR THE 583 SUB-CATCHMENTS IN IRELAND.

body, the model results were interpreted by catchment scientists along with the other national datasets including:

- ecological status and trends in ecological and chemical monitoring data;
- information on land use, pressures, pathways and the sensitivity of receptors;
- licence, enforcement, audit and inspection information from regulatory agencies; and
- local, on-the-ground knowledge from the Local Authorities and Fisheries agency staff.

Reducing nutrient losses and improving water quality – understanding pressures and connections

Agriculture has been identified as a significant pressure in 729 (64%) river and lake water bodies that are At Risk of not meeting their environmental objective (draft RBMP). Progress has been made in reducing nutrient losses from agriculture in recent decades, but further improvements are needed to decouple the relationship between agricultural productivity and emissions to water. Studies have shown that nutrient losses from agricultural land do not occur uniformly in the landscape but from 'hot spots', or critical source areas, where the source of nutrients have a pathway that connects them to a surface water body. For phosphorus, this pathway can be poorly drained slopes, whereas for nitrogen well drained soils over a permeable aquifer is a major pathway (Deakin et al., 2016). The results from the CatchmentTools project were used to examine the dominant pathways in all sub-catchments, and showed that rate of phosphorus losses from pasture increases with the percentage area of poorly drained soils in a sub-catchment. These results were statistically significant - $r^2 = 0.87$, $p = <0.001$, see Figure 3.

New Irish research is developing water quality models and risk assessment tools to help identify these high-risk areas to help reduce the overall losses of nutrients to surface waters in Ireland. Discover more research from the DiffuseTools project at cwrr.ucd.ie/diffuse

Eva Mockler, UCD Civil Engineering

A fully referenced version of this article will be available on www.catchments.ie

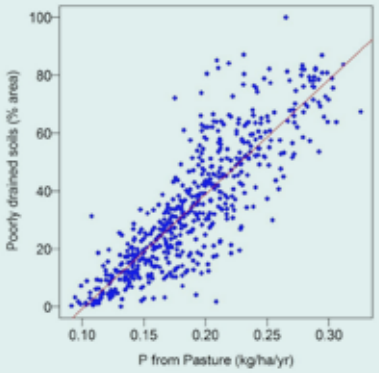


FIGURE 3: STRONG RELATIONSHIP BETWEEN THE PERCENTAGE AREA OF POORLY DRAINED SOILS AND THE ESTIMATED LOSSES OF PHOSPHORUS FROM PASTURE FOR THE 583 SUB-CATCHMENTS IN IRELAND.

RESOURCES

German Study: Economics of ecosystems and biodiversity: nature conservation and climate policy are mutually beneficial

A new study has assessed the value of ecosystem-based approaches to mitigating climate changes and conserving biodiversity in Germany. The researchers highlight the trade-offs and synergies between climate adaptation and nature conservation and suggest that effective ecosystem-based climate policy requires improved coordination between different sectors, such as agriculture, forestry and energy.

Climate policy can affect ecosystems and land use in variety of ways, either complementing or occasionally conflicting with policies aimed at conserving biodiversity. Nature-based solutions — those which use or imitate natural processes — can benefit both biodiversity and climate change adaptation and mitigation. The ecosystem approach in relation to climate policy involves the sustainable management of ecosystems to implement mitigation and adaptation actions, for example, by conserving forests to protect natural stores of carbon within trees and decrease soil erosion or water flows, thus reducing the impacts of floods. On the other hand, climate change adaptation measures, such as the strengthening of grey flood defences, may in some instances interfere with natural processes and therefore, affect biodiversity.

The researchers say that to successfully implement ecosystem-based climate policy in Germany there needs to be improved coordination between different sectors (e.g. agriculture, forestry and energy), and they identify three main recommendations to this end:

- Ecosystems with high natural carbon storage (e.g. peatlands and forest) should be protected and form a key part of an ecosystem-based climate policy
- Cost-effective measures should be pursued where possible, due to the high costs of ecosystem conservation and restoration
- Climate-orientated land-use strategies should be developed, with appropriate targets and measures to ensure effectiveness. Adequate means (regulatory instruments, incentives, funding, etc.) are required to develop such strategies

You can read more online: www.bit.ly/ecosystemsbiodiversityeconomics

From "Science for Environment Policy": European Commission DG Environment News Alert Service, edited by SCU, The University of the West of England, Bristol.

