

Irish Water Interim Pesticide Strategy:

A collaborative approach with
catchment stakeholders



Acknowledgements

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We extend our thanks to all the members of the NPDWAG along with members of the public for all their proactive work over the last number of years to help protect Ireland's drinking water sources and the aquatic environment.

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Executive Summary

The way in which land is managed has the potential to increase the risk of pesticide contamination of drinking water sources. Irish Water monitor for pesticides in public drinking water supplies to determine if the EU Drinking Water Directive standards are met. Regular monitoring of public water supplies has demonstrated sporadic exceedances of these standards, with herbicides used in weed control accounting for the majority of exceedances. Conventional treatment processes are not designed to remove pesticides from raw water and therefore the risk from pesticide use needs to be understood and managed in the catchment.

Protection of drinking water sources is a key part of the Water Services Strategic Plan and essential to our Drinking Water Safety Plan approach. This document details Irish Water's Interim Pesticide Strategy for progressively reducing the risk of pesticide contamination to our drinking water sources.

The overarching aim of our Interim Pesticide Strategy is to protect drinking water sources from pesticide contamination and to improve the quality of sources, in order to safeguard human health and the aquatic environment. It is proposed that this will be achieved primarily by working collaboratively with all relevant stakeholders, who share the

common goal of reducing the risk of pesticide contamination to public drinking water sources.

This interim strategy provides a risk management framework which consists of three key pillars described below. Each pillar includes specific actions that will be implemented collaboratively by Irish Water and key stakeholders. The three pillars are:

- **Collaboration:** with National Pesticide and Drinking Water Action Group (NPDWAG) stakeholders and other relevant stakeholders during all stages of the risk management process;
- **Understanding risk:** to identify, risk assess and prioritise catchments at greatest risk from pesticides in order to target the collaborative management of the risk; and
- **Managing risk:** to undertake collaborative management of pesticide risk. Catchment management is identified as the primary approach and it provides benefits for biodiversity and climate change. Other actions include influencing policy, investigation of alternative options to minimise pesticide risk and managing future pesticide risk.

The success of this strategy will be evaluated using a variety of indicators and the weight of evidence approach.

Introduction

Background

Irish Water provides treated drinking water to over 80% of the population and distributes over 1.7 billion litres of water from over 900 water treatment plants (WTPs) every day. We abstract raw water from approximately 290 surface water catchments and 960 groundwater catchments. When combined these drinking water catchments cover approximately 50% of the land area of Ireland.

The land-use within these catchments covers a variety of types including agriculture, forestry, peatlands and urban areas. How land is managed has the potential to increase the risk to raw water quality and present treatment challenges at our WTPs.

Conventional treatment processes (e.g. coagulation, flocculation, filtration, disinfection) are not designed to remove pesticides from raw water sources, therefore the risk from pesticide use activities needs to be understood and managed in the catchment.

Pesticide use is common across many sectors including agriculture, forestry, horticulture, transportation (e.g. roadside and railway verges), amenity (e.g. public parks, golf courses), industry, and domestic use in gardens. In order to minimise the risk of environmental pesticide

contamination, Irish Water is committed to working with catchment stakeholders to manage pesticide risk through catchment management-based approaches.

The benefits of catchment management with regards to the protection of drinking water sources are widely recognised. By focusing on solutions that address the source of the problem rather than dealing with the consequences we will achieve additional benefits. These benefits include improving the quality of the aquatic environment, the potential to improve local biodiversity, and limiting the carbon intensive energy requirements which additional treatment processes would require.

An evidence review on catchment management projects to establish whether catchment management makes a difference to water quality was published by UK Water Industry Research (UKWIR) in 2019. It was found that overall, 57% of the catchments (based on 122 catchments) demonstrated an improvement in water quality from catchment management. For pesticides (other than metaldehyde) the success proved even greater with 85% (based on 14 catchments) demonstrating an improvement.

This document details Irish Water's Interim Pesticide Strategy for progressively reducing the risk of pesticide contamination of our drinking water sources. The sustainable land management approach outlined in this

document is designed to be the first stage of a multiple barrier approach to drinking water risk management in accordance with the World Health Organisation's (WHO) and the Environmental Protection Agency's (EPA) guidance on Drinking Water Safety Plans (DWSPs).

This interim strategy is intended to cover the period from 2021 to 2024. During this period national water source protection legislation and policy is being reviewed, pilot source protection projects are ongoing and collaborative working relationships will be further developed and strengthened. Over the coming years we will expand our strategic approach for the protection of drinking water sources.

Legislation and Policy Context

Pesticides in drinking water sources is a broad policy area which covers sustainability, agriculture, biodiversity and the environment. This section provides an overview of the relevant legislative and policy areas from the global scale to the national scale, as follows:

- **United Nations Sustainable Development Goals:** providing the global context for continued efforts to address drinking water quality issues in a more holistic and sustainable.

- **Legislative and regulatory drivers:** principal directives and national legislation covering drinking water, catchment management and the regulation of pesticide use.
- **New European strategies:** under the European Green Deal establishing new targets for reducing pesticide risk.
- **National policy:** established by national agencies relevant to the protection of water from pesticides.

Sustainable Development Goals

In 2015, all United Nations Member States adopted the 2030 Agenda for Sustainable Development. Building on the principle of "*leaving no one behind*", the new Agenda emphasises a holistic approach to achieving sustainable development for all. The 2030 Agenda includes 17 Sustainable Development Goals (SDGs) and 169 targets (Figure 1).

The United Nations SDGs provide the global context for continued efforts to address drinking water quality issues in a more holistic and sustainable way that achieves added benefits for biodiversity.



Figure 1 United Nations Sustainable Development Goals (un.org)

The SDGs include three objectives that are particularly relevant to the Interim Pesticide Strategy:

- Goal 6: Ensure availability and sustainable management of water and sanitation for all.
- Goal 12 Ensure sustainable consumption and production patterns.
- Goal 15: Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss.

Legislative and Regulatory Drivers

The principal directives and national legislation pertinent to this Interim Pesticide Strategy are summarised as:

a) **Drinking Water Directive (DWD) (98/83/EC)**

concerns the quality of water intended for human consumption and sets out the quality requirements. The directive is transposed into national legislation by the European Union (Drinking Water) Regulations 2014 (SI No. 122/2014). The parametric values for pesticides in the drinking water regulations are 0.5 µg/l for total pesticides and 0.1 µg/l for individual pesticides and their relevant metabolites, degradation and reaction products (hereafter referred to in this as the DWD standards). These are not health-based standards but were based on the limit of analytical methodology at the time the standards were established (DWI, 2010). Where monitoring confirms a persistent issue, the

EPA highlights these as priority supplies for action (EPA Action List¹).

b) Revised Drinking Water Directive (DWD)

(2020/2184) entered into force on 12 January 2021 and must be transposed into national law by 12 January 2023. The revised DWD is intended to modernise the DWD (98/83/EC). The overarching objective of the revised DWD is to ensure a high level of quality and it advocates the risk-based approach to water safety, covering the whole supply chain from the source to the tap. This allows for further prevention and mitigation measures to protect drinking water sources and favours actions to reduce pollution at the source, through the application of the polluter pays principle (European Commission, 2020a).

c) Water Framework Directive (WFD) (2006/11/EEC)

establishes a catchment-based approach to the protection, improvement and sustainable use of rivers, lakes, transitional waters, coastal waters and groundwater. It adopts the ‘polluter pays’ principle and integrated a number of existing EU Directives for the protection of water from pollution. The

directive is transposed into national legislation by the European Union (Water Policy) Regulations 2003 and 2014 (SI No. 350/2014), European Union European Communities Environmental Objectives (Surface Water) Regulations 2009 (SI No. 272/2019) and the European Union European Communities Environmental Objectives (Groundwater) Regulations 2010 (SI No. 9/2010). The regulations provide environmental quality standards (EQSs) for some pesticides and thresholds for groundwater. Article 7 of the directive specifically requires that countries protect drinking water sources:

- “ensure the necessary protection for the bodies of water identified with the aim of avoiding deterioration in their quality in order to reduce the level of purification treatment required in the production of drinking water.”
- The register of protected areas required under Article 6 shall include “areas designated for the abstraction of water intended for human consumption under Article 7”

¹ A public water supply with 4 or more pesticide exceedances within a spraying season, as determined by monthly monitoring. When one season of compliant

monthly results is obtained, the EPA closes the investigation file for that supply. This can span two calendar years e.g. June 2019 to June.2020.

d) **Sustainable Use of Pesticides Directive (SUD) (2009/128/EC)** aims to reduce the risks and impacts of pesticide use on human health and the environment and promote the use of Integrated Pest Management (IPM) and alternative approaches, such as non-chemical alternatives to pesticides. EU countries have drawn up National Action Plans to implement the range of actions set out in the directive. The directive is transposed into Irish legislation by the Sustainable Use of Pesticides Regulations of 2012 (SI No. 155/2012). The Sustainable Use of Pesticides Regulations are regulated and enforced by the Department of Agriculture, Food and the Marine (DAFM). The regulations restrict the use of pesticides near the aquatic environment and drinking water sources and provide for a range of other measures that will help to protect water bodies.

e) **Regulation (EC) No. 1107/2009 concerns the placing of plant protection products** on the market throughout the EU. The regulation states that a plant protection product:

- *“shall have no immediate or delayed harmful effect on human health, including that of vulnerable groups, or animal health, directly or*

through drinking water (taking into account substances resulting from water treatment) ...”

- This regulation has been implemented by the European Communities (Plant Protection Products) Regulations (SI No. 159/2012).

New European Strategies

The European Green Deal is part of Europe’s growth strategy and provides a roadmap with actions to boost the efficient use of resources by moving to a clean, circular economy and to restore biodiversity and cut pollution. The EU will also provide financial support and technical assistance to help people, businesses and regions over the period 2021-2027.

As part of the European Green Deal the Commission published two strategies relevant to pesticide use in May 2020:

- The Farm to Fork Strategy; and
- The EU Biodiversity Strategy for 2030.

Both strategies highlight that the Commission will take actions to reduce by 50% the use and risk of chemical pesticides by 2030 and reduce by 50% the use of more hazardous pesticides by 2030 (Figure 2).



The use of pesticides in agriculture contributes to pollution of soil, water and air. The Commission will take action to reduce the use of chemical and more hazardous pesticides by 50%



Organic farming is an environmentally-friendly practice that needs to be further developed. The Commission will help the EU's organic farming sector to grow, with the goal of 25 % of total farmland being used for organic farming by 2030.

Figure 2 Farm to Fork 2030 targets relating to pesticides

The Farm to Fork Strategy highlights the “*urgent need to reduce dependency on pesticides and antimicrobials, reduce excess fertilisation, increase organic farming, improve animal welfare, and reverse biodiversity loss*”. It states the Commissions commitment to revising the SUD to enhance provisions on IPM and promote the use of safe alternatives to protecting harvests.

The EU Biodiversity Strategy expresses that farmland birds and insects, particularly pollinators, are key indicators of the health of agroecosystems and that their decline must be reversed. The strategy re-emphasises the goals set out in the Farm to Fork Strategy to reduce by 50% the overall use of – and risk from – chemical pesticides by 2030 and reduce by 50% the use of more hazardous pesticides by 2030. The strategy states that space for wild animals, plants, pollinators and natural pest regulators needs to be brought back in at least 10% of agricultural area under

high-diversity landscape features. These features include, buffer strips, hedges, non-productive trees and ponds. These features will contribute to carbon sequestration, support climate adaptation, prevent soil erosion, and filter air and water.

National Policy

National Pesticides Action Plan for the Sustainable Use of Pesticides

A National Action Plan (NAP) is required under the SUD regulations and is reviewed at least every five years. The second Irish plan was published in 2019 by DAFM and sets out a national strategy to achieve sustainable use of pesticides, establishing objectives, targets, measures, and timeframes. The overarching aim of the NAP is to reduce the risks and impacts associated with the use of pesticides on human health and the environment and to encourage the development and introduction of Integrated Pest Management (IPM).

The NAP uses a combination of statutory measures and voluntary industry-led initiatives in 5 key areas:

- a) Training, education, information exchange and data gathering
- b) Controls on application equipment

- c) Controls on storage, supply & disposal of Plant Protection Products (PPP)
- d) Controls on use of PPPs in specified areas for the protection of water
- e) Integrated Pest Management (IPM).

The NAP specifies the following actions to protect water and drinking water quality from the impact of pesticide use:

- Conservative assumptions in the exposure and aquatic effects assessments
- Buffer zones to safeguard use of the product in the field
- Use of approved drift-reducing nozzles
- Training on best practice measures for DAFM-registered pesticide advisors
- Establishment of a National Pesticides and Drinking Water Action Group
- A focus on Priority Catchment areas to target actions.

HSE/EPA Joint Position Paper on Pesticides in Drinking Water

In 2019 the Health Service Executive (HSE) and EPA published a joint position paper regarding pesticides in drinking water. They describe the approach to ensuring compliance with EU DWD in Ireland as being focused on

preventing pesticides from entering drinking water sources. Actions highlighted include education, training and awareness-raising amongst all stakeholders, including pesticide users, and implementation and enforcement of the relevant legislation is achieved via the efforts of multiple agencies, including Irish Water, the EPA, the HSE, local authorities and DAFM.

The position paper acknowledges that treatment for the removal pesticides is an option available to help achieve compliance but that it should only be considered when efforts to prevent contamination of source waters fail.

In the position paper it is highlighted by the HSE and EPA that the levels of pesticides found in Irish drinking waters have not presented an appreciable risk to human health:

“Further guideline and health-based limits specific to individual pesticides are developed by the WHO. Without exception, the WHO limits, where available, are much higher than EU parametric limits. The EU limits approximate a zero-tolerance policy for pesticides in drinking water. While the WHO values do not have a regulatory standing, they are valuable in the determination of any potential risk to human health presented by a breach of the EU regulatory limits.”

The position paper concludes that the exceedances of the DWD standards are undesirable and must be addressed proactively.

River Basin Management Plan (RBMP) (2018-2021)

The Department of Housing, Local Government and Heritage (DHLGH) published the second cycle RBMP in 2018 which sets out the proposed framework for ensuring that Ireland’s water environment is protected and improved, in line with the objectives of the WFD. The plan covers the period 2018–2021 and a third-cycle plan will cover the period 2022–2027.

The following evidence-based priorities have been adopted for this river basin planning cycle:

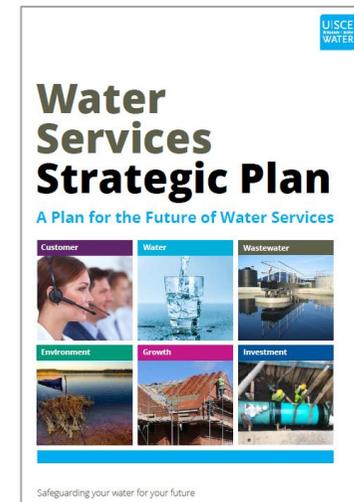
- a) Ensure full compliance with relevant EU legislation
- b) Prevent deterioration
- c) Meet the objectives for designated protected areas
- d) Protect high-status waters
- e) Implement targeted actions and pilot schemes in focused sub-catchments aimed at (1) targeting water bodies close to meeting their objective and (2) addressing more complex issues that will build knowledge for the third cycle.

The plan advocates for effective national measures to address pressures on water quality and that supporting measures are prioritised to ensure implementation of “*the right measures in the right place*”.

We support the RBMP Implementation Strategy through participation within the RBMP implementation structures and participation in WFD characterisation activities. The objectives and priorities of the RBMP 2018 – 2021 have been incorporated into our investment plans and work programmes as appropriate, and this will continue into the third cycle.

Irish Water Context

Irish Water published its Water Services Strategic Plan (WSSP) in October 2015 which was required under Section 33 of the Water Service No. 2 Act of 2013. The WSSP sets out strategic objectives for the delivery of water services up to 2040 and provides the overarching framework for subsequent



detailed (Tier 2) implementation plans and water services projects.

Delivery of a pesticide strategy is a Tier 2 Plan within the WSSP framework. The strategic objectives of the WSSP which are relevant to drinking water source protection and this interim strategy are:

Ensure a Safe and Reliable Water Supply:

- Manage the sustainability and quality of drinking water **from source to tap** to protect human health.
- Prepare and implement **Drinking Water Safety Plans**.

Protect and Enhance the Environment:

- Ensure that Irish water services are delivered in **sustainable manner** which contributes to the protection of the environment.
- Work effectively with other stakeholders to support a **catchment-based approach**.

We strive to manage the sustainability and quality of drinking water from source to tap, and commenced the development of a new approach to Drinking Water Safety Plans (DWSP) for all water supply zones (WSZs) in 2018. DWSPs seek to protect human health by assessing, managing and mitigating risks to water quality by taking a whole catchment approach from source through to the tap.

Protection of drinking water sources is a key priority component of this risk management approach. We will continue to engage with all stakeholders as part of the development and implementation of these measures aimed at delivering effective improvements in the quality of drinking water sources under the DWSP approach.

The National Water Resources Plan (NWRP) is our plan to identify how we will provide a safe, sustainable, secure and reliable water supply to our customers for now and into the future whilst safeguarding the environment. The NWRP will set out how we will balance the supply and demand for drinking water over the short, medium and long term. It is a 25-year strategy to ensure we have a safe, sustainable, secure and reliable drinking water supply for everyone. Phase 1 the NWRP Framework Plan has now been adopted, accompanied by a Strategic Environmental Assessment (SEA) Statement and an Appropriate Assessment (AA) Determination, which are available to download at www.water.ie. Phase 2 NWRP - Regional Water Resources Plans comprises the development of four Regional Water Resources Plans (RWRPs) each of which will be subject to SEA and AA.

The approaches are focussed on both the supply and demand aspects of public water supply and are summarised in Figure 3:



Figure 3 National Water Resources Plan pillars

We expect the number of public water supplies in Ireland to reduce as we invest in upgrading and providing strategic new infrastructure throughout the country. This process will be driven by the requirement to deliver the required quality and quantity of water in the most efficient manner. This rationalisation journey will require both new sources and substantial provision of trunk water mains and reservoirs, with an associated need for investment. Since the start of 2014, 72 WTPs have been rationalised by Irish Water by laying a water main connection to a neighbouring WTP. However, it is likely that we will have to continue to operate a substantial number of WTPs for the foreseeable future, particularly in areas of low population density and remote areas.

Water Quality and Pesticides in Ireland

Environmental monitoring of pesticides

The EPA monitors for certain pesticides and other priority and specific pollutants under the WFD Surveillance Monitoring Programme. In the EPA's Water Quality in Ireland 2013-2018 Report published in 2019 the analysis focused on the screening of 14 substances in 144 rivers nationally (16,069 measurements). Not all the pesticides monitored have an associated EQS (e.g. MCPA). MCPA was the most widely detected pesticide; detected in over half of all rivers that were monitored. The report stated that most values were $<0.1 \mu\text{g/l}$ with 33 results exceeding $0.2 \mu\text{g/l}$. There were detections in 21% of river samples for MCPA, which affected 56% of the river samples. Mecoprop (9% of detections in 37% of rivers), another commonly used herbicide was the next most abundant pesticide, followed by 2,6-Dichlorobenzamide (BAM) (8%, 51%) and then 2,4-D (5%, 29%).

The EPA also monitor pesticides in groundwater. The last reported screening analysis for a wide suite of pesticides was undertaken in 2014 at 204 monitoring locations across Ireland, which was summarised in EPA's Water Quality in Ireland Report 2010-2015. Only 0.25% of results were above the limit of quantification (LOQ). Of these there were only four individual exceedances of the DWD standards for

the pesticides: fluroxypyr and triclopyr and twice for 2,6-dichlorobenzamide (BAM).

Pesticides monitoring in drinking water

Irish Water are responsible for the monitoring of pesticides in public drinking water supplies to determine if DWD standards are met. We regularly monitor treated water samples for a specific list of pesticides, developed in consultation with the DAFM, EPA and HSE. Monitoring of public supplies has demonstrated sporadic exceedances of the DWD standards. The concentrations of pesticides found to occur in drinking water or within drinking water sources are at concentrations well below those of health concern according to WHO guidelines.

The chlorophenoxy herbicide group used in weed control accounts for the majority of exceedances of the DWD standards (i.e. MCPA and 2,4-D). MCPA is a selective herbicide specifically designed to kill weeds without harming crops and is commonly used to treat rushes. 2,4-D is contained in numerous approved plant protection products for use on grassland and cereals, and for amateur home garden use.

In 2020, 36 public water supplies exceeded the DWD standards for pesticides on one or more occasions. Fifty-

seven per cent of these exceedances related to MCPA. In a sub-set of catchments there are more persistent exceedances of the DWD standards. In 2020 of the 36 supplies with exceedances in the DWD for pesticides 6 were highlighted for action by the EPA (EPA Act List), these included:

- Longford Central (Lough Forbes)
- Newcastlewest, Co. Limerick (River Deel)
- Belturbet, Co. Cavan (River Erne)
- Clonroche, Co. Wexford (Groundwater)
- Newport, Co. Mayo (Newport River)
- Foynes/Shannon Estuