

Catchments Newsletter

Integrated Catchment Management: sharing science and stories



PLIGHT OF THE PEARLS

Young Scientists win with study of Pearl Mussels in the River Allow

Inside this issue

Farming and Biodiversity Photo Competition

Locally Led Agri-Environment Schemes

The Burren LIFE Programme

Hill farming in the Blackstairs


The impact of cattle grazing

Winter land use restrictions

The Floods and Water Framework Directives

All-Ireland Development of Rivers Trusts

Community Engagement in Wetlands

More 

CONTENTS

Inside this issue

Editorial	3	Open Data Released: Ireland's rivers and their catchments	28
News and Articles	4	New Irish Website: High-Nature-Value-Farmland.ie	29
'Plight of the Pearls' – Young Scientists look at Pearl Mussels in the River Allow	4	Chartered Institute of Water and Environmental Managers: Floods and dredging – a reality check	29
'And a river runs through it' - Eco Eye looks at the Blackwater River Catchment	4	UK Environment Agency Blog: What the public have taught me about flooding	29
The development of Rivers Trusts in Ireland	5	EU Website: Natural Water Retention Measures	29
EPA Advice for Private Well Owners Affected by Flooding	5	Dutch Room for the River project	29
Locally Led Agri-environment Schemes: Innovation, partnership, locally adapted and results orientated solutions	6	UK: Multiple Benefits of River and Wetland Restoration – Killer Facts measured from projects implemented on the ground	30
The Burren LIFE Programme – Farming for Conservation	7	Scotland: Learning from community led flood risk management, including natural flood management	30
"The mountain didn't get that way without work"	9	UK Case Study: Making space for natural processes – forest to bog restoration at RSPB Forsinard Flows Reserve	30
DuhallowLIFE: A community led water and nature conservation programme	11	UK South West Water: new Upstream Thinking project launched	30
The impact of cattle on freshwater ecosystems	13	Wheel Report: EU Funding for non-profits	31
Conservation Grazing in the Kerry Uplands	14	Wheel Report: Let's commission for communities	31
Winter land use restrictions: Can they make a difference to river water quality?	15	European Environment Agency- Floodplain Management and Restoring Healthy Ecosystems	31
Drinking Water Safety Plans – from catchment to tap	16	University of Cambridge - Commercial gains from addressing natural capital challenges in the dairy sector	31
Ireland's Catchment Flood Risk Assessment and Management (CFRAM) Programme	18	ESRI Working Paper: Water Quality and Recreational Angling Demand in Ireland	31
Sustainable Community Engagement in Wetlands	19	EPA Research Update	32
WFD Typologies for Lakes: Why are they important and how do we assign them?	21	EPA Research Report 155: Public Engagement in Integrated Catchment Management – StreamScapes recommendations	32
Phase 3 of the Agricultural Catchments Programme begins	22	EPA Research 161 - Assessment of disposal options for treated wastewater from single houses in low-permeability subsoils	32
2015 Farming and Biodiversity Photo Competition –Winners	25	EPA Research 163 - Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE)	32
Water Framework Directive Application – Phase 2 development update, and plans for a public version	26	EPA Research 166 - Characterisation of Reference Conditions for Rare River Types	32
The Water Policy Advisory Committee: joined-up policy-making and the Water Framework Directive	27	EPA Research - Water Research in Ireland 2014-2020	32
Resources	28	Private Wells Infographic	33
Sustainable Water Network – Weekly Newsletter	28		
United Kingdom and Ireland Lake Network	28		

EDITORIAL

Editorial

*'The research suggests that social learning is the key to adaptive processes for tackling water and climate change as part of sustainable communities in Europe for the 21st century. This has resonance in many other facets of building a more sustainable Europe, including personal consumption, climate change, energy use and nature protection.'*¹

While great progress has and is being made on the scientific aspects of catchment management and Water Framework Directive implementation in Ireland, in my view there are significant deficiencies in the areas of **public participation** and **social learning**, which need to be addressed urgently.

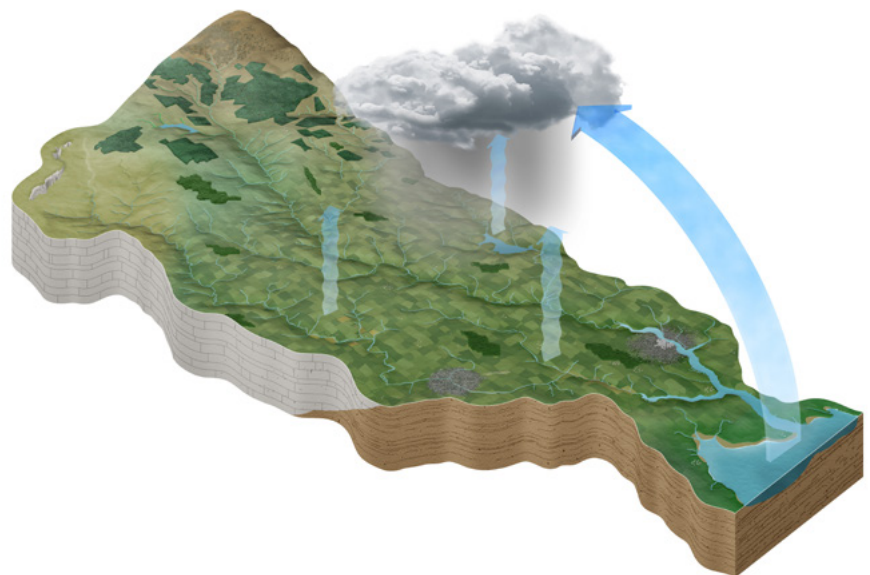
But 'all is not lost'! Several articles in this Newsletter provide evidence on the increasing role and relevance of social learning, community involvement and locally-led initiatives. Ciara Maxwell in her article on "**Sustainable Community Engagement in Wetlands**" even defines social learning as 'learning together to manage together', while illustrating the role of local stakeholder involvement (page 19). Mark Horton in his article on **Rivers Trusts** provides a means of community involvement and social learning (page 5), while James Moran gives a practical 10 step plan for developing '**locally led agri-environment schemes**' (page 6). The **Burren LIFE Programme – Farming for Conservation** is one of the exemplars for us to follow and learn from. It is a **locally initiated and targeted conservation programme which places farmers at the centre of the conservation agenda**, and illustrates the role of incentives in enabling environmental benefits (see article by Brendan Dunford on page 7). The Duhallow LIFE project is another exemplar (see article by Fran Igoe on page 11), and is the inspiration for the project by 'Young Scientists' Darragh O'Keefe and Riona Sheahan with the poetic title, '**Plight of the Pearls**' (see front cover and page 4). I found the article on the work and approach of the **Blackstairs Farming Group** inspiring (page 9) and I look forward to seeing the fruits of their work not only in terms of protecting and enjoying the environment of the Blackstairs Mountains, but also perhaps eating them when their lamb producer group is set up! Perhaps it is my farming background and my age, but for simple enjoyment of nature and farming, one of my favourite articles is by Killian Kelly on **cattle in the beautiful Kerry uplands** (page 14).

But science is not forgotten in this Newsletter. Eleanor Jennings outlines details on a new EPA-funded research project on '**the impact of cattle on freshwater ecosystems**' (page 13), while Ray Flynn and Jenny Deakin summarise research indicating the **benefits on water quality of the period in which application of fertilizers is prohibited** (page 15). Derval Devaney outlines the **drinking water safety plan approach** to protecting our drinking water together with progress to-date (page 16), and Grace Glasgow links the Water Framework Directive with the Floods Directive in her article on Ireland's **Catchment Flood Risk Assessment and Management** programme, while also summarising the programme (page 18). Our lakes are vital ecosystems; Caroline Wynne and Deirdre Tierney describe the approach to deriving the **alkalinity of unmonitored lakes** as a means of better understanding and protecting them (page 21). We have the first (from Ger Shortle) of what we hope will be regular articles from the Teagasc **Agricultural Catchments Programme** (page 22), a programme which undoubtedly "has

amassed a unique environmental, agronomic and socio-economic data set unrivalled around the world". We also have an article from Cian Ó Lionáin on how the **Water Policy Advisory Committee** is taking a 'whole of government, inter-agency and inter-sectoral approach' to implementation of the Water Framework Directive (page 27).

And, if you read on, you will see that this is not all... In his 2014 thesis, Ó Cinnéide quotes Orr (2007): "*We need to take a social learning approach in water, where we learn together how to make sense of complex problems and adapt our ways of managing*". This area is, perhaps, our greatest future challenge. But, as the articles in this Newsletter show, we are starting to meet the challenge. In addition, the **Catchments Newsletter** can be part of the process provided you, the reader, contribute articles on your views, recommendations and findings on the catchment components of water, biodiversity, flood mitigation, land-use and people.

Donal Daly, EPA



¹ This quote is the 2nd last paragraph in: Ó Cinnéide, M. 2014. Social Learning and Public Participation in an Era of Regulatory Change, the Evolution of the Water Framework Directive in Ireland and Europe Doctorate in Business Administration, Waterford Institute of Technology, Ireland.

NEWS & ARTICLES

‘Plight of the Pearls’ – Young Scientists look at Pearl Mussels in the River Allow

This January, my project partner Riona Sheahan and I entered and displayed a project at the 52nd annual BT Young Scientist and Technology Exhibition, 2016, held in the RDS in Dublin. Our project, entitled the “Plight of the Pearls”, investigated the factors that affect the distribution of the freshwater pearl mussel along the River Allow, a tributary of the River Blackwater in North County Cork.



YOUNG SCIENTISTS DARRAGH O’KEEFE AND RIONA SHEAHAN WITH THEIR TEACHER DERRY O’DONOVAN

Of the factors that we investigated where mussels were present, we found that substrate size and siltation were the two factors that affected their distribution; depth of the water, distance of the mussels from the river bank, macro-habitat type, pH and temperature values and light intensity were all found not to have a significant impact. Total absence of pearl mussels in certain locations was associated with pollution discharges. Our project won the 3rd prize in the Biological and Ecological Sciences, Intermediate (Group), category, a major achievement for us and something we hope will contribute in a meaningful way to the saving of the pearl mussel.

We first came across the freshwater pearl mussel in primary school. Dr Fran Igoe came to

our schools to talk about our river and this was our first exposure to the species. Opting to work with Fran and the LIFE+ team for our project was an easy decision as the mussel was not only something of relevance to us as local people, a fact highlighted to us by the LIFE+ Project’s visit. We are extremely grateful to Fran Igoe, John Ballinger and Nuala Riordan for their assistance and advice during our project and our science teacher Mr Derry O’Donovan.

At the exhibition itself, we met many members of the public who had either never heard of the pearl mussel or who only had scant information regarding the species. We were delighted to get the opportunity to talk to these people about the mussels and to explain to them how important it is that we conserve them in rivers

where they remain. The awareness we raised through the undertaking of the project among our fellow students, our families, our friends and indeed members of the wider community was something we were delighted and we found that, while people might not have heard of the mussels before, they were delighted to learn about them and listened with interest.

We intend to enter our project into the ECO-UNESCO Young Environmentalist’s Awards at the end of February. This will bring further awareness to the “plight of the pearls” and we hope that all our work will make a difference in this area.

Darragh O’Keefe, Transition Year Student, Colàiste Treasa, Kanturk, Cork.

‘And a river runs through it’ - Eco Eye looks at the Blackwater River Catchment

In this episode, aired on March 1st, Eco Eye’s Anja Murray looked at the Blackwater River, examining it as a microcosm of many of Ireland’s water catchments.

The episode explored some of the issues affecting rivers and communities throughout

the country. She followed the water from source to sea, looking at the impacts on the river and the people that rely on it.

This episode covered how water is not just essential for our health and quality of life, but how communities all over Ireland rely on the ecosystem services provided by our rivers and streams. These communities way of life relies on the health of the river, and the

Duhallow community on the Blackwater have taken extraordinary steps to protect this river catchment. They know that the economy and livelihoods of this community rely on the water that runs through its heart.

bit.ly/ecoyecatchments

Paddy Morris, EPA

NEWS & ARTICLES

The development of Rivers Trusts in Ireland

Rivers trusts are charities, established by local people to look after, protect and improve rivers, streams and lakes in a particular river-catchment or an area comprising many river catchments.



As local charities they are often described as having “wet feet” because they have the reputation of being “doers”, concentrating their effort on practical catchment, river and fishery improvement works on the ground. In the history of almost every trust there has been a key trigger leading to their formation, for example through a concern over the general decline in species and water quality in a river or a pollution incident which resulted in the loss of fish and other wildlife.

Such events focus minds and often the decision by local rivers users, landowners and other interested parties, to form a new trust or similar body is often seen as a most appropriate and effective way forward in order to begin the restoration of the river.

There are already a number of rivers trusts established or forming across Ireland. The Slaney Rivers Trust and Nore Suir Rivers

Trust are both established and have been undertaking projects to help improve the rivers in their catchments.

The Waterville Lakes and Rivers Trust in County Kerry, Maigne Rivers Trust in County Limerick and Inishowen Rivers Trust in County Donegal are all in the process of forming. These trusts join the 7 established rivers trusts in Northern Ireland, 44 in England and Wales and 25 rivers and fisheries trust in Scotland – a network with a vast wealth of knowledge and expertise in river conservation and management, who are always happy to help each other.

The Department of Environment, Community and Local Government and the newly formed Local Authority Water and Communities Office are keen to see the development of rivers trusts across Ireland. The Department has provided funding to The Rivers Trust (the umbrella body for rivers trusts www.theriverstrust.org) to

support the role of the All-Ireland Development Officer – Mark Horton, who is based at, and manages, Ballinderry Rivers Trust in County Tyrone.

Mark is on hand to offer advice and support to groups who are interested in forming a rivers trust in their area. Talks can be provided to groups on what rivers trusts are, the work they are involved in and how they form, as well as support and guidance in then setting up a rivers trust as a charity.

If you would like to find out more about rivers trusts contact Mark Horton (All-Ireland Development Officer) on 00 44 28 867 61515 or via e-mail mark@theriverstrust.org, or contact the Water and Communities Office on info@lawco.ie

Mark Horton, All-Ireland Rivers Trust Development Officer

EPA Advice for Private Well Owners Affected by Flooding

If your well has been affected by the recent flooding, the EPA recommends that you should make sure it is properly disinfected before using it for drinking water. This should be carried out once any flooding has subsided.

The EPA has extensive online resources available, including information on:

- Protecting your private well water
- Testing and treating your well water
- Concerns and complaints
- Further guidance and Frequently Asked Questions
- A Protect Your Well Assessment App

- A short animation explaining how to protect your private well.

You can access these at: bit.ly/floodedwell

The EPA has also published an ‘Advice Note on Restoring Public Water Supplies Following Flooding’ which should be used by water suppliers such as Irish Water and Group Water Schemes operators if supplies have been affected by flooding. This is also available at the above link.

See infographic on P.33.



NEWS & ARTICLES

Locally Led Agri-environment Schemes: innovation, partnership, locally adapted and results orientated solutions

Ireland's Locally Led Agri-environment Scheme (LLAES) proposals in our current Rural Development Programme 2014-2020 have significant potential to bring innovative solutions to bear to ensure sustainable land management. It is specifically targeted at meeting the requirements of EU Birds, Habitats and Water Framework Directives and has a total budget over the programme period of €70 million.

The LLAES measure is included in the RDP to complement the national level Green Low-Carbon Agri-environment Scheme (GLAS) which is a traditional action based approach which pays farmers to undertake particular actions which are linked to cross-cutting objectives of climate change, water quality and biodiversity. The LLAES aims to address particular environmental and biodiversity challenges not addressed at national level by GLAS. It is envisaged that this will include both schemes addressing centrally identified priorities, and also an open competitive call. All priorities will be linked to implementation of the Birds, Habitats and Water Framework Directives. The centrally identified priorities include the continuation of the successful BurrenLIFE programme, priority pearl mussel catchments, and hen harrier areas. LLAES should encourage locally driven solutions and will require submission of proposals by local groups accompanied by detailed estimates of costs. The only current theme identified for the competitive call in the RDP is the conservation/restoration of upland peatlands. At the moment it looks like there will be LLAES developed for the Burren; Freshwater Pearl Mussel Catchments; Hen Harrier Area and Upland Peatlands.

The detail of how the LLAES measures will operate is not yet finalised apart from the Burren scheme. Looking at the Burren together with the overview of the LLAES measures available from the Department of Agriculture, Food and

the Marine gives us some pointers on how other locally led schemes might operate.

<http://www.agriculture.gov.ie/farmerschemespayments/locallyledschemes/>

BurrenLIFE takes a farmer led approach where the farmer nominates and co-funds conservation actions on their farm, giving them the freedom to farm. This is similar to the traditional action based approach of GLAS but what makes the Burren different is that it combines these actions with a results based payment. To ensure that the desired results are achieved payments are made to farmers based on the environmental condition of their farm. Essentially each field gets a quality score and farmers who deliver the best environmental outcomes receive the highest payments. This innovative programme is held up as an example across the EU of how results based agri-environment schemes can work.

http://ec.europa.eu/environment/nature/rbaps/index_en.htm

Key to its development and success has been the local partnership approach where farmers, NGOs, state agencies and government departments came together to find locally tailored and practical management solutions. This partnership is solidified in the implementation of the scheme where the farmers tailor the scheme to their farms and are supported by a dedicated project team, steering group and farm advisors.

A partnership approach will be key to the success of other LLAES over the next 5 years. The partnership approach works and is needed to secure stakeholder involvement and bring together the range of expertise to develop and implement the scheme. Through the development of the partnerships dedicated community champions will emerge that will take the initiative and drive innovation. There are currently a number of groups around the country setting up local partnerships and the prospect of a LLAES is a welcome catalyst for the development of such partnerships. The development of these local partnerships can be an opportunity for farmers and the wider community to come together. Supported by government departments and agencies these groups have the potential to achieve the sustainable management of natural resources at local level.

Locally Led Schemes: a suggested 10 step plan

Below is a suggested 10 step plan to develop a LLAES proposal that may be useful to local groups interested in LLAES. As can be seen local partnerships will need considerable support to develop meaningful proposals. Emerging groups should be supported as LLAES have significant potential to develop results orientated and innovative solutions.

James Moran, Sligo IT

Steps	Considerations
What is the environmental/biodiversity goal for your area?	Current priorities = Hen Harrier, Pearl Mussel Catchments and Upland Peatlands. Set goals related to your selected priority
What is the environmental baseline?	What is the current state of the target for your area? Use existing information where possible.
What is already paid for in GLAS?	LLAES must be additional to GLAS, double payment is not allowed.
Define specific target and location	What is your specific target in terms of land type and location? Should be informed by step 2.
Start developing proposals	At this stage the local group should assess if it has the expertise and resources to develop programme. Identify if there is local support available.
Build understanding of the relationship between farm management and your environmental target	What are the qualities of a field/farm that provide the optimum conditions to achieve your environmental goal? Can a set of costed actions be developed that are linked to the achievement of optimum condition?

NEWS & ARTICLES

Steps	Considerations
Development of indicators of success	Can a simple set of variables be selected that can be used to measure the delivery of the required result for the environment? Used as a basis for payment for result.
Are landscape-scale measures required?	Is there a need for groups of farmers to work together to deliver the required results? If desired this will add additional complexity that needs to be taken into account in scheme design.
Identification of institutional capacity to deliver	Need to ensure sufficient resources (financial and staff) will be available for ongoing implementation, monitoring and evaluation if proposal is successful. Ensure running costs are built into proposal.
Draft proposal developed and ready for call.	Includes: scheme outline for area covering geographical extent; target species/habitats; scheme requirements; detailed costings including resource requirements for ongoing implementation, monitoring and evaluation.

The Burren LIFE Programme – Farming for Conservation

The Burren region, located between Counties Clare and Galway, is a place which has long been recognised for its unusual rocky landscape, its rich wildlife and its fascinating archaeology. As with much of the Irish landscape, the Burren has been shaped over many millennia by the actions of farmers and their livestock. Supporting these farmers to sustain low-input grazing systems is a key challenge if we are to ensure the Burren maintains its exceptional natural and cultural heritage.



THE BURREN LANDSCAPE

Burren Life is a locally targeted conservation programme which tries to meet this challenge, using a novel approach which places farmers at the very centre of the conservation agenda and rewarding these farmers for their environmental performance. With 15,000ha currently under management, Burren Life has proven to be very impactful and has received much recognition in recent times for its work. This perhaps belies the fact that the model is based on over 10 years of applied, farm-level research and relationship-building.

The initial spark for Burren Life came from a number of local actors, most importantly farmers who felt their voices weren't being heard when Special Areas of Conservation were

being designated on, and Agri-environment schemes designed for, their land. A 3 year, Teagasc-funded research project ensued which told the full story of 'farming and the Burren', highlighting the threats posed by recent changes in farming, but emphasising that 'farming' and 'environmental' lobbies had more in common than was recognised.

This research provided the impetus for the National Parks and Wildlife Service, Teagasc and the Burren Irish Farmers Association to come together in support of an EU-LIFE funded project aimed at developing a blueprint for sustainable farming in the region. This 5 year research project, again conducted at farm level in the Burren with the full involvement of local

farmers, showed a way forward which could accommodate all stakeholder interests. With appropriate scientific input from a local project team, and based on lessons learned from the local research, a bespoke model to incentivise farmers to improve the environmental health of their farm was developed. Using this model, funded by the Department of Agriculture, Food and the Marine and the National Parks and Wildlife Service, the Burren Life Programme (2010-2015) was introduced, its subsequent success built on the solid foundations of strong local ownership and pride, effective working partnerships, and practical science.

NEWS & ARTICLES

How does Burren Life operate?

Burren Life uses a novel 'hybrid' approach to farming for conservation which sees farmers paid for both work undertaken and, most importantly, for the delivery of defined environmental objectives. Within Burren Life, farmers are helped to prepare their own simple farm plan (most only 3 pages and very visual) each year by their trained advisor and the Burren Life team. The plan is tailored to suit the needs of the individual farm and outlines the two payment categories:

1. Payment for Actions

The annual farm plan contains a list of actions (jobs) which are nominated by the farmer with the aim of improving the site's management and conservation condition. Each job is individually costed and co-funded by the farmer, and is carried out within the year by the farmer and/or a local contractor. Payment issues only when jobs are completed, and to a satisfactory standard. The farmer can 'opt-out' of a planned action if he/she so chooses, ensuring maximum flexibility for the farmer. Most farms nominate a mixture of jobs to suit the needs of their land e.g. removing encroaching scrub from species-rich grassland, repairing internal walls or enhancing access. Protecting natural water sources and gathering, storing and supplying clean water are among some of the most popular jobs undertaken. Work completed over the first 6 years of the Burren Life Programme includes:

- 241ha of scrub (mainly hazel and blackthorn) removed across a wide area of the Burren
- 164km of (c.3m wide) stock paths opened through scrub to reconnect areas of grazing
- 112km of broken wall (gaps!) repaired and 720 new gates fitted
- 440 new watering points installed and scores of sensitive springs protected
- 55km of vehicle access tracks repaired or created, enabling improved long-term management



BURREN LIFE FARM WALK

2. Payment for Results

Every eligible field of species-rich Burren grassland and heath is assessed annually with a user-friendly 'habitat health' checklist (one criterion used is the condition of the natural water sources in the field, for example). Each field receives a score between 1 and 10: all fields with a score greater than 3 receive payment but higher scores receive higher payments. This gives farmers the incentive to manage their fields in ways that will improve their scores and their payment as well.

The results-based payment system allows farmers greater freedom to decide how to manage their land (with advice if needed) and also guarantees the taxpayer better value for money - no delivery, no payment! It also generates data (see table below) which demonstrates the positive environmental impact of Burren Life. This graph shows that, between 2010 and 2015, the area of Burren grassland in very good condition (scoring >7) increased and the area in poorer condition (scoring ≤7) decreased.

Impact of Burren Life

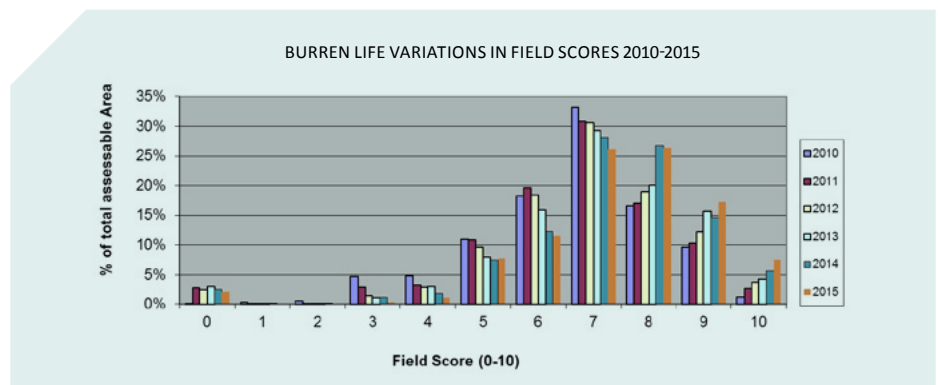
Over the course of the first 6 years (2010-2015), Burren Life has had major environmental and socio-economic impacts in the Burren. €5.9m has been invested directly in the region, with an average of €6,500 per year going to each farmer, with the added benefit that much

of this money is recycled locally. Farmers themselves have invested an additional €1.6m in the programme through co-funding of farm works, amounting to a total spend of €7.5m. This funding has contributed to a number of spin-offs such as increased work for local contractors, more custom for local shops and manufacturers (e.g. Burren gates), and new farm-based tourism enterprises.

Burren Life has delivered a range of proven environmental benefits on about 14,500ha of prime Burren habitat. It has cemented strong partnerships between farmers and management agencies, helped to create a very positive attitude towards conservation among farmers, and has generated a far greater appreciation of the role of farmers by the wider community. Through this work, Burren Life has made a very meaningful and lasting contribution to the future of Ireland's most extraordinary landscape, the Burren.

The success of the programme has contributed to the introduction of a new €70m measure for Locally-led Agri Environment Schemes in the Rural Development Programme 2015-2020, which includes an expansion of the programme across the entire Burren (30,000ha target area) with an estimated annual budget of €3-4m. www.burrenlife.com

Brendan Dunford, Burren LIFE Programme Manager



BURREN DRINKING TROUGH

NEWS & ARTICLES

“The mountain didn’t get that way without work” Communicating the Blackstairs Farming Group’s High Nature Value message to farmers and funders.

The Blackstairs Mountains are located in the south east of Ireland. An inland mountain range, they form the boundary between counties Carlow and Wexford. The highest peaks are Mount Leinster (796m), Blackstairs (734m) and Slievebawn (527m). The climate is drier and sunnier than the west of Ireland and so the principal habitat is Dry Heath, though Blanket Bog and Wet Heath occur along with Acid Grassland as vegetation mosaics.



THE BLACKSTAIRS (PHOTO - FERGAL MURPHY)

The upper slopes of the mountain range are unenclosed and are farmed as commonage. Typically sheep, mostly Cheviot, are put up between April and June when the lambs are strong enough. They are brought down in autumn and the lambs sold on as store lambs. A small number of farmers graze the commonage year round. This usually depends on how much green lowland fields farmers have to support stock in the winter. A small number of farmers have cows (sucklers) and horses on the commonage but the vast majority use sheep.

The Blackstairs mountain range covers circa 70km², of which 50.52km² corresponding to the unenclosed land is designated a Special Area of Conservation. Dry and Wet Heath exist outside the Special Area of Conservation on enclosed land along with good examples of Semi-natural Grassland and Woodland and the area qualifies as being of high nature value due to the presence and quality of its peatland habitats. The mountains also have value as a cultural landscape containing archaeological sites dating back 5000 years including cursus monuments, summit cairns, a portal tomb and a cluster of rock art sites from the Neolithic period. The field systems adjacent to the commonage contain some particularly large granite drystone walls, up to 2.5m high and 4m wide in places and artefacts linked to traditional farming practices.

“You have to be born into hill farming and have a genuine interest in it.”

The economic viability of farming in The Blackstairs has been in decline for decades. It became clear that the future of hill farming and hill farming communities was precarious and a small group of people began to ask what could be done. In April 2014, funding for pilot ‘locally led’ projects using a similar approach to the Burren LIFE project was included in the Irish Rural Development Programme 2014-2020. Contact was made with Dr Brendan Dunford (Burren LIFE) and Dr James Moran (IT Sligo) and on their advice the Blackstairs Farming Group was formed. A diverse group, there were many motivations for involvement, the predominant one being a desire for farming and farming communities in the Blackstairs to move from slow incessant decline to a more sustainable footing. There was also a shared connection to the land, to the Blackstairs and a desire for the skills and knowledge acquired by Blackstairs farmers over generations to be recognised, valued and sustained.

“You don’t learn anything about hill farming in agricultural college”

Over the next year the Group attended events including the Burren Winterage School and the ‘Who Cares for the Uplands’ conference organised by the Irish Uplands Forum. We learned about ‘HNV Farming’, ‘Locally Led Agri-environment Projects’, ‘Ecosystem Services’ and ‘Public Goods’ and understood that our farmers produced goods which were valued by society but which could not be sold at the mart. That the farming system in the Blackstairs was

responsible for the rich biodiversity and beauty of our landscape, providing high quality water supplies to surrounding towns and villages and storing carbon in upland peats. During this period we encountered The European Forum on Nature Conservation and Pastoralism. In March 2015 the European Forum on Nature Conservation and Pastoralism employed Colin Gallagher as the Forum’s High Nature Value Ireland Officer and offered technical support to our group to help us develop a locally led project. We were delighted but there was an obstacle. We needed to raise funds to assemble the baseline environmental data required.

The composition of our committee was crucial in getting the funding we needed. It contained farmers, both lowland and hill farmers; a local architect who could place funding applications in policy context and who had knowledge of and confidence in community led design processes; two local councillors (elected representatives to local government) who were able to guide us through local administration and direct our funding request to decision makers, and a retired environmental science lecturer with experience and contacts in the field of environmental management.

In June 2015 the Blackstairs Farming Group secured the funding required from sources including The Heritage Council and Carlow and Wexford Local Authorities. We then began to plan how to develop from being a small working group to a more representative group spanning two counties. Positive engagement between

NEWS & ARTICLES

the Blackstairs Farming Group committee, the project team and the local farming community was prioritised and included in the brief for the selection of the ecology team. The European Forum on Nature Conservation and Pastoralism also recognised that communication and engagement were important, and funded the role of a local coordinator to liaise with farmers, stakeholders and funding bodies and to manage the project locally.

The project team were in place by mid-June 2015 and comprised Colin Gallagher (European Forum on Nature Conservation and Pastoralism High Nature Value Ireland Officer), Dr Mary Tubridy (Ecology Team) and Helena Fitzgerald (Local Coordinator and Blackstairs Farming Group Committee Member). The first project team meeting developed the methodology for the research phase of the project and included a plan for community engagement. This plan was then discussed and agreed by the Blackstairs Farming Group Committee. The research work involved gathering information on farming practices and changes to farming in the Blackstairs through face to face interview with and completion of a questionnaire by Blackstairs hill farmers. The habitat mapping involved field work to establish the extent and condition of habitats within the study area and included a series of farm walks around the mountain range attended by hill farmers and other stakeholders.

The Blackstairs Farming Group committee contributed to the project planning phase, suggesting who the project team could make contact with and advising on practical issues like suitable access routes to the mountain.

In addition the Blackstairs Farming Group agreed a communications plan which included placing regular project updates on social media (@BlackstairsFarm on Twitter and Blackstairs Farming Group on Facebook) and in local print media such as parish newsletters and newspapers. There was still concern that isolated farmers would not hear about the project, so the project coordinator and Blackstairs Farming Group Committee Members contacted many farmers by phone and text message to share information on the project and to encourage attendance at meetings and events. In some cases communication by land line was the only way of making contact with these farmers. In addition the project coordinator identified and contacted other stakeholders including Teagasc, Coillte and the National Parks and Wildlife Service. A particular challenge at this stage of the project was the absence of specific detail on what the project would mean for farmers. It was explained that the process was farmer-led and would reflect the issues farmers themselves identified as being important, however this approach was not a familiar one and for a period there were concerns that the project had an extremist environmental agenda to remove farmers from the mountain and re-wild. The work of Colin Gallagher was particularly skilful in making it clear that the project had a farming focus and in time concerns abated. A turning point came when hill farmers themselves explained to the concerned farmers that the wildlife and habitats on the hill were there because the hill was farmed, and that the project was working to identify how hill farming

could be supported and optimised for the environment and for the farmer.

“How can hill farming become more attractive for the young farmer?”

By September 2015 the information gathering phase of the project was complete and it was decided to hold an information meeting to present the research findings to Blackstairs farmers. At the meeting held in Rathanna on the 9th October and attended by circa 70 hill farmers and other stakeholders, it was unanimously agreed to proceed to the next stage of development of the locally led project. Colin Gallagher presented his analysis of data from the Irish Central Statistics Office which indicated a 50% drop since 1991 in the number of farms in the Blackstairs where the main holder was under 44, with a 50% reduction in sheep numbers over the same period. At the meeting representative farmers from around the mountain joined the Blackstairs Farming Group committee to participate in a series of workshops to further develop the project.

“I would love to be farming full time or even to make it profitable enough to hand on to the next generation”

The project report ‘A Case For a Locally Led Agri Environment Scheme For The Blackstairs, Preliminary Proposal’ will be ready in early 2016. This report will shape our submission to Ireland’s Department of Agriculture Food and the Marine for Rural Development Programme 2014-2020 funding under the ‘locally led’ measure. The engagement with Blackstairs farmers over the last 9 months, involving over 800 hours of voluntary input by Blackstairs hill farmers has indicated that in addition to the locally led project there is interest in developing other business areas to support the hill farming enterprise, including potentially forming a lamb producer group, developing sustainable tourism products and farm based businesses associated with the management of the mountain. It has also become clear that Blackstairs farmers who have come to project meetings to listen, learn and contribute are keen to innovate and are outward looking; characteristics hill farmers are not usually credited with. The legacy of our project with the European Forum on Nature Conservation and Pastoralism is a sense of momentum which we would like to build on as we work towards more sustainable and resilient farming communities in the Blackstairs. Given the rate of decline and the age profile of our farmers, the question is; are we too late?

Helena Fitzgerald, Blackstairs Farming Group Coordinator



BALLYGLISHEEN FARM WALK (PHOTO - HELENA FITZGERALD)

NEWS & ARTICLES

DuhallowLIFE: a community led water and nature conservation programme

Sustainable management of water and wildlife often requires the cooperation of local people living within a catchment. Something not always appreciated, however, is that these communities themselves can also positively contribute towards better water management, if encouraged to take a proactive role in the management of their local water resource.

There are a number of Irish examples of projects (e.g. Loobagh, Slaney and Mulkear Rivers) where local people are working on initiatives with others to improve their catchments. This article highlights some of the achievements of a community led EU LIFE funded project, which is focused on the upper reaches of the Munster Blackwater River, in north Cork and east Kerry.

The Blackwater River is one of Ireland's largest rivers, extending some 160km from source to sea and draining an area in excess of 3,000km². The river rises in the mountains of east Co. Kerry, traversing much of Co. Cork and flowing into west Co. Waterford, before entering the sea at Youghal Bay. The river is one of Ireland's most important tourist angling rivers and large numbers of anglers travel from the UK and further afield, to stay in local fishing lodges and soak up the beautiful scenery, taking time out from their busy lives to relax and fish. The river is also important for a range of wildlife and together with its tributaries is designated as a Special Area of Conservation. This designation is due to the presence of species of EU conservation importance such as otters, kingfishers, lampreys and salmon. The river is also the largest Special Area of Conservation designated under the EU Habitats Directive for the protection of the rare Freshwater Pearl Mussel in Ireland.

Like so many other Irish rivers, a wide range of pressures have led to a decline in the river's habitat and water quality. These pressures include changes in the landscape and water quality; forestry, intensification of agriculture, peat cutting, land reclamation, drainage, drinking water and waste water treatment, runoff from increasing road traffic, windfarm development, urbanisation, and septic tanks from rural one-off houses all present challenges to the management of the river. All these pressures are associated with most catchments in modern Ireland and so any conservation or management lessons learnt on the River Blackwater should be relevant for other catchments.

In 2009 the Kanturk Angling Club, who had been carrying out river habitat improvement

works, approached IRD Duhallow Ltd, the rural development company active in the area, and the Southern Regional Fisheries Board (now Inland Fisheries Ireland), with a view to develop a large scale project to improve the river for fish. They recognised the need for a broader holistic approach that took in all aspects of the biodiversity along the river, rather than focusing just on fish, and identified the EU LIFE funding mechanism as a possible source of funding.

On consultation with ecologists and people with experience in funding applications, a pragmatic approach was taken, following a simple logic - protect the most sensitive species, the Freshwater Pearl Mussel, and other species such as the Atlantic Salmon and Brown Trout would also benefit. Freshwater Pearl Mussel require pristine habitat and water quality and therefore any efforts to protect them should improve the environment for other coexisting species, including fish. Actions to protect other species such as Kingfisher, Dipper, and Otter were also added to the projects remit to further increase biodiversity improvements and importantly help increase engagement of the wider public. A team was put together and the completed application submitted. The project was awarded funding in 2010.

From the beginning, the project took a people-centred view by including the community at its core. In tandem with ten on-the-ground conservation actions, another 19 actions covered project planning and communication with the public and key stakeholders at a range of levels. The project endeavoured to form partnerships with the local landowners, interest groups and state agencies to maximise the project's reach and achieve buy-in by all stakeholders. Regular meetings, public information nights, field trips, door-to-door calls, newsletters, brochures and information signage all went part and parcel with the project, so that the local community and the wider stakeholder interest groups were kept informed. Much of the project work on the ground was carried out by participants on the Rural Social Scheme and volunteers.

Conservation actions were carried out on a large scale, sometimes spanning the farms

of hundreds of landowners. For example, the invasive species Himalayan balsam was removed from almost 40km of river bank. This was conducted annually over a five year period to the point that the plant, once found in very high densities along rivers in the River Allow catchment, is now virtually absent. This was achieved through the mobilisation of large groups of people and through a sustained effort by all involved. It followed a carefully planned strategy, which took into account the stages of development of the plant at different locations along the catchment. It was found that plants in open sunlight areas reached maturity earlier than those in shaded areas and therefore had to be targeted first, before dealing with the slower growing plants in wooded areas. Plants in sunlit areas were found to seed earlier than those growing in more shaded areas. But all the while, the project worked from the source of infestation in a downstream direction, as the seeds themselves are waterborne and can infest a large area downstream of a mature plant. This work was all done by hand, without the use of chemicals and is, as far as we are aware, the largest manual Himalayan balsam control programme of its type in Europe. Full credit to all involved, and despite their initial reservations, the participants, suspended their understandable reservations "to go picking flowers" and made the control programme a success.



BLACKWATER FRESHWATER PEARL MUSSEL
(PHOTO: DUHALLOWLIFE.COM)

NEWS & ARTICLES



BLACKWATER ATLANTIC SALMON
(PHOTO: DUHALLOWLIFE.COM)

A number of innovations to address specific environmental problems were developed by the project. For example, farming along the catchment occurs within the floodplain, incidentally where some of the best cuts of silage are taken.

However at certain locations due to repeated inundation by water during flood events, it was not practical for farmers to fence the river banks to manage their livestock. These floods carry debris, ranging from rushes to fully grown oak trees, down the river which in turn lodge and build up on the fences eventually breaking them. The inability to fence such areas left the river banks vulnerable to trampling and over-grazing by farm animals. Therefore the LIFE project team developed a novel technique with the local farmers to address this problem; fencing that could be placed along river banks and survive the onslaught of debris carried by regular flooding episodes.

This innovation allowed farmers to maintain their fence line, ensuring that the 38km of fencing placed by the LIFE project will last over time, and can withstand the increasing floods that we are experiencing. Similarly, innovations were developed to trap silt travelling along deeply cut farm drains before it reached the Special Area of Conservation and smother the spawning beds of fish and Freshwater Pearl Mussel habitat.

Willow planting techniques using live willow stakes and poles were tested, and a best practice river bank restoration technique was developed to address the more severe river bank erosion situations by working with nature. Thousands of native trees were planted along the river banks to improve tree diversity along the riparian areas and encourage increased root mass to bind the soil in the river banks and improve river bank stability during

flooding episodes. All trees were sourced locally, following best practice with regards to provenance, being donated by local people and a Coillte locally managed native woodland estate.

A continuous survey of Freshwater Pearl Mussel was carried out from the upper most point of occurrence all the way downstream to Kanturk town, a river length of over 28km. This is the longest continuous survey of Freshwater Pearl Mussel in the UK or Ireland. All of the records (over 14,000 individual mussels) were mapped on GIS and the data not only helped direct conservation works, but also identified areas affected by acute pollution. The latter was followed up and will be the subject of a separate article in a future issue of this newsletter.

Actions were also carried out to improve the conservation status of Otters, Kingfishers and Dippers by the placement of nest boxes, Otter Holts and brush bundles. These actions not only improved available habitat for these species, but also increased local awareness as local farmers were engaged in discussions with the project team during the construction phase.

Education was a major element of the project. Thirty-six national schools and five secondary schools were visited by the project team and these kids were then bussed to their local stream or river, all tributaries of the Blackwater, for a demonstration by Inland Fisheries Ireland staff on how fish are sampled by electrofishing. Demonstrations were also given on aquatic macroinvertebrates monitoring for the determination of water quality. In addition, the children took part in a fun "Nature Detective programme", where they recorded wildlife in their back gardens and farms with their parents, logging their observations into attractive survey booklets provided by the LIFE project.

The data was then uploaded onto an online map hosted on the project website. To increase public engagement, the project was actively promoted on social media. Updates and photographs from our trap cameras were regularly posted and one post of an Otter "marking its territory" received over 7,000 views, with hits from countries as far away as Mexico.

A major part of the project is that it now serves as a demonstration project to illustrate what can be done to improve nature conservation by working with farmers at the practical level on the ground. The demonstration farms provide real world examples of how nature and farming can co-exist in relative harmony rather than in perpetual conflict.

The ethos of IRD Duhallow, which aims to improve not only the economy of the rural

area but also the social, cultural, heritage and environment of local people, means that the project will continue to evolve and improve, and hopefully not only deliver a positive impact to the local environment but also provide insights for those with interest in sustainable management and nature conservation in Ireland.

The IRD DuhallowLIFE project ran from 2010 to 2015 and is now into its afterLIFE phase. This is the phase in which the partners commit to continue the work originally supported by the LIFE fund of the European Union. This project is the first community led EU LIFE Nature project in Ireland and has now been augmented by a second project, RaptorLIFE which is not only targeting conservation actions at other tributaries on the Blackwater SAC but also towards the upland landscape to improve habitat for fish and birds of prey. A major element of this work is the removal of invasive species such as Japanese knotweed, removal of invasive conifers and other non-native species, and working with upland farmers.

Large scale projects, such as LIFE projects in themselves can deliver significant results on the ground, but they are also catalysts towards better environmental management, as it is only through the constant partnership working and evolution of ideas and solutions that the challenges of nature and water conservation and sustainable living can be achieved. So I imagine the afterLIFE phase of these projects will continue for some time to come and will need to be nurtured into the longer term to deliver their true potential.

www.duhallowlife.com

Fran Igoe, former Coordinator, IRD Duhallow LIFE Project



BLACKWATER OTTER (PHOTO: DUHALLOWLIFE.COM)

NEWS & ARTICLES

The impact of cattle on freshwater ecosystems

Unrestricted cattle access to watercourses has been linked to deterioration in water quality arising from contamination with faecal matter, increases in suspended sediment, and nutrient enrichment. Preventing such access by fencing off streams and rivers is one of the measures included in the Irish government's new Green Low Carbon Agri-environmental Scheme, GLAS.

Studies on similar measures in other jurisdictions, for example the USA, New Zealand and Australia, have reported improvement in water quality in some cases, but, to date, there has been no intensive study of their effectiveness under Irish conditions, and indeed few studies in Europe generally.

COSAINT - Cattle Exclusion from Watercourses: Environmental and Socio-economic Implications is an EPA funded project (2014-W-LS-6) led by Dr Daire Ó hUallacháin of Teagasc which will run for four years from 2015. Partners include Dundalk Institute of Technology (Drs Eleanor Jennings and Suzanne Linnane, and PhD student Patricia Antunes), University College Dublin (Dr Mary Kelly-Quinn and PhD student Matt O'Sullivan), Dublin City University (Prof. Fiona Regan) as well as Teagasc partners. The project will assess the impacts of cattle access on nutrient and sediment loading, on faecal contamination and on biological quality of streams, and will undertake a socio-economic assessment of cattle exclusion measures in Ireland. Study sites have been selected in three moderate status catchments (Co. Louth, Co. Monaghan, and Co. Wexford), and two high status catchments (Co. Cork and Co. Kerry). In one study catchment, the Milltown Lake catchment in Co. Monaghan, one of the three tributaries of the Drumleek River was fenced in its entirety to exclude livestock in 2008 with the cooperation of the local farming community, during the National Source Protection Pilot Study. This new project now offers a unique opportunity to quantify the impacts of this mitigation measure eight years on.

The project is using a combination of high frequency sampling and motion detection cameras to capture information on the extent and duration of cattle access to these watering



CATTLE CROSSING A STREAM

points and on concurrent changes in water quality. The effects of cattle access points and cattle in-stream activity on aquatic biota are also being assessed using macroinvertebrates, as well as the extent of ecosystem impact and recovery downstream from sites. The study sites include those with existing cattle access points that are targeted for inclusion in the proposed GLAS scheme. On a national scale, Teagasc partners in COSAINT will undertake a survey to identify the number of farms with on-farm water courses, and an assessment of the cost-effectiveness of existing and potential livestock exclusion measures for the farming sector. One of the key challenges to increasing the participation rate of farms in voluntary cattle exclusion measures such as those proposed in GLAS is the provision of alternative sources of water. There is a large body of

literature in relation to the provision of water in agriculture (e.g., nose-pumps, solar pumps, pumping from streams, pumping from ground water). However, the feasibility of implementing some of these measures under Irish conditions, and the likelihood of adoption by farmers (particularly more extensive farmers) remains unclear. The socio-economic study will also include an assessment of the 'willingness to adopt' cattle exclusion measures and determine what if any incentives are required to ensure adequate participation that is voluntary. The project will be of relevance to a wide range of stakeholders, including researchers, land-owners, and policymakers, and will inform future agri-environmental measures.

Eleanor Jennings, DKIT

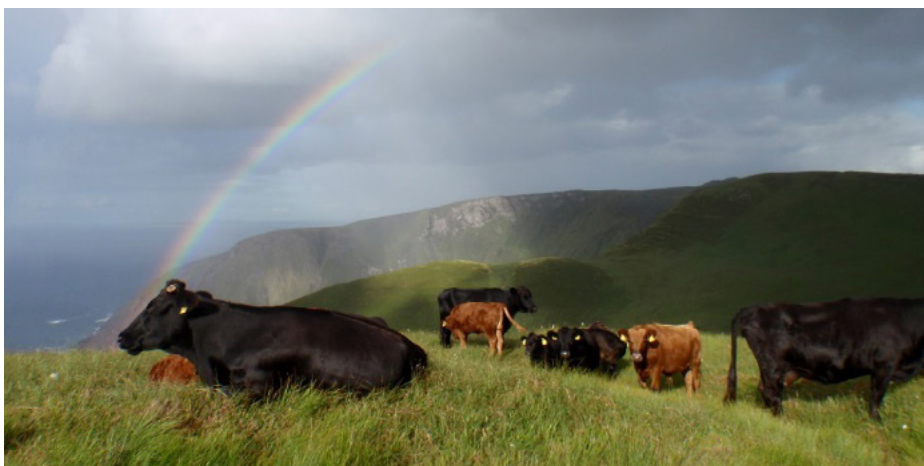


CATTLE IN A STREAM, WITH SOME EROSION OF THE BANK

NEWS & ARTICLES

Conservation Grazing in the Kerry Uplands

This project seeks to develop evidence-based management recommendations for the uplands, specifically with regard to the impact of cattle grazing on upland habitats. The home range and resource selection of Dexters (a native breed) in the 462 hectare Mount Brandon Nature Reserve in County Kerry is being investigated. It is a collaborative project between the Institute of Technology, Tralee, the National Parks and Wildlife Service, and an organic farmer in west Kerry.



DEXTERS IN THE KERRY UPLANDS

In Ireland the 'uplands' (land over 150 m) form our greatest expanses of semi-natural habitats. Almost 29% of the country is considered upland and over 40% of the Natura2000 Network occurs in these areas. Uplands are important areas for conservation, supporting many rare and threatened plant and animal species, and containing up to 14 habitat types listed under Annex I of the Habitats Directive (Perrin et al., 2014). Annex I habitats are of particular community importance and member states are obliged to maintain priority habitats in 'favourable conservation status'.

The latter half of the twentieth century brought about widespread degradation of Ireland's upland habitats, due in part to inappropriate grazing regimes (Heritage Council, 1999). Reforms have tried to redress imbalances in the uplands, much of which are deemed to be High Nature Value farmland, using a wide range of measures. However, the conservation status of the majority of designated upland habitats in Ireland is currently assessed to be in 'poor' or 'bad' condition (National Parks and Wildlife Service, 2013).

Grazing trials were initiated in 2011 with the Dexters, a small and hardy Irish breed. The cattle, based in the lowlands for much of the year, are brought to the mountain in mid-July and have unlimited access to the 462 hectare site and its range of habitats until October. The research focuses on the four main habitat

types available to the cattle; dry heath (145 ha), wet heath (62 ha), blanket bog (71 ha) and wet grassland (14 ha). The higher slopes of the reserve are dominated by montane heath and support an interesting 'arctic-alpine' flora, but these heights (>500 m) are not utilised by the cattle and are not under examination. Control plots were established in each of the main habitats in 2011, prior to the cattle being introduced to the site.

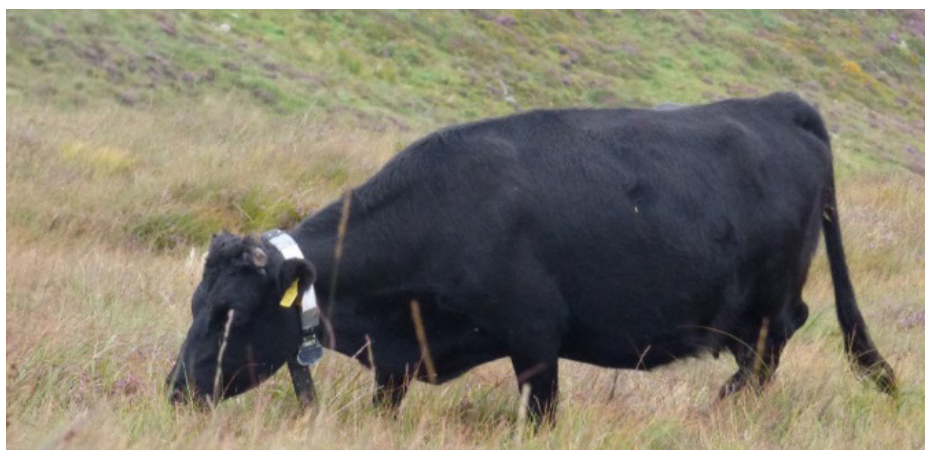
Home range and habitat selection studies were conducted between 2013 and 2015, which involved tracking selected animals with GPS collars. These data were used to generate home range estimates and conduct habitat selection

analysis. Vegetation and ground beetle (Carabid) sampling was completed each year in order to examine how the grazing impacted habitats and species.

The 30 cattle used in this study have set up a home range of approximately 100 ha each season, the size, shape and structure of which has been stable both within and between years. This is probably dependent on the distribution of habitat patches in the reserve, as well as factors such as water availability and ease of access between habitat patches. Habitat selection was significant, with cattle showing most preference for wet grassland patches, and least for blanket bog.

Knowledge of the behaviour and grazing preferences of cattle in unenclosed landscapes has potential value for land owners and farmers in the development of grazing prescriptions and management plans for sensitive upland ecosystems. The analysis of vegetation and invertebrate data is ongoing and focusses on relating the intensity of use by the cattle to various elements of biodiversity e.g. species richness and diversity, the response of *Molinia caerulea* 'Purple Moor Grass' and importantly, the conservation status of the Annex I habitats (sensu Habitats Directive). The project is due for completion in May 2016.

Killian Kelly, PhD Student, Institute of Technology, Tralee



DINGLE DEXTER WITH GPS COLLAR

NEWS & ARTICLES

Winter land use restrictions: Can they make a difference to river water quality?

The appearance of the Irish countryside in winter time can often reveal a very different picture to that which many of us encounter during the summer. Green pastures, grazed by cattle, can be replaced by water-logged fields; livestock are often out of sight, while odours associated with slurry spreading are typically absent.

These changes arise partly because of natural processes in which seasonal hydrological cycles can lead to saturated ground, but also because of agricultural directives that require farmers to house cattle during winter months and hold off on the application of slurry to fields until soils are drier; this aims to reduce the environmental impact of agricultural nutrients during these wetter periods and improve overall water quality. But do winter land use restrictions work?

To investigate this issue a consortium of EPA-funded researchers from Queen's University Belfast, Trinity College Dublin and NUI Galway piloted the use of some recently developed pollutant fingerprinting methods with conventional catchment hydrological techniques to investigate the link between land use and water quality. More specifically, application of the approach to the Mattock Catchment on the Louth/Meath border aimed to evaluate whether it could provide further insight into seasonal variations in the delivery of diffuse contamination to water courses. The Mattock was one of the four EPA Research "Pathways" Project Study Catchments, subject to intense investigation over a five year period, including collection of detailed hydrological and hydrogeological data. Poorly productive Ordovician and Silurian bedrock aquifers with a variable cover of low permeability subsoils underlie most of the catchment. These conditions give rise to poor natural drainage across much of the area, while widespread

artificial drainage has been installed to lower water levels.

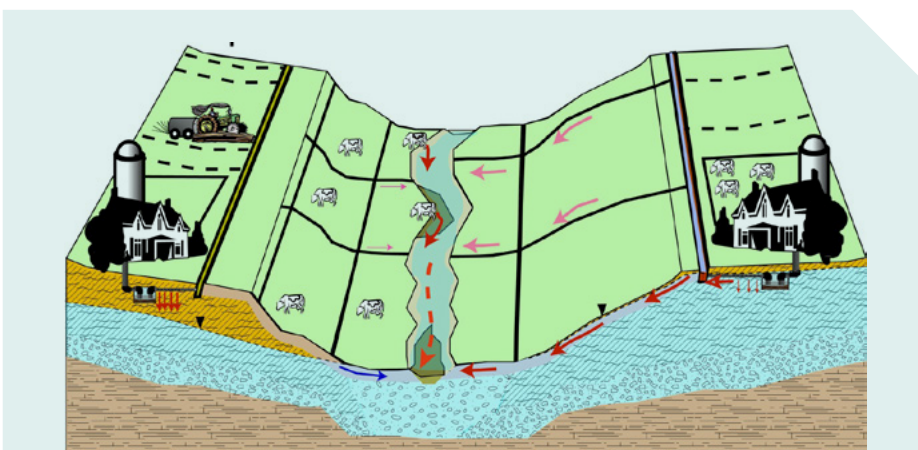
Although land use across the catchment is dominated by cattle rearing, which can generate significant loads of nutrients and associated faecal microorganisms, these contaminants can also be derived from wastewater generated by the catchment's 1850 inhabitants. Of the total catchment population, approximately half live in the town of Collon, and are served by a centralised wastewater treatment facility that discharges to the Mattock River two kilometres upstream of the catchment outlet. Elsewhere, inhabitants are dispersed across the catchment and employ domestic wastewater treatment systems for sewage disposal.

Initial year-round water quality monitoring of the Mattock during low flow was undertaken to investigate seasonal variation in contaminant loads. Results showed persistent and fresh microbiological contamination occurred across the catchment, yet failed to reveal significant differences in nutrient or faecal indicator organism levels between the open and closed seasons for slurry spreading. This occurred in spite of widespread observations of livestock gaining access to the river during the open season. By contrast cattle were housed indoors in during the closed season when subsoil groundwater levels were higher, as reflected by localised ponding of water in fields and greater hydraulic connectivity of drains discharging to the Mattock.

Further sampling and analyses of river water samples collected from across the catchment permitted characteristics of microbiological contaminants to be investigated in more detail. Genomic analyses of samples for *Bacteroides* sp. allowed microbiological contamination derived from cattle to be distinguished from that of humans. Results from river water samples collected during the open season pointed toward contamination upstream of the wastewater treatment plant at Collon being dominated by cattle-derived sources, whereas samples collected downstream of the plant reflected mixed contributions from cattle and humans. These findings contrasted with results from samples collected during the closed season where analyses indicated that microbiological contamination of all waters across the catchment was dominated by human sources.

Although results initially proved puzzling, they could be explained when reconciled with hydrological conditions. Combining flow and concentration data across the catchment revealed sustained increases in faecal indicator organism fluxes moving downstream that pointed to widespread contaminant sources contributing to the total faecal indicator organism export at the catchment outlet. In summer this could be explained by localised inputs from livestock across the catchment. In contrast the dominance of human sewage indicators in samples collected during the winter period was indicative of contributions from domestic wastewater treatment systems upstream of Collon. Although these operate year-round, they tend to discharge to depth during the summer period, when groundwater levels are lower. In winter, on the other hand, subsoil groundwater levels are higher. This serves to limit percolation, and often results in excess effluent being discharged to ditches via overflow pipes connected to soakaway systems; the greater hydraulic connectivity of the ditch network provides an effective route to deliver contaminants to the Mattock River.

The implications of this study are manifold. An absence of cattle-derived faecal indicator organisms in samples collected in the closed season suggests that winter



OPEN AND CLOSED SEASON FLOW PATHWAYS

NEWS & ARTICLES

land use restrictions can prove effective in protecting water quality from microbiological contamination by agriculturally-derived effluent during low flow conditions. As a corollary to this point, the data suggest land use restrictions can also help protect (chemical) water quality of the river from other contaminants, such as nutrients, derived from the same waste sources.

On the other hand the impact of domestic wastewater treatment system derived sewage on water quality can prove more problematic, particularly if surface water acts as a source of drinking water. Although agriculturally derived microbiological contamination can cause illness, the range of contaminants capable of causing infection is greater in human waste; these include species-specific viruses which are rarely investigated but have been shown to be the cause of waterborne disease outbreaks in both North America and Western Europe.

This study's results highlight the benefits of multidisciplinary collaborations in investigating sources and delivery of surface water contaminants at the catchment scale. In the case of the Mattock, the results have demonstrated the variation in contributions throughout the year and the critical role played by hydrological conditions in their delivery to water courses. Given the comparable conditions encountered elsewhere, processes operating in the Mattock are suspected to be representative of a number of other catchments across Ireland.

Overall, findings have relevance in not only demonstrating the value of winter farming measures for protecting water quality, but also for identifying the potential of domestic wastewater treatment systems to impact water quality on a seasonal basis. An improved understanding of these processes, derived through comparable investigations

in contrasting physical settings, will assist in identifying further suitable scientifically-defensible measures to protect water quality in the wider environment.

If you would like to know more about this work, you can read about it in the following article:

Flynn, R., Deakin, J., Archbold, M., Cushnan, H., Kilroy, K., O'Flaherty, V., Misstear, B. (2016) Using microbiological tracers to assess the impact of winter land use restrictions on the quality of stream headwaters in a small catchment. *Science of The Total Environment*. Vol 541, P. 949-956. doi:10.1016/j.scitotenv.2015.09.071

Raymond Flynn, Queen's University Belfast, Bruce Misstear, Trinity College Dublin, and Jenny Deakin, EPA

Drinking Water Safety Plans – from catchment to tap

A water supply is deemed 'safe' if it meets the relevant drinking water quality standards at the tap and 'secure' if a risk management system, a Drinking Water Safety Plan is in place. A Drinking Water Safety Plan identifies all potential risks to the water supply, from catchment to tap, and mitigation measures and procedures are put in place to manage unacceptable risks.

In 2009 the World Health Organisation published detailed guidance on the implementation of the Drinking Water Safety Plan approach, the document is entitled "Water Safety Plan Manual: step-by-step Risk Management for Drinking Water Supplies" (bit.ly/whowspm). The primary objective of this approach is to protect human health. The approach applies equally to small and large drinking water supplies.

The EPA has adopted the World Health Organisation's Water Safety Plan approach. The EPA's Advice Note No. 8 – Developing Drinking Water Safety Plans, provides guidance on the Drinking Water Safety Plan approach and encompasses all potential hazardous events from the catchment to the consumer (see EPA Advice Note No 8 (bit.ly/epadwadvice8) and illustration on page 17). The advice note is intended to give an overview of the steps involved in constructing a Drinking Water Safety Plan and an outline of what it should contain. Drinking Water Safety Plans are also covered in Section 10 of the EPA's 2010 Handbook for Public Water Supplies (bit.ly/epapublicwaterhandbook).

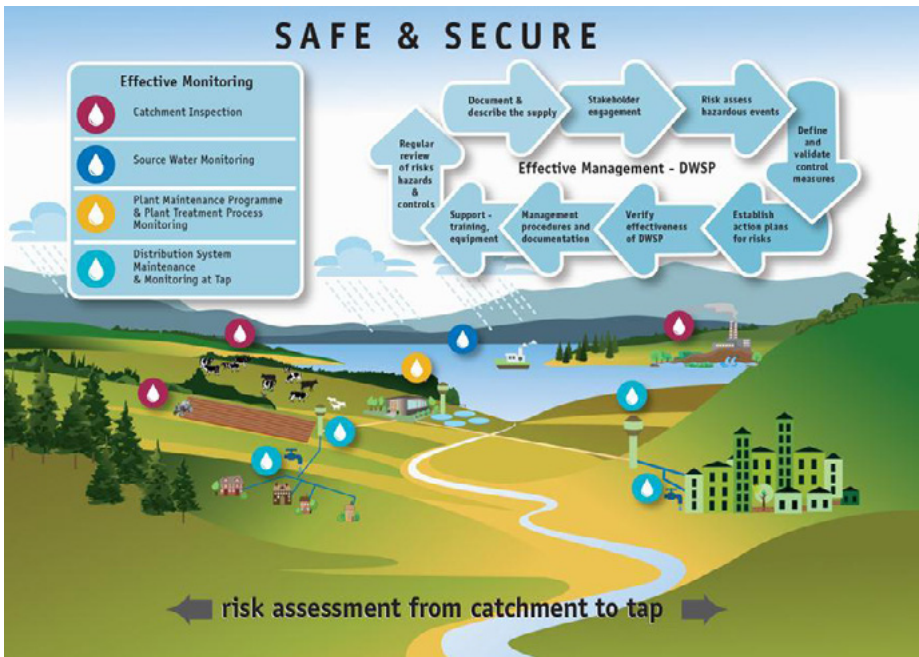
Security of Public Drinking Water Supplies

Many of the current problems seen in the drinking water supply network result from under-investment and a reactive management approach to water quality problems. In contrast, the Drinking Water Safety Plan is a preventive management framework for safe drinking water that comprises system assessment and design, and operational monitoring and management plans (including documentation and communication). A Drinking Water Safety Plan for each public water supply facilitates continuous improvement in the security of the supply and protection of human health.

Responsibility for the development and implementation of Drinking Water Safety Plans for public water supplies rests with the water supplier. The output from the Drinking Water Safety Plan process will be used to prioritise remedial works for supplies that need it most and drive improvements in the provision of consistently safe and secure drinking water nationally.

Irish Water will take the lead in the implementation of the Drinking Water Safety Plan approach for public water supplies. However as the water supplier in many cases is only responsible for part of the water supply system, for example the abstraction, treatment and distribution elements, its Drinking Water Safety Plan team should work with others to ensure the risk assessment is completed from catchment to point of use for each water supply system. This will involve collaboration with other stakeholders, especially those involved in catchment activities including government agencies, industry, farmers, landowners, environmental non-governmental organisations, recreation/sporting bodies, etc. These stakeholders will need to co-operate and assist the water supplier in the identification and mitigation of unacceptable risks in the catchment of the drinking water source. This will allow a greater understanding of the complete water system and how each entity operates, and also ensure that hazards are identified at entity boundaries that could otherwise be missed or not understood.

NEWS & ARTICLES



THE DRINKING WATER SAFETY PLAN APPROACH – RISK ASSESSMENT FROM CATCHMENT TO TAP

Successful engagement of such stakeholders will serve a dual role of improving the quality of the raw water source, providing protection of the supply, and assist in meeting Water Framework Directive requirements by maintaining or improving its water quality status.

Drinking Water Safety Plans and the Water Framework Directive

Article 7 of the Water Framework Directive requires Member States to identify waters used or to be used for drinking water and provide for their necessary protection (for example, by delineating Drinking Water Protected Areas). Member States may establish ‘Safeguard Zones’ for those bodies of water at risk of further deterioration in raw water quality so that, as a minimum, the need for additional water treatment to meet drinking water standards is avoided and ideally the level of treatment can over time be reduced. The delivery of Article 7 objectives will primarily be through measures set out in River Basin Management Plans drawn up for the river basin districts across Ireland under the Water Framework Directive.

The findings from the catchment element of the Drinking Water Safety Plan risk assessment will be pivotal in identifying Article 7 water sources at risk, as the Drinking Water Safety Plan will identify individual parameters or hazards (e.g. nitrate, pesticides) in the catchment in addition to the identification of generic risks or hazardous events (e.g. agricultural pollution) which introduce those hazards to the water supply. For each unacceptable risk identified, the water supplier will formulate an action plan

of short, medium and long term mitigation measures required to reduce the risk to the water supply. These mitigation measures can be fed into the Programme of Measures associated with the Water Framework Directives River Basin Management Plans, and contribute to identifying Drinking Water Protected Areas and associated Safeguard Zones. The collation of relevant Drinking Water Safety Plan information for the River Basin Management Plans should enable medium to long term catchment-based solutions to be established that will mitigate the risks in the long term. All relevant local partners and stakeholders will need to be engaged in the process in identifying long-term sustainable solutions to priority issues that may compromise future water supplies. Whilst there is a specific role for Government, EPA, Local Authorities and the Water Supplier, a wide range of partners including other regulators, businesses, local communities and Non-Governmental Organisations will also have a

role in delivering the necessary improvements, depending on the issues in each catchment. Water suppliers should therefore be prepared to share the relevant findings on their risk assessments as part of engaging with local partners and stakeholders.

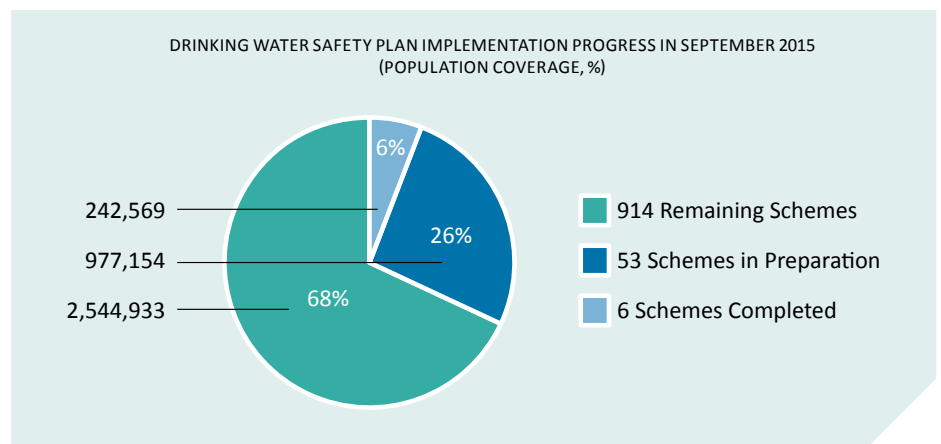
Where are we now ...

Irish Water is committed to and has adopted the Drinking Water Safety Plan approach for the risk assessment of public water supplies. The pie chart below illustrates Irish Water’s current progress with the implementation of Drinking Water Safety Plan (completed, in preparation or to commence). This is an improvement from 2013 where 2 Drinking Water Safety Plans were completed.

Irish Water is to submit a Drinking Water Safety Plan Implementation Strategy Plan to the EPA in Q1, 2016 setting out how it plans on completing Drinking Water Safety Plans for all its public water supplies. Financial and resource requirements for the implementation of these plans need to be addressed at the outset. Proper implementation of the Drinking Water Safety Plan approach from source to tap can save money and better target resources in the longer term. The output of Drinking Water Safety Plan risk assessments should inform the Capital Investment Programme 2017-2021, which will assist the targeting of investment towards priority (high risk) supplies.

The implementation of the Drinking Water Safety Plan approach across all public drinking water supplies and providing relevant information on the outputs of such Drinking Water Safety Plan risk assessments will increase confidence in the water supplier, while ensuring that our water supply is consistently safe to drink. This approach will also bring about a greater understanding and awareness amongst all stakeholders involved, from source to tap, in their role in the protection of Ireland’s water resources.

Derval Devaney, EPA



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Ireland's Catchment Flood Risk Assessment and Management (CFRAM) Programme

Ireland's Catchment Flood Risk Assessment and Management (CFRAM) Programme is central to the medium and long-term strategy for the reduction and management of flood risk throughout Ireland. It delivers core components of the National Flood Policy whilst also meeting the requirements of the EU Floods Directive.

The programme is funded and managed by the Office of Public Works who, as competent authority, are responsible for reporting, coordination and consultation under the Floods Directive.

Preliminary Flood Risk Assessment

This initial stage saw an extensive national programme of data collection and analysis to identify the areas where flood risk would be further assessed. A national, formal consultation was undertaken in 2011.

Flood Hazard and Risk Mapping

A Catchment Flood Risk Assessment and Management study was commissioned in each River Basin District. Data collection included historic flood event and rainfall records, high resolution floodplain surveying, and detailed channel/structure surveys of selected rivers.

Hydraulic models determined flood hazard (where rivers or the sea is likely to flood in extreme events) and flood risk (the resultant impact on people, the economy and the environment). Flood mapping was presented at a series of Public Consultation Days held in 2014 and early 2015 and a national, formal consultation closed in late 2015.

Flood Risk Management Options

The Catchment Flood Risk Assessment and Management Studies tested a range of options against flood risk management objectives to identify potential solutions. Flood risk management objectives were agreed after formal public consultation in 2014.

These involved further assessment of flood risk management in line with social, environmental, economic and technical objectives. Options considered include high level measures to prevent future risk and detailed protection measures. The options comprise both structural and/or non-structural measures which have been identified for the sustainable management of flood risk.

Project options were presented at a series of Public Consultation Days in 2015 and early 2016; seeking comments about the options from stakeholders and the public.

Flood Risk Management Plans

The findings of the options consultation stage will inform draft Flood Risk Management Plans proposing a list of 'Preferred Options' that are tailored to each community; and which take into account those elements which are most important to each area (i.e. local economic activity, community facilities, infrastructure, the environment and local cultural heritage).

A further series of project Public Consultation Days, together with a national, formal consultation, will be held in summer 2016; at which the Catchment Flood Risk Assessment and Management Studies will be seeking comments about the draft plan from stakeholders and the public.

The findings of the draft plan consultations will inform the development of a final plan in late 2016.

2011

Preliminary Flood Risk Assessment Formal Consultation

2014

Flood Risk Management Objectives Public Consultation

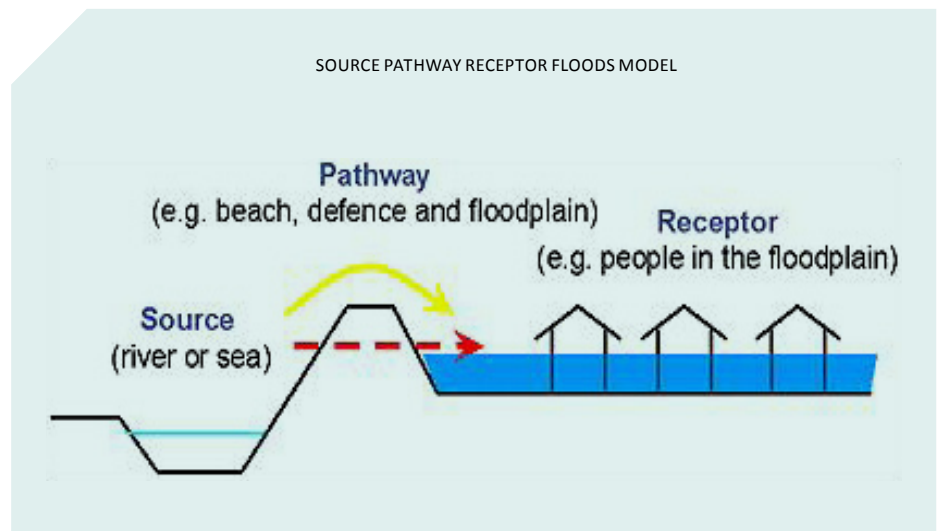
2015

Draft Flood Mapping Public Consultation
Draft Flood Mapping Formal Consultation

2016

Flood Risk Management Options Public Consultation
Draft Flood Risk Management Plan Public Consultation
Draft Flood Risk Management Plan Formal Consultation

CATCHMENT FLOOD RISK ASSESSMENT AND MANAGEMENT TIMELINE



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Floods/Water Framework Directive Integration

The Catchment Flood Risk Assessment and Management Programme has necessitated an ambitious degree of data collection and analysis meaning that there are new datasets available potentially to support Water Framework Directive assessment; this includes hydromorphological data:

- surveys of river longitudinal and cross-section, channel and bank structures (bridge and weir geometry);
- hydrological analysis resulting in improving of some rating relationships, and understanding of catchment boundaries and possibly response;
- hydraulic analysis predictions of water levels, extent and velocity may enhance the understanding of the fate of combined sewer overflow discharges and flooding risk of utility assets possibly facilitating future integrated flood risk management approaches;
- data on the maintenance/siltation of rivers and estuaries.

Like the Water Framework Directive, the Floods Directive has a six-yearly review cycle. This first cycle of Floods Directive implementation has focussed on the areas with the most significant risk and by definition these are mainly the urban areas where the flood risk receptors are most concentrated. Consequently, where structural measures are found to be the preferred flood

risk management solution, it may be that measures can be mitigated such that they will not represent a critical morphological pressure. To this end the assessment of alternative flood risk management options integrates the Water Framework Directive within the environmental objectives of a multi-criteria analysis that also considers social, economic and technical criteria.

A particular opportunity that was headlined for interaction in the first Water Framework and Floods Directive cycles was the possibility of “win-win” measures, namely those which might jointly aid the management of quantity and quality pressures. Natural Flood Management measures include activities such as silt trapping, drain blocking, slowing of flow and other land use adjustments – the potential applicability of such measures is being assessed in order that catchments, suitable to pilot these approaches, can be identified and the measures trialled in an Irish context. In particular these measures might offer benefits in the climate change adaptability of flood risk management as well as affording opportunities for the Integrated Catchment Management approach being promoted by the EPA to support stakeholder engagement in Water Framework Directive implementation.

The Flood Risk Management Plans will, of course, be subject to Strategic Environmental Assessment and Habitats Directive Assessment, thus enabling their potential interaction with River Basin Management Plans, other spatial plans, and conservation plans and programmes to be considered and perhaps enhanced by ensuring policy and plan linkage.



NATURAL FLOOD MANAGEMENT – WIN/WIN FOR WATER FRAMEWORK DIRECTIVE AND FLOODS MEASURES?

The severe flooding in late December 2015 and New Year 2016 has heightened the public's interest in flood risk management. Consultation activities offer an obvious and key opportunity for interaction between these two Directives. The Catchment Flood Risk Assessment and Management Programme is reaching an exciting stage, the findings of the significant volume of technical work are pointing towards preferred options to manage flood risk and the time to review, comment and influence Flood Risk Management Planning and find opportunities to interact is during the summer of 2016.

Details of the Floods Directive consultations are made available at www.cfram.ie

Grace Glasgow, RPS Consultants

Sustainable Community Engagement in Wetlands

Ní neart go cur le chéile (“There is strength in unity’)

Community engagement in wetland conservation can help deliver Water Framework Directive objectives.

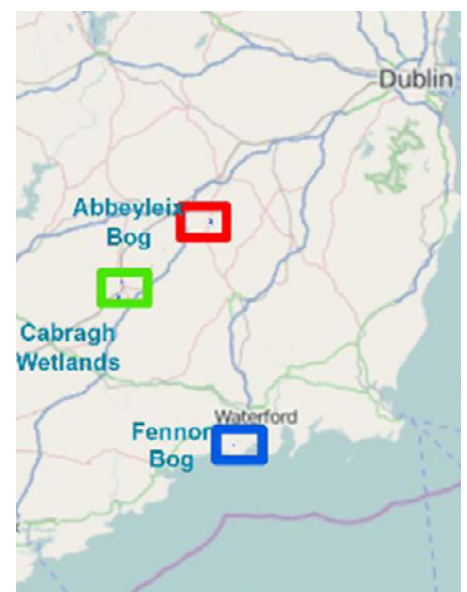
A research study was undertaken to assess stakeholder opinions and perceptions relating to community based wetland projects to identify key requirements for sustainability, i.e., achieving the dual goal of self-sustaining projects and protected ecosystems.

The study indicated the ancillary benefit of community engagement in fostering a shared environmental understanding by a process

called social learning - learning together to manage together.

A mixed methods study investigated community engagement strategies at three wetland projects in Ireland

- Abbeyleix Bog Project, Co. Laois
- Cabragh Wetlands, Co. Tipperary
- Fenor Bog, Co. Waterford



RELATIVE LOCATION OF THREE CASE STUDY SITES (SCALE: 1:4,000,000) [SOURCE: OPEN STREET MAP AND CONTRIBUTORS CC-BY-SA].

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Stakeholder Surveys

Three stakeholder groups involved in the projects were surveyed - project managers, visitors/volunteers, and other users.

This provided largely qualitative data on the projects and anecdotal evidence of successful community engagement.

Project managers identified a number of barriers to maintaining community engagement, including funding, volunteer capacity, lack of interest amongst general public and compliance/legal issues. The table opposite outlines measures proposed by project managers to sustain community engagement.

Abbeyleix

- Keep accessibility open
- Try to get more people actively involved in the project
- Build capacity by involving as many groups and individuals over time
- Only commit to achievable goals while keeping the ethos of the project at the base of every decision
- Keep organising Open Days and walks

Cabragh

- Develop expert sub-committees to lead/manage different areas of operation
- Spread the load among more people
- Improve membership links
- Continual evaluation of areas that could be improved
- Use of social media
- Hold more seminars on what Cabragh Wetlands does for sustainable development
- Representation at national conferences
- Develop profile

Fenor

- Encourage the involvement of younger people in fundraising (sale of work, etc.)
- Prepare educational resources as required
- Continued involvement by Irish Peatland Conservation Council in monitoring, education and reporting.

MEASURES PROPOSED BY PROJECT MANAGERS TO SUSTAIN COMMUNITY ENGAGEMENT



BOARDWALK INSTALLED AT FENOR BOG

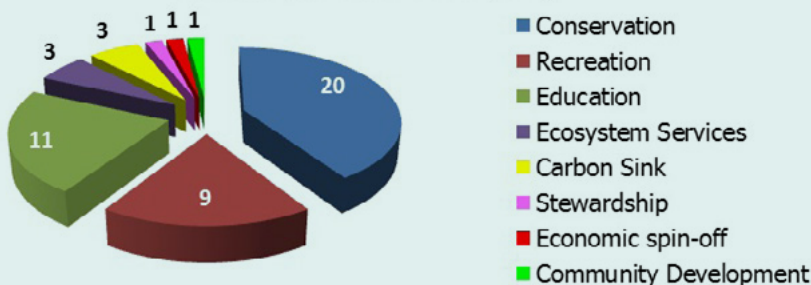


NOTICE BOARD AT FENOR BOG. BOTH BOARDWALK AND NOTICE BOARD INSTALLED BY MÓIN FHIANNÚRACH DEVELOPMENT ASSOCIATION IN PARTNERSHIP WITH THE IRISH PEATLAND CONSERVATION COUNCIL (IPCC)

Key Findings

- The three projects were initiated in response to threats (i.e., landfilling, development or peat extraction).
- Open access to the public is important and a diverse range of facilities and activities is provided and/or facilitated.
- 86% of visitors surveyed reside within 20km of the wetlands.
- All stakeholders surveyed consider that:
 - (a) Conservation is the most important reason for managing the sites (see pie chart on the left), with education and recreation generally of equal importance thereafter, and
 - (b) Wetlands are very important for Wildlife Protection, when rated for specified ecosystem services.
- 90% of project managers consider that external support is necessary to sustain community engagement.
- Administrative costs of projects range from €2,000 to more than €36,000 per annum, reflecting the degree and type of management undertaken.

Most important reasons for managing Abbeyleix Bog according to Other Users (n=5).



EXAMPLE OF WEIGHTED RATING OF MANAGEMENT OBJECTIVES BY SURVEY PARTICIPANTS. OTHER USERS SURVEYED AT ABBEYLEIX WERE LANDOWNER, STATE AUTHORITY REPRESENTATIVE, ENVIRONMENTAL CONSULTANT, A RESIDENT, AND A LANDOWNER IN THE LOCALITY.

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a topic, from a relatively small sample of the population, and subject the results to statistical analyses to provide insights into the different perspectives that exist within the population and the differences that exist between stakeholder groups (Kindermann and Gormally 2013, Ryan et al 2006). A set of twenty statements on regulatory/management support and social/education aspects of community projects was presented to participants for sorting (Q sorting) according to whether they agreed or disagreed with the statements and the level of (dis)agreement. The results were analysed using factor analysis, rotation, and principal component analysis.

Common Factors

Four common factors, which may be considered perspectives shared by stakeholders, were identified as:

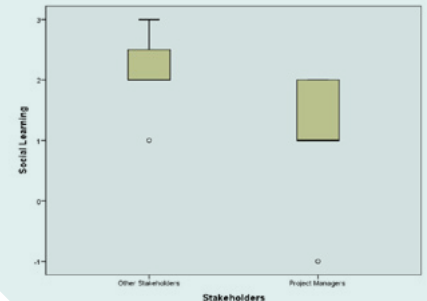
- (i) Socio-environmental capacity building
- (ii) Integrated, multi-agency collaboration
- (iii) Objective, socially inclusive governance,

(iv) Honest, progressive working relationships.

These factors highlight fundamental requirements for effective and sustainable community wetland projects from the perspective of a group of stakeholders with considerable experience and expertise in this area.

Overall, 94% (n=16) of participants agreed with the statement: "Involving various stakeholders introduces new ideas and techniques and results in learning (social learning, i.e. learning together to manage together)". The chart right shows that the social learning value is marginally more perceptible to other stakeholders than Project Managers. Other stakeholders surveyed included landowner, volunteers, consultant, state and local authority personnel. Two outliers (indicated by a circle on the boxplots) ranked the social learning value lower than their respective groups. The Other Stakeholder outlier somewhat agreed (+1) with the statement while the Project Manager outlier somewhat disagreed (-1).

BOXPLOTS INDICATING STRONGER AGREEMENT AMONGST THE GROUP 'OTHER STAKEHOLDERS' THAN 'PROJECT MANAGERS' WITH THE SOCIAL LEARNING VALUE OF INVOLVING VARIOUS STAKEHOLDERS IN PROJECTS



This project was completed between September 2013 and September 2015 during a MSc in Biodiversity and Land Use Planning via distance learning through NUI Galway's School of Science. It was funded by the EPA's Learning and Development Unit.

Ciara Maxwell, EPA

Water Framework Directive Typologies for Lakes: Why are they important and how do we assign them?

The Water Framework Directive requires that we assign typologies to all of our surface water bodies. These typologies describe physical characteristics of rivers, lakes, estuaries etc. that are independent of any pressure on them. The Water Framework Directive gives us examples of characteristics like geology and depth for lakes.

In Ireland, a typology for lakes was developed by a research team from TCD and UCD who found important changes in the biological communities that we use to assess ecological status across a number of physical and chemical attributes of lakes. For example, the team found that lakes with higher alkalinity concentrations (a measure of the ability of the water to neutralise acid inputs), had naturally higher frequency of occurrence of a family of plants called stoneworts (Characeae). They also found that deeper lakes had different species of phytoplankton and macroinvertebrates. It is important to understand that these differences occur naturally, if changes in water quality are being inferred from changes in biological communities.

All lakes and reservoirs on the Water Framework Directive monitoring programme have been assigned a Water Framework Directive typology, this means that they have been assigned a type based on their altitude, alkalinity, depth and size.

However, in the last reporting period, 595 lakes were un-typed because alkalinity and depth measurements were not available. Our research project, between TCD and the EPA, was tasked with predicting the alkalinity and depth of these lakes, so that they could be assigned a type. Data are available from Geographic Information System mapping on the size and altitude of the unmonitored Water Framework Directive lakes. Using monitoring data, a statistical model was developed that can predict the likely alkalinity type of a lake from the percentage of limestone

and peat in the lake catchment. We found that low alkalinity lakes had less than 41 % of limestone in their catchments and greater than 69 % cover of peat soil. This means we can predict that a lake will be of low alkalinity if it satisfies those criteria. Moderate alkalinity lakes also had less than 41 % of limestone in their catchments, but had less than 69 % peat. High alkalinity lakes had greater than 41 % limestone. This model performed very well, correctly classifying 87 % of lakes in an independent data set into the correct alkalinity category.

Parameters	Boundaries											
	<20				20-100				≥100			
Alkalinity (mg L ⁻¹ CaCO ₃)												
Depth (m)	≤4	>4	≤4	>4	≤4	>4	≤4	>4	≤4	>4	≤4	>4
Area (ha)	<50	≥50	<50	≥50	<50	≥50	<50	≥50	<50	≥50	<50	≥50
Type	1	2	3	4	5	6	7	8	9	10	11	12

THE IRISH WATER FRAMEWORK DIRECTIVE TYPOLOGY FOR LAKES. SOURCE: FREE ET AL., 2006.

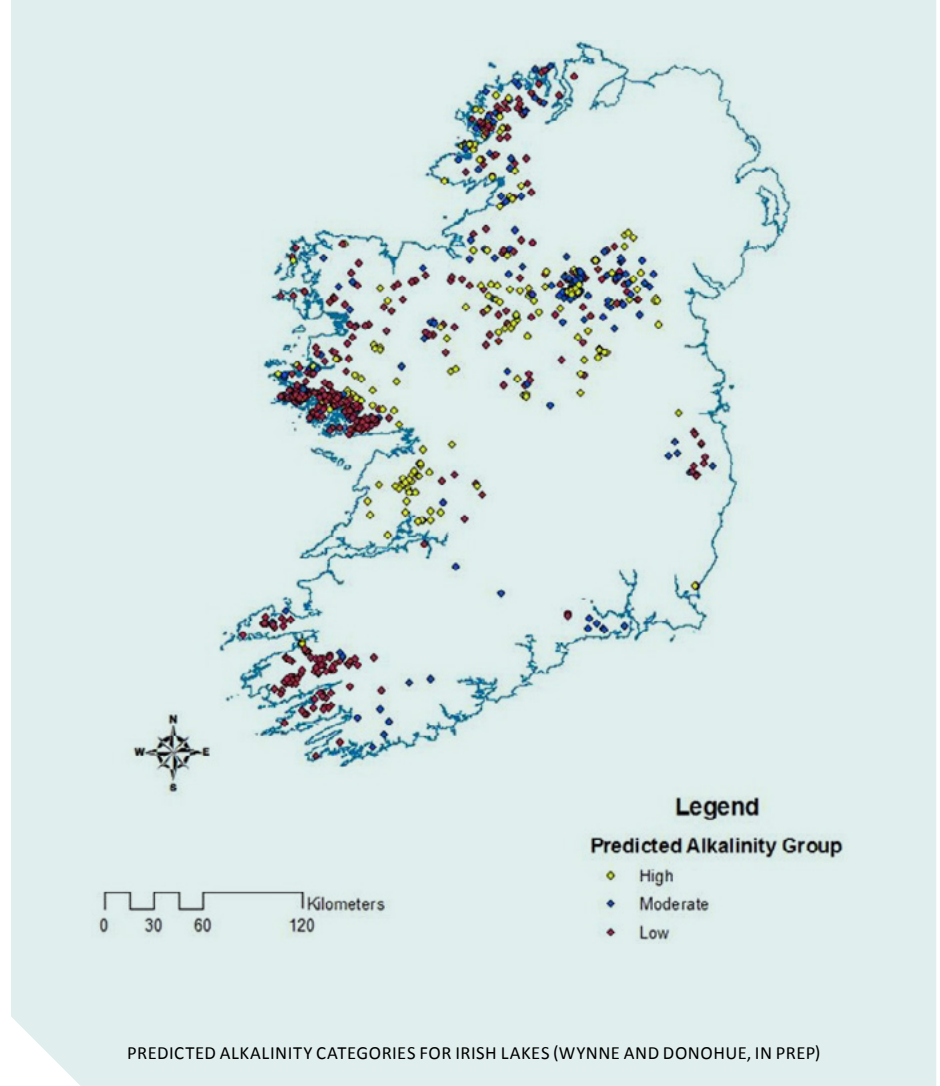
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We were not as successful in creating a model to predict lake depth from the monitoring programme data. However, during the period 2009 to 2012, bathymetry (depth) surveys were commissioned by EPA and existing bathymetry data was collated from variety of sources e.g. Local Authorities, Inland Fisheries Ireland, TCD, River Basin Districts, North-South Share. These data were analysed using a common protocol (Webster and Donohue, unpublished report), resulting in bathymetry maps for 348 unmonitored lakes. Using monitoring data, the predictive model and outputs of the bathymetry surveys, we were able to assign or update the Water Framework Directive typology for 582 lakes. This will assist EPA biologists in assigning status and interpreting how lake biological communities respond to pressure. It will also help fulfil our reporting requirements to the European Commission on lake water body typology assignment as part of Water Framework Directive Article 5 Characterisation. Currently there are 230 un-typed and unmonitored Water Framework Directive lakes. We will shortly be contacting local authorities to request assistance in obtaining alkalinity and/or depth measurements for these remaining lakes. If data are not available, these lakes will be prioritised for survey to allow typology assignment to all Water Framework Directive lakes.

For more information:

See www.epa.ie/water/wm/lakes

Caroline Wynne, RPS Consultants and Deirdre Tierney, EPA



Phase 3 of the Agricultural Catchments Programme begins

Funding for the third four-year phase (2016 -2019) of the Agricultural Catchments Programme was announced just before Christmas 2015. The programme which started in 2008 has amassed a unique environmental, agronomic and socio-economic data set unrivalled around the world.

It is funded by the Department of Agriculture, Food and the Marine who set out objectives focussed around monitoring the effectiveness of the programme of measures contained in the National Action Programme introduced under the Nitrates Directive. These are known as the Good Agricultural Practice measures and most farmers refer to them as the "Nitrates Regulations".

The first phase of the programme was completed at the end of 2011 and Phase 2 ran to the end of 2015. Phase 1 was concerned with project design, development and scientific

assertion from the first years of data collection. Phase 2 was mainly concerned with validation of assertions and policy impact. Phase 3 will continue the approach established in the first two phases while developing the modelling area and expanding the dissemination effort.

Since the Agricultural Catchments Programme was launched the Irish agricultural policy landscape has changed substantially first with the publication of the strategies of Food Harvest 2020 and more recently Food Wise 2025. These reports have placed the development of the

bioeconomy at the forefront of plans for the recovery of the Irish economy and identify sustainability as a core value and goal of the sector. Of course, labelling our production as "sustainably produced" is of little value to the marketers unless it can be verified. The verification of the sustainability credentials of Irish food, at least regarding water quality, has thus become an important potential use for Agricultural Catchments Programme findings.

The Agricultural Catchments Programme approach is based on looking at the impacts

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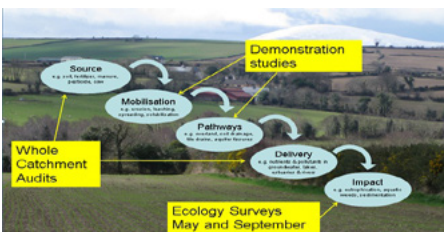
of the Good Agricultural Practice measures in the context of maintaining viable farming businesses in the Irish countryside. This means developing our scientific knowledge of how the catchments work so that we can better understand the effects of changes brought about by the Good Agricultural Practice measures on the environment and farming. We place a strong emphasis on trying to identify win-win opportunities – where farmers can manage their farms to the benefit of both their livelihoods and the environment.

A multidisciplinary team of researchers, advisors and technicians delivers the programme in six intensively farmed agricultural catchments. These were selected and established in partnership with over 300 farmers who farm in them and they cover a range of important farming/landscape combinations including dairy, tillage, drumlin and karst. These catchments include derogation holdings as required by the European Commission under Ireland’s approval to operate under grassland stocking densities above the allowed 170 kg organic nitrogen per hectare under the standard Nitrates Directive allowance. The map below shows the location of the catchments and their main characteristics



Agricultural Catchments Programme Approach

A key strength of the Agricultural Catchments Programme that sets it apart from most other such studies is that a single, common experimental design is used in all six catchments. This design is based on the concept of a continuum from source to impact (see image below) – for nitrogen or phosphorus to impact on stream ecology it must pass through each stage of this continuum.



AGRICULTURAL CATCHMENTS PROGRAMME CONCEPT OF CONTINUUM FROM SOURCE TO IMPACT



JOHN KENNEDY AGRICULTURAL CATCHMENTS PROGRAMME TECHNICIAN DOWNLOADING DATA FROM THE BANKSIDE ANALYSER

Each stage of the continuum is monitored and analysed to build up a better understanding of how the whole system works and to try to determine what conditions lead to increased risk of these nutrients impacting on water quality. This work entails high resolution monitoring in both time and space of the main physical parameters, such as the nitrogen and phosphorus concentrations in the surface and groundwater, stream flow, weather data, soil nutrients levels, ecology etc. Automated bankside analysers deliver much of this high resolution data, but a great deal of it is collected via more traditional methods by the programme’s technicians

A second key strength is the integration of a strong socio-economic element into the programme. This entails a high level of engagement with the farmers in the catchments mainly via the four Agricultural Catchments Programme advisers who deliver an advisory service to the farmers and collect data on nutrient management and economic performance. This integrated approach allows the catchment researchers to combine the biophysical with the socio-economic in analysing the impact of the measures and thus better understand the likely outcomes and potential for improvements in farm management that could lead to win-win opportunities.

Agricultural Catchments Programme Findings – in summary

Twelve of the more significant findings from the first two phases of the Agricultural Catchments Programme are listed below:

Soil Phosphorus Trends – the proportion of fields in Phosphorus index 4 (sufficient/excess) has declined in four out of the five catchments reported on but the number of index 1 and 2 fields (very low/low) have increased indicating an overall decline in soil Phosphorus levels reflecting national trends. There is convergence towards index 3, the optimum for farming productivity, in the Timoleague catchment which is predominantly used for intensive dairying, but not in the other catchments.

Nutrient Management Planning – over half of farmers surveyed who had a Nutrient Management Plan didn’t use it. A farmer focus group indicated that they found the current type of plans difficult to use and favoured a simpler, flexible Nutrient Management Plan approach combining a durable map with a table.

Reduced Nitrogen and Phosphorus surpluses of inputs over offtakes – analysis of National Farm Survey data for dairy farms over seven years since the introduction of the Good Agricultural Practice measures has shown that Nitrogen and Phosphorus surpluses have

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declined nationally without reducing output. Between 2006 and 2012 Nitrogen surpluses declined by approximately 25 kg/ha and Phosphorus surpluses by approximately 6 kg/ha. This provides strong evidence of improving efficiency of nutrient use leading to better environmental and economic performance.

Soil type and geology override soil Phosphorus index as a predictor of Phosphorus loss risk – a ‘one size fits all’ approach that does not take account of soil type may not adequately address Phosphorus loss risk mitigation.

Phosphorus loss to groundwater while generally not significant can be important in some settings - on some free-draining soils over half of Phosphorus loss can be through groundwater, although overall losses are generally low in these settings. These types of losses are governed mainly by soil Phosphorus chemistry - Phosphorus is fixed by iron and aluminium in the soil, but iron-rich soils may give higher water soluble Phosphorus concentrations leading to higher groundwater Phosphorus which can add to river baseflow concentrations.

Disproportionate summer influence of point sources - in some catchments summer Phosphorus concentrations in streams increase as baseflow reduces indicating a predominantly point source influence, especially in catchments with lower summer baseflow. This may have a disproportionately large impact on year-round stream ecology.

Closed period – stream Phosphorus concentrations reduce during the closed period and don’t show a pulse of increased losses at the start of the open period i.e. there is no evidence of increased incidental losses as slurry spreading begins. High Phosphorus concentrations outside the closed period are related to incidental losses from storms.

Sediment losses – Irish sediment losses are low by international standards. Stream bank/bed erosion and road losses make up most (75% in a poorly drained catchment) on the more common land uses, i.e. grassland in catchments with modified channels.

Critical Source Areas – a Geographic Information System-based approach to Critical Source Area identification using high resolution digital maps could identify sub-field scale Critical Source Areas, pathways of Phosphorus losses and stream channels at highest risk facilitating targeted management of these areas to minimise risk of nutrient loss.

Main influences on farmers’ nutrient management practices – Teagasc advisers, family, other farmers, farming press, farm walks and discussion groups have most influence

regarding nutrient management decisions among surveyed farmers.

Overriding climate pressures – Phosphorus and Nitrogen diffuse and point source mitigation measures are susceptible to large scale weather systems over the Atlantic; excessively wet years and wet pulses following dry periods have become more common patterns during the Agricultural Catchments Programme monitoring period. Ireland may be particularly susceptible due to location, making impact of mitigation measures hard to predict.

Nitrates in groundwater – groundwater nitrate levels in all monitored catchments are well below the World Health Organisation standard of 50mg/l, however this can be exceeded occasionally at individual wells due to localised events but recover to preceding levels over time.

Using the Agricultural Catchments Programme findings to improve future outcomes

Improved nutrient management is the single area with the greatest potential to improve outcomes for water quality on Irish farms. Better management of nutrients, including liming to correct soil pH, will optimise nutrient use efficiency and deliver better profits for the farmer while reducing risk of nutrient loss to water. An improved approach to supporting farmer nutrient management decisions is one of the elements needed to achieve this improvement.

The new Teagasc Nutrient Management Plan Online package aims to address this need by making it easier for advisers and planners to produce high quality Nutrient Management Plans with maps that make it easier for the farmer to understand and implement the plan. Of course advisory support to interpret the plans is also important. This support should extend to decisions on slurry and manure spreading regarding timing, soil type and location. In future it may be possible to have real-time updates for farmers based on weather forecasts to support their decision making. Ultimately, the development of a Critical Source Area identification package for use by environmental planners and advisers could facilitate better precision in targeted mitigation measures to parts of the landscape when they can be most effective. This approach could tie in with environmental schemes and nutrient management planning to facilitate sustainable intensification of farming.

The impact of farm and non-farm point sources can be significant and where there is evidence of this impact, targeting and elimination of

these sources will reduce pressure on the receiving waters. Similarly where bed and bank erosion is leading to damaging sediment loss, mitigation of these risks could be considered. It’s also important to take account of lag times and large scale climate pressures and review pressure/impact patterns with care as cyclical trends and lags in water body recovery may confound or delay the effectiveness of mitigation efforts.

Finally policy makers should consider that most improvements in farm management, such as better animal breeding or better grassland management, will lead to better nutrient use efficiency as more product is produced from lower inputs. Thus, supporting the uptake of better farm management practices, while not directly targeting environmental gains, will likely have positive environmental and economic effects – a classic win-win.

Agricultural Catchments Programme Phase 3

In Phase 3 of the Agricultural Catchments Programme (2016 – 2019) it is planned to build on the data collected and the work done in the previous two phases by continuing with the current approach while developing a greater modelling competence. The modelling work requires an integrated environmental-economic modelling approach to specifically address the challenges inherent in meeting the production and environmental targets set out for Irish agriculture. The primary aim of this work is to develop the capability to identify the risks to expansion and advise on the overall costs and benefits associated with sustainable intensification practices at field, farm and catchment scale. Existing and Phase 3 Agricultural Catchments Programme data, as well as appropriate external data, will be used.

Phase 3 also aims to deliver an enhanced knowledge transfer and dissemination programme in collaboration with Teagasc colleagues. It will focus primarily on getting key messages from the Agricultural Catchments Programme to farmers mainly via the existing Teagasc Knowledge Transfer structures, but also includes dissemination to a wider audience of policy makers, regulators, environmental scientists and the general public. Given the range and diversity of the audience and the resource constraints that exist an approach that uses all feasible channels, including this newsletter, is needed to deliver this dissemination programme.

Ger Shortle, Manager, Teagasc Agricultural Catchments Programme

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2015 Farming and Biodiversity Photo Competition –Winners

We are happy to highlight the winners of the 2015 ‘Farming & Biodiversity’ Competition which is produced by the Irish Agricultural Science Teachers Association and Streamscapes, with sponsorship from the EPA Catchments unit. This year’s theme was ‘Farming & Water Quality –Best Practice’ which yielded some very knowledgeable and interesting entries.

There were some great images of controlling water run-off from farmyards, utilising rain water for watering animals as well as supplying an innovative Donegal bathtub, but the Judges’ favourites were efforts that had been undertaken to buffer the impacts of nutrients and silts from reaching wild rivers and streams.

More information is available on www.iasta.ie and www.streamscapes.ie



“GRANTING DREAMS TO BLOCKING STREAMS; USING XMAS TREES AS SILT TRAPS ON WORK EXPERIENCE” - SEAN GRAYSON, ST. PETERS COLLEGE WEXFORD. TEACHER: WILLIE WHITE



“STOP POLLUTING; LET’S WORK TOGETHER, TO MAKE THE WATER CLEAN AND BETTER” - AOIFE BUCKLEY, COLÁISTE MHUIRE BUTTEVANT, CO. CORK. TEACHER: PATRICK CURTIN



“REED BED FILTRATION SYSTEM IN AIRFIELD, DUNDRUM, USED TO FILTER WATER NATURALLY” - CHRISTOPHER MERTON, WESLEY COLLEGE. TEACHER: IAIN WALLACE



“WATER CONSERVATION, NO EROSION ON BANKS; PREVENTS RIVER POLLUTION, NATURE SAYS THANKS” - DANIEL FURLONG, ST. PETERS COLLEGE WEXFORD. TEACHER: WILLIE WHITE



“WEIRD, WONDERFUL, WIRED WATERWAY” - MATTY CASEY, MILLSTREET COMMUNITY SCHOOL. TEACHER: SARAH BUCKLEY

Water Framework Directive Application – Phase 2 development update, and plans for a public version

Phase 2 of the Water Framework Directive application went live in December 2015 but is currently largely only accessible by public agency staff. It has been developed to support our subcatchment risk assessments, which are focussed on rivers and lakes. Assessments are expected to be complete for all 583 subcatchments by the end of this year. The assessment is based around a 5-step process allowing each subcatchment to be assessed to varying degrees of detail depending on the issues. The 5 steps include a conceptual model of how water and contaminants move through the subcatchment, an assessment of the pressures and impacts and a list of further actions required.

In addition to these assessments, additional capabilities added in this release include;

- new map layers including subcatchments, catchments and pressures;
- Information and maps of Point Pressures (e.g. Urban Waste Water facilities, EPA licensed activities);
- Maps of Protected Areas;
- Pollution Impact Potential maps for diffuse sources of pollution.

At the end of Phase 2 the app has the below functionality, Phase 2 additions are in red. The app can be accessed by public bodies and researchers via www.edenireland.ie

Phase 3 – Making the information available to the public

The next phase of development should be completed by June 2016. This phase aims to make the information currently available on the Water Framework Directive App more widely accessible, and to provide resources on the web to support Integrated Catchment Management in Ireland. This will see stories of best practice from this newsletter and elsewhere used to build awareness of the ‘catchment’ concept, and help the public become more aware of and involved in water management in their local area. As part of this work, we will be contacting existing River Basin District websites to ensure that all 1st Cycle Documents are transferred, so that the new website can serve as a library of all relevant documents for the 2nd Cycle of the Water Framework Directive.

‘Catchments.ie’ – is this the best name?

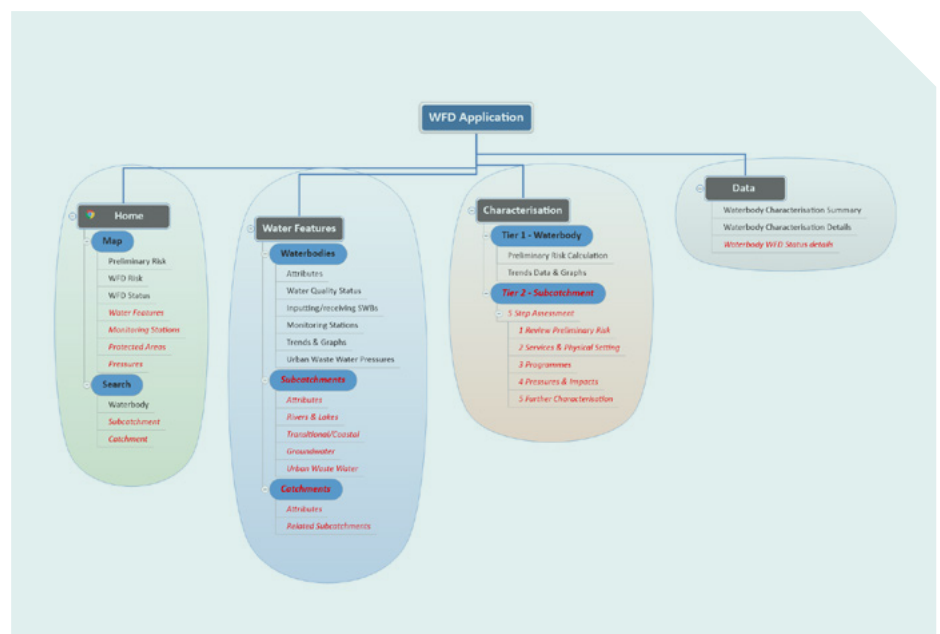
The name proposed for this website is **Catchments.ie** – however, we are open to suggestions for a better one. The name was chosen as we think it gives us the opportunity to embed the catchment concept in the mind of the interested public who will use this, and gives us an opportunity to build awareness and a positive impression of the concept over time.

For some people ‘catchment’ may be a relatively unfamiliar word. If you have any feedback or suggestions for a better name, get in touch – catchments@epa.ie

Have you a story to tell?

To make this new website successful, we will need stories from around the country. If you would like to submit a story for the website and/or the next issue of this newsletter, please email catchments@epa.ie and let us know what you have in mind.

Jenny Deakin, EPA, and Brendan Ward, EPA Contractor



NEWS & ARTICLES

The Water Policy Advisory Committee: joined-up policy-making and the Water Framework Directive

In 2014, the Minister for the Environment introduced the European Union (Water Policy) Regulations 2014 which set out a new governance structure to achieve better implementation of the Water Framework Directive in Ireland. A number of reviews of the river basin management plans produced under the first Water Framework Directive cycle in Ireland concluded that implementation was fragmented. The 2014 Regulations therefore introduced a much more integrated governance structure where clear responsibilities were assigned to the EPA, the local authorities and the Minister.

The Regulations also established the Water Policy Advisory Committee which brings together the key policy-setting national organisations that impact on Ireland's delivery of the Water Framework Directive. The functions of the Water Policy Advisory Committee are to advise the Minister on policy in relation to:

- the preparation of River Basin Management Plans;
- Water Framework Directive environmental objectives;
- programmes of measures to achieve these objectives; and
- other related matters concerning the protection and management of the aquatic environment and water resources.

The Water Policy Advisory Committee has been meeting on a quarterly basis since 2014 and it allows a range of Government Departments and agencies to consider the full range of policy measures, legislation and European Directives that potentially impact on Water Framework Directive implementation in Ireland. It ensures that the 3 governance tiers set out in the 2014 Regulations align well. Those tiers are as follows:

- (1) the Minister is ultimately responsible for the setting of environmental objectives, and for making programmes of measures and River Basin Management Plans;
- (2) the EPA leads on the science that underlies Water Framework Directive implementation,

and it advises the Minister on the roles set out for him above; and

(3) local authorities are responsible for regional coordination, public consultation, and the implementation of River Basin Management Plans and programmes of measures in their functional areas.

The Water Policy Advisory Committee is chaired by a senior representative of the Minister, currently Ms. Maria Graham, Assistant Secretary, and the public bodies represented on the committee are as follows:

- Department of Agriculture, Food and the Marine;
- Department of Communications, Energy and Natural Resources;
- Department of Arts, Heritage and the Gaeltacht;
- Department of Health;
- Environmental Protection Agency;
- County and City Management Association;
- Office of Public Works;
- Commissioners for Energy Regulation (who regulate public water and wastewater services); and
- Such other organisation or body as the Minister may determine from time to time.

The committee also invites external stakeholders to present to it and to discuss water management issues. Previous external

invitees have included the Sustainable Water Network (SWAN) and Irish Water. In order to develop awareness of its work, reports of meetings are published on the Department's website (bit.ly/environwfd)

In 2016, the Water Policy Advisory Committee will focus on:

- the issues raised during the public consultation on significant water management issues in Ireland;
- the preparation of draft second cycle River Basin Management Plans by December 2016 (which will then be consulted on in 2017); and
- advising the Minister with regard to a regulatory regime for water abstraction.

Successful implementation of the Water Framework Directive can only be achieved by a whole-of-government, inter-agency and inter-sectoral approach. The Water Policy Advisory Committee is an important forum for teasing out the interplay between the many issues which arise seeking to preserve and improve the quality of our inland, estuarine and coastal waters, and then to make appropriate recommendations to the Minister. While this cross-cutting approach takes more time than the traditional "top-down" directional approach to policy-making I firmly believe that it will ultimately produce better long-term results.

Cian Ó Lionáin, Department of the Environment, Community and Local Government

RESOURCES

Sustainable Water Network – Weekly Newsletter

If you'd like to be updated on the recent work and achievements of the twenty-six leading environmental groups active in the Sustainable Water Network, then you may find SWAN's weekly newsletter a handy resource.

Sent out every Friday, not only is the newsletter full of water news from Ireland and abroad, it collates all water-related upcoming events in one convenient place. That means you'll never lose track of looming submission deadlines,

conference registration details, and even community clean-ups, ecological surveys, and art exhibits near you. Additionally, the newsletter features regular updates from the SWAN office, such as concise, original articles on topical issues, including a recent piece on the brand-new floods report out from the EEA, which you can read here: bit.ly/swanweekly

SWAN is also working on an audio story which will take a look at the devastating impacts

landfill leachate is having on dolphins in Irish waters. To hear it first, sign up for the newsletter by visiting SWAN's website at www.swanireland.ie; you can also follow SWAN on Twitter and Facebook.

facebook.com/sustainablewaternetnetworkSWAN
twitter.com/swanireland

Sydney Weinberg, Sustainable Water Network (SWAN)

United Kingdom and Ireland Lake Network

The United Kingdom and Ireland Lake Network (UKILN) has recently revamped its website:

www.ukandirelandlakes.org

The website was originally launched in 2001 with the purpose of sharing best practice in lake management and raising awareness with lakeside communities about the importance of lakes to everyone; from small ponds to our largest lakes.

It has a wide and varied membership from state bodies, researchers to non-government bodies. It provides a good opportunity to expand your professional network, exchange idea through discussion forums and for information dissemination.

Each year since its inception in 2009, a conference has been held and so far each member country, Wales, Scotland, Northern Ireland and Ireland have hosted the event. These are usually intimate affairs with ample

opportunity to network and learn something new.

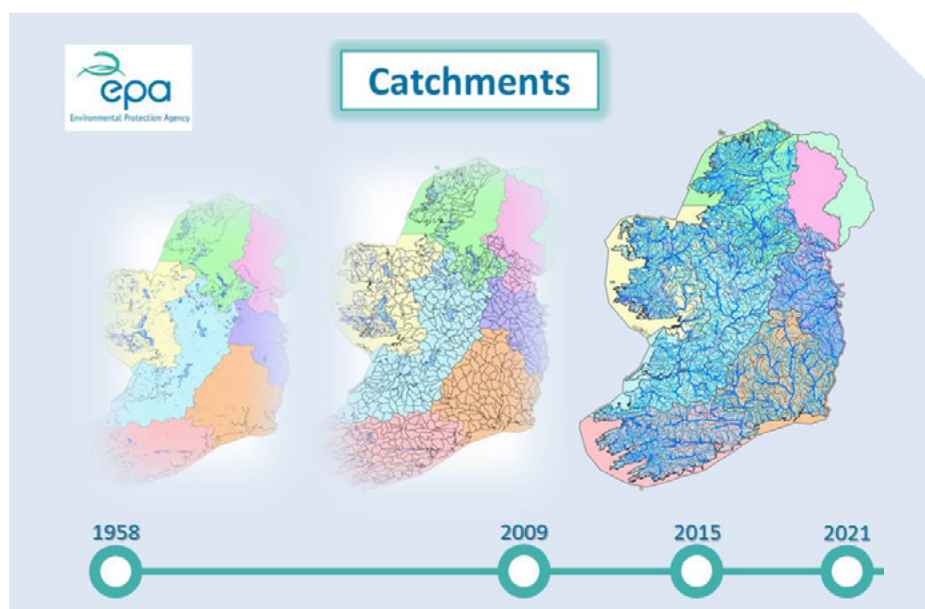
The 2016 conference is back in England on the 21st (talks) and 22nd (fieldtrip) of April and will draw from case studies in lake watershed stewardship in the Lake District and beyond to give new perspectives and generate discussion. See their website to join up, and for further details.

Deirdre Tierney, EPA, and John Pinder

Open Data Released: Ireland's rivers and their catchments

The Ordnance Survey of Ireland & EPA have released a freely downloadable Catchment Package with Ireland's rivers now digitally available as open data.

<http://gis.epa.ie/GetData/Download>



RESOURCES

New Irish Website: High-Nature-Value-Farmland.ie

High Nature Value farmland is extensively managed farmland that has high biodiversity. This farmland is important for the conservation of semi-natural habitats and the plants and animals linked with them.

Supporting this type of farmland will ensure high levels of farmland biodiversity, vibrant rural communities, high water, air and soil quality and resistance to flooding among other things.

These farms occur in areas that are mountainous, or areas where

intensification is not financially viable and so land is prone to abandonment. Farming sustains the biodiversity of these landscapes and is integral to maintaining their high nature value.

This website gives an overview of High Nature Value farmland in Ireland, and highlights the public goods that this farmland can provide to wider society.

www.high-nature-value-farmland.ie/

Chartered Institute of Water and Environmental Managers: Floods and dredging – a reality check

This report looks at recent floods in the UK and analyses whether dredging would have made a significant difference.

It shows that while dredging can reduce water levels on a local scale and may be critical in key locations, it is not a universal solution to the problems of flooding.

bit.ly/floodsdredgingrealitycheck

UK Environment Agency Blog: What the public have taught me about flooding

This blog from the UK Environment Agency looks at how flood risk is communicated, how avoiding jargon is key, and what running Community Workshops in 5 local communities has taught them over the course of a year.

bit.ly/publictaughtflooding

EU Website: Natural Water Retention Measures

This website is a European catalogue of Natural Water Retention Measures. You can learn about related concepts, access the practical guide that will help you implement Natural Water Retention Measures, or directly access the different products: synthesis documents, a catalogue of measures, and case studies.

www.nwrm.eu

Dutch Room for the River project

The goal of the Dutch Room for the River Programme is to give the river more room to be able to manage higher water levels. At more than 30 locations, measures will be taken that give the river space to flood safely. Moreover, the measures will be designed in such a way that they improve the quality of the immediate surroundings. The Room for the River programme will be completed by approximately 2016.

bit.ly/roomfortheriver

RESOURCES

UK: Multiple Benefits of River and Wetland Restoration – Killer Facts measured from projects implemented on the ground

Another UK resource, this has been compiled by Environment Agency Head of Biodiversity Alastair Driver.

It has several examples of UK projects and their observed data, and includes lots of information on natural flood management.

bit.ly/riverrestorationkillerfacts

You can also follow Alastair on Twitter: [@AlidriverEA](https://twitter.com/AlidriverEA)

Scotland: Learning from community led flood risk management, including natural flood management

Learning from community led flood risk management utilised the Carse of Stirling as a case study area to work with the community, landowners and The Carse of Stirling Partnership to assess natural flood management measures suitable for addressing flooding issues across the Carse of Stirling, additionally outlining any likely ecosystem service provision. bit.ly/crewfrm

UK Case Study: Making space for natural processes – forest to bog restoration at RSPB Forsinard Flows Reserve

This case study demonstrates the importance of making space for, and restoring natural processes, allowing ecosystems to increase resilience against climate change pressures. Designated as a nature reserve in 1995, Forsinard Flows is located in Caithness and Sutherland in the north of Scotland.

Here you can find a vast area of blanket bog - Europe's largest - known as the Flow Country.

However, in the 1970s and 1980s, large areas were chosen as sites for non-native conifer plantations, affecting the hydrological (water regulating) function of the bog, and contributing to losses of habitats and wetland species.

Blanket bog ecosystems are at risk from climate change as they are vulnerable to changes in rainfall and temperature. Healthy 'active' bogs are more resilient to climate change, however, and adaptation focuses on restoring the natural functions of degraded bogs. The Royal Society

for the Protection of Birds bought the reserve in 1995, and since then, their work to fell the trees and restore the bog hopes to improve climate change resilience by, in time, returning the bog to a healthy state. Restoration also has the benefits of carbon storage for climate change mitigation, and once again creating a good habitat for wetland species.

bit.ly/forsinard

UK South West Water: new Upstream Thinking project launched

The multi-award-winning Upstream Thinking partnership is expanding its work to improve river water quality in the south-west of the UK with a new five-year programme.

A partnership of South West Water, the Devon Wildlife Trust, the Cornwall Wildlife Trust, the Westcountry Rivers Trust and the Exmoor

National Park Authority is building on work begun in 2008 to change land management practices to protect rivers. Supported by the National Farmers Union, the Environment Agency, Natural England and the Farming and Wildlife Advisory Group, the programme is part of South West Water's long term business plan to reduce its environmental footprint

and manage the impact of diffuse pollution on customers' bills. The programme has two main elements: advice and grants for farmers and the restoration of peatland in partnership with landowners.

bit.ly/southwestupstreamthinking

RESOURCES

Wheel Report: EU Funding for non-profits

In January 2015, The Wheel commissioned a report into European Union funds, specifically to cover the period of 2015 to 2020. The report was to focus on the operation of relevant European Union programmes and the specific funding opportunities they might present to Irish non-profits in particular.

bit.ly/wheeleufunds

Wheel Report: Let's commission for communities

Let's Commission for Communities identifies the societal value that the community and voluntary approach delivers: the energy, endeavour and commitment displayed, and the funds contributed. The report makes strong recommendations about what is needed if we want to continue to benefit from a thriving community and voluntary sector.

bit.ly/wheelcommunities

European Environment Agency- Floodplain Management and Restoring Healthy Ecosystems

Floodplains once covered wide stretches along European rivers, but today only fractions of them remain. These ecosystems have an important role to play in reducing flood risks and are also the natural habitat of many endangered species. A new report by the European Environment Agency provides an overview of significant floods in Europe, and looks at the role of floodplains in flood protection, water management and nature conservation.

bit.ly/eeafloodplain

University of Cambridge - Commercial gains from addressing natural capital challenges in the dairy sector

With a wide array of commitments to create a more sustainable dairy industry, farmers and others have sought clarity as to which approaches businesses could support at the production level to help deliver these commitments.

Six leading companies partnered with the University of Cambridge Institute for Sustainability Leadership to make an important first step. Representing different perspectives upon the dairy value chain, each company recognised that more sustainable use of natural resources creates a more resilient dairy industry by providing opportunities for increasing productivity, reducing input costs and mitigating risks.

bit.ly/dairynaturalcapital

ESRI Working Paper: Water Quality and Recreational Angling Demand in Ireland

Using on-site survey data from sea, coarse and game angling sites in Ireland, this paper estimates count data models of recreational angling demand. The models are used to investigate the extent to which anglers are responsive to differences in water quality, with the water quality metric defined by the EU's Water Framework Directive. The analysis shows that angling demand is greater where water quality has a higher

ecological status, particularly for anglers targeting game species. However, for coarse anglers we find the reverse, angling demand is greater in waters with lower ecological status. On average, across the different target species surveyed, anglers have a willingness to pay of €371 for a day's fishing.

bit.ly/esriangling

EPA RESEARCH UPDATE

EPA Research Report 155: Public Engagement in Integrated Catchment Management – StreamScapes recommendations

For over 25 years, StreamScapes have helped local communities understand their aquatic environments, and the biodiversity they support. This report details the techniques they have developed for public engagement, and recommendations for the future. This study aims to provide a relatively short and practical guide to what works.

bit.ly/streamscapesreport

EPA Research 161: Assessment of disposal options for treated wastewater from single houses in low-permeability soils

The potential impacts of incorrectly situated or poorly constructed domestic waste water treatment systems (DWWTs) include the pollution of either groundwater and/or surface water and places a risk on human health particularly via private wells.

This research has demonstrated with field trials a range of systems that may be a solution for on-site wastewater treatment and disposal in low permeability soils, although changes in

current policy and legislation would be required to facilitate their use. EPA staff will review the report and liaise with DECLG in relation to the relevant recommendations/findings highlighted by the authors and incorporate the findings into national guidelines as appropriate

A decision support tool, also produced by this study, has been developed for strategic assessment at a Local Authority level to inform policy. This has highlighted that surface water

discharge may need to be reconsidered in areas where the discharge to ground is very problematic. It has also shown that the concept of clustered decentralised systems could target a significant proportion of potentially poor sites in low permeability areas and therefore lower the burden of monitoring associated with individual discharge consents.

bit.ly/eparesearch161

EPA Research 163: Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE)

One of the Biological Quality Elements to be assessed under the Water Framework Directive is angiosperms. Whilst seagrasses (*Zostera* spp.) are the only true marine angiosperms, saltmarshes are also included within this

Biological Quality Element under the Water Framework Directive. In the past, a suitable Water Framework Directive status assessment tool for saltmarshes has not been fully applied in an Irish context. This requirement led to the

establishment of a project which resulted in the development of this tool for the assessment of Irish saltmarshes at a water body level.

bit.ly/eparesearch163

EPA Research 166 - Characterisation of Reference Conditions for Rare River Types

This report is a Literature Review of the Rare Type project, which will help ensure that rare river types are categorised and assessed correctly as required by the Water Framework Directive. This project seeks to determine if the current 12 national river types adequately

represent rare river types; and if the existing metrics accurately assess their status.

The first key step is to determine if the four categories of rare river type (naturally acid rivers, lake outlets, highly calcareous rivers, and groundwater-dominated rivers) examined

in the RARETYPE project do in fact represent river types distinct from the 12 national types. If this is the case, then type-specific reference conditions must be established for the new types.

bit.ly/eparesearch166

EPA Research - Water Research in Ireland 2014-2020

A summary of the EPA Water Research Programme, highlighting key achievements, water research publications and water research projects funded between 2014 and 2020.

bit.ly/epawater2020

PRIVATE WELL CONTAMINATION RISK

PRIVATE WELLS



720,000

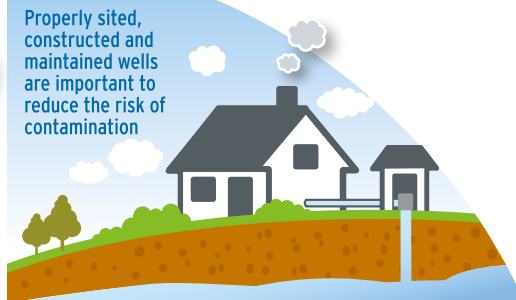
PEOPLE
IN IRELAND

are supplied
by private
groundwater
sources*

*EPA 2010; CSO 2012

17%
OF THE
POPULATION

Properly sited,
constructed and
maintained wells
are important to
reduce the risk of
contamination



MANY PRIVATE WELLS ARE AT RISK FROM CONTAMINATION



DRINKING
CONTAMINATED
WATER CAN CAUSE
SERIOUS
ILLNESSES

**HARMFUL
PARASITES**
(Cryptosporidium)

**HARMFUL
BACTERIA**
(VTEC)

VTEC patients are up to
times more
likely to have
consumed
untreated
private water

4

Is your
wellhead
sealed?



STEP 1

CHECK YOUR WELL
Ensure your health
is not at risk

Can surface
water get
into the well?



STEP 2

CHECK FOR ANY SOURCES OF POLLUTION

SEPTIC
TANKS



1

SLURRY
LANDSPREADING



2

CHEMICAL
STORAGE



3

FUEL
STORAGE TANKS



4

STEP 3

TEST YOUR WELL WATER AT LEAST ONCE A YEAR
ideally following wet weather
(treatment may be necessary
if contaminated)

FOR MORE INFORMATION
See the Protect your Well app on
www.epa.ie
to assess your own water supply

FOR MORE ADVICE & GRANT INFORMATION
Check with your local authority,
your local environmental health officer
or the EPA at www.epa.ie

PRIVATE WELL CONTAMINATION RISK

PRIVATE WELLS



IS YOUR PRIVATE WELL AT RISK FROM CONTAMINATION?

Many people assume that because their water comes from a well or a spring that it is safe to drink ...but this is NOT necessarily the case

THERE ARE TWO MAIN THINGS TO CHECK TO MAKE SURE THAT CONTAMINATION IS NOT GETTING INTO YOUR WELL

1 Is your wellhead sealed?

2 Can surface water get into the well?

CHECK POSSIBLE SOURCES OF CONTAMINATION

SEPTIC TANKS

SLURRY LANDSPREADING

CHEMICAL STORAGE

FUEL STORAGE TANKS

ANIMALS NEAR WELLHEAD

ABANDONED BOREHOLES

YOU SHOULD GET YOUR WELL TESTED AT LEAST ONCE A YEAR

Your local authority Environment Section or HSE Environmental Health Officer may be able to advise on a suitable laboratory

IF YOUR WELL IS CONTAMINATED YOU SHOULD:

Take action to eliminate sources of contamination;
and Install treatment;
OR
Connect to a public or group water supply

VISIT YOUR LOCAL AUTHORITY WEBSITE OR THE PROTECTING YOUR PRIVATE WELL SECTION OF WWW.EPA.IE

CAN YOU CONTRIBUTE TO THE NEXT ISSUE?

Do you have a story you would like to tell, or a resource you would like to share?

The next issue of the Catchments Newsletter will be issued in June. If you would like to submit an article, please email catchments@epa.ie and let us know. The only rule is you need to avoid acronyms, if at all possible.

Deadline for submissions: May 1st

DISCLAIMER

Although every effort has been made to ensure the accuracy of the material contained in this publication, complete accuracy cannot be guaranteed. The Environmental Protection Agency and the author(s) do not accept any responsibility whatsoever for loss or damage occasioned or claimed to have been occasioned, in part or in full, as a consequence of any person acting, or refraining from acting, as a result of a matter contained in this publication.

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