EPA Research 223: A Summary of the State of Knowledge on Climate Change Impacts for Ireland

Background

The background to this report lies with its predecessor, the first State of Knowledge on Climate Change Impacts for Ireland (Desmond et al, 2009). That report filled a large knowledge gap by providing an authorative synthesis of the available information on climate change impacts and adaptation. Since then we've had the publication of the IPCC 5th Assessment Reports (2013) and numerous national level reports on all aspects of climate change science, impacts and adaptation. In addition, we've begun to see the implementation of adaptation at sectoral and local levels. This new reality has created an urgent need for an updated synthesis report that accurately reflects the scientific advances made nationally in knowledge and information generation. The report represents the distillation of a large body of work, largely carried out through research activities since 2009.

Identifying Pressures

Changes in Ireland's climate are in-line with and similar to relevant global trends. Climate change will have diverse and wide ranging impacts on our environment, society, economic sectors and natural resources. The challenge is to provide decision makers at all levels and the general public with high quality information to make informed decisions on policy development and investments that will be resilient to the impacts of climate change. This report provides: 1) a summary of observed and projected changes in the Irish climate across a number of key parameters; 2) a synthesis of knowledge of ongoing and anticipated climate change impacts across a number of environmental and economic sectors and: 3) recommendations for further steps required to support policy development and aid the implementation of adaptation nationally.

Informing Policy

The information summarised in this report will assist in the development of coherent and rational decision making at the national, sectoral and local level, namely by:

- Providing a high level synthesis of existing climate change information across a number of key parameters such as temperature, precipitation, sea level rise and extreme weather events;
- Providing a synthesis of ongoing and anticipated climate change impacts across a large number of environmental and economic sectors;
- Providing a summary of possible adaptation options;
- Identifying knowledge gaps and suggestions on how they might be filled.

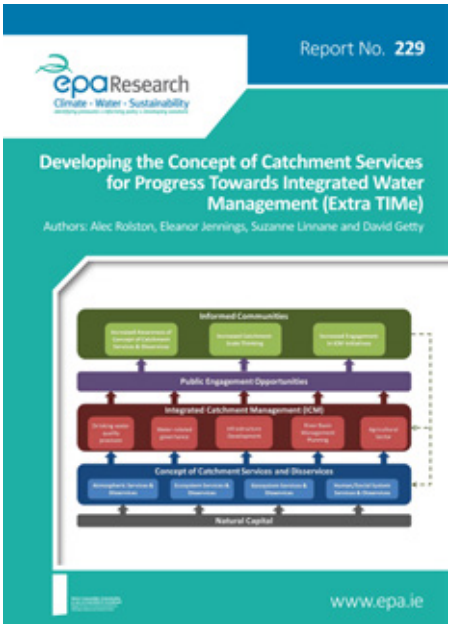
Developing solutions

This report provides Irish decision makers with an authorative and timely summary of the state of knowledge on climate change impacts. It will assist the development of adaptation strategies and plans at national, sectoral and local level decision making. It is part of the solution to the societal challenge of transitioning to a climate resilient Ireland.

www.bit.ly/eparesearch223

You can find additional climate change resources on www.climateireland.ie

RESOURCES



EPA Research 229: Developing the Concept of Catchment Services for Progress Towards Integrated Water Management (Extra TIMe)

Identifying Pressures

The research showed that the sensitivity of catchment services and disservices to future climate change projections varied, with water balance/yield, aquifer recharge, crop yield and water abstraction being the services most sensitive to climate change. The over-abstraction of water resources, flooding and drought were the disservices found to be most sensitive to climate change. As environmental and social policies influence catchment services in different ways, integrated policy development is needed to work across the land-use and water management realms that underpin the principles of Integrated Catchment Management.

Informing Policy

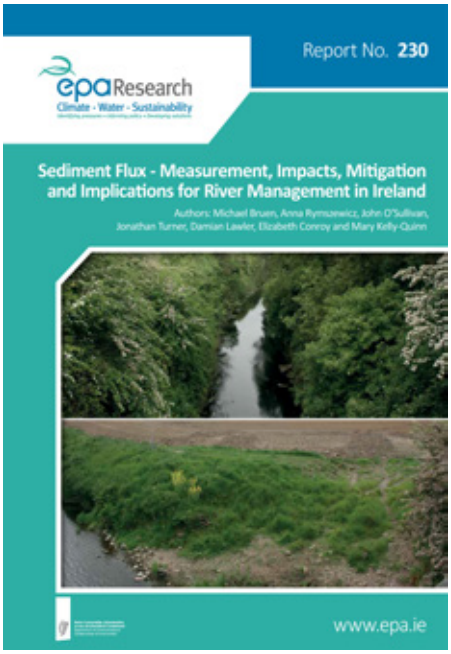
The concept of catchment services and disservices has the potential to underpin environmental and social policy and legislation. Therefore, there are implications for current water governance and engagement across both agencies and communities.

Developing Solutions

The research identified that there are opportunities for the concept of catchment services and disservices to underpin key policy initiatives in to the future, such as current and future rounds of EU WFD river basin management planning, and the National Planning Framework (Ireland 2040-Our Plan).

www.bit.ly/eparesearch229

EPA Research 230: Sediment Flux – Measurement, Impacts, Mitigation and Implications for River Management in Ireland



The SILTFLUX project addressed three major objectives related to sediment pollution in rivers.

1. Increasing knowledge and understanding of silt flux in rivers to help set standards for suspended solids flux and concentrations for the protection of sensitive catchments in Ireland;
2. Assessing the benefits of silt reduction that mitigation measures can achieve, differentiating between the effects of fine and coarse sediments;
3. Understanding the relationship between concentrations/ flux of silt and the potential for ecological impacts when deposited in different types of rivers, and under variable land-use pressures

Identify Pressures

The SILTFLUX project measured sediment flux at high temporal resolution and studied the biological response in selected river catchments of common typologies found in Ireland (focussing, on siliceous and calcareous geologies in combination with pasture and tillage land-uses). While sediment loads delivered by Irish rivers were low in comparison with many European rivers, deposited sediment was more closely associated with biological impact, although disentangling the impacts of sediment from other influences, such as nutrients, is challenging.

Inform Policy

While further study is required before definitive sediment thresholds for impact can be established, a precautionary deposited sediment cover target not exceeding 20% is recommended for the upper reaches of river networks. However, for areas with sediment-sensitive species, a lower target may be advisable. Coordination of methods between agencies collecting sediment data is recommended to facilitate inter-comparison of datasets. SILTFLUX produced a checklist of measures to reduce and mitigate sediment effects in sensitive habitats.

Develop Solutions

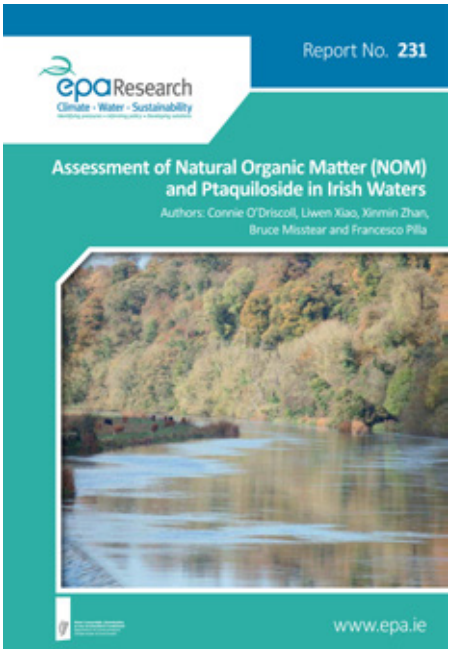
SILTFLUX showed that, with care, turbidity can be used to estimate suspended sediment flux in Irish rivers, but that site and instrument specific calibration equations are required. Long term datasets of these variables are required to establish reliable relationships. The project produced a list of measures for reducing sediment loads and mitigating their effects. The project developed a modelling approach from its own data that could be extended with additional data to estimate sediment flux from ungauged small catchments which can contribute to a national sediment yield map.

The project showed that visual methods for estimating deposited sediment are useful and recommends that the methodology be standardised to enhance the usefulness of such data and in particular their relationship with reference conditions.

Final technical report: www.bit.ly/eparesearch230

Literature review: www.bit.ly/eparesearch176

EPA Research 231: Assessment of Natural Organic Matter (NOM) and Ptaquiloside in Irish Waters



Summary

Ireland has an unacceptably high number of drinking water supplies that exceed the parametric value of 100 µg L-1 for total trihalomethanes (THMs) and has been reporting the highest non-compliance with respect to total THMs in drinking water across the 27 EU Member States.

Identifying pressures

This research identified high-risk catchments for public and private water supplies in relation to NOM across Ireland. This study highlighted that presence of peatland in the catchment is an important factor contributing to THMs in supplies where water has no pre-treatment and receives chlorine disinfection only. Furthermore, in supplies where there is removal, to some degree, of natural organic matter, presence of both peatland and pasture give rise to higher concentrations of THMs. The extent of bracken coverage in Ireland is not known. Ptaquiloside concentrations were detected in the bracken fronds from frond emergence to plant die-off and in the receiving drinking water supply on one sampling occasion at plant die-off.

Informing policy

The findings from this research suggest that there is a need for policy that recommends the use of a high-risk catchment map tool such as that trialled in this research in establishing monitoring programmes for collation of baseline data on NOM quantity and character for the design of new/upgraded WTPs. Audit monitoring of THMs to comply with the Drinking Water Regulations should consider the nature of the source water accounting for both the seasonal flush of NOM in the autumn period and episodic rainfall events where supplies are influenced by such events. Accurate mapping of zones of contribution should be a prerequisite for drinking water supplies. Consideration should be given to the localised predicted effects of climate change on NOM concentrations in water supplies and monitoring of high-resolution data. The extent of bracken coverage in Ireland should be established using remote sensing with ground-truthing to accurately determine the extent of the bracken problem in Ireland. There is a need for policy that can increase the level of awareness of the possible risks of bracken and ptaquiloside to private drinking water wells.

Developing solutions

The establishment of a national water utility in 2014 represents a significant opportunity for improving THM compliance through systematic connectivity and viewing each abstraction source as a function of its catchment rather than of its management boundaries. The findings of the ptaquiloside study from this research suggest that there is a need for stakeholder awareness, with regard to ensuring bracken-free zones close to water abstraction sources, especially for supplies with short water residence times. Investigation into the ptaquiloside concentrations of bracken subjected to different management treatments indicated that spraying with asulam was the most effective means of control for reducing ptaquiloside load. Asulam, the most effective herbicide for eradicating bracken is currently banned in the EU and can only be used with derogation. This finding indicates that cutting bracken may increase the production of ptaquiloside in the short term and hence the potential risk to drinking water quality. However, asulam is a pesticide and is itself potentially harmful to drinking water.

www.bit.ly/eparesearch231

EPA Research 232: Demand for Water-Based Leisure Activity: the Benefits of Good Water Quality

The objective of this research was to determine how water-based recreational activities in Ireland are affected by differences in water quality across recreational sites.

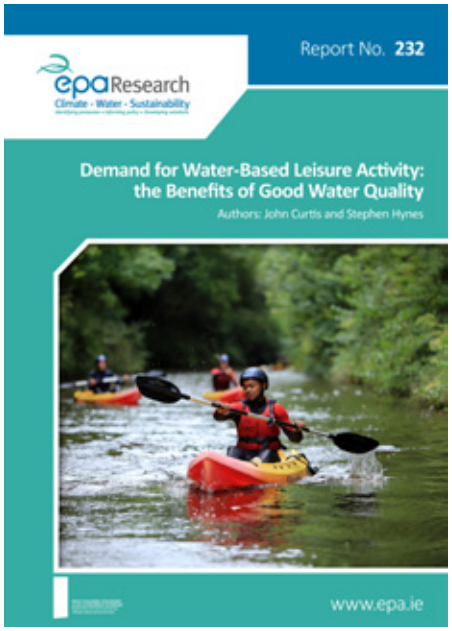
Identify Pressures

The EPA's 2016 State of the Environment report notes that, while the quality of Ireland's surface waters is among the best in Europe improvements are still needed. Over the past six years there was no improvement in quality of river, transitional and coastal waters, while lake water quality has become slightly worse. The quality of Ireland's marine and freshwater resources is of direct importance to the public and especially those that participate in water based recreational activity.

Inform Policy

This research demonstrates that the quality of surface water impacts on the public's water based recreational activity. There is a higher likelihood that waterway users visit waterway locations with a high-quality levels to undertake their recreational activity; and additionally, that recreational trips of longer duration are associated with waterway sites that have high water quality levels.

www.bit.ly/eparesearch232



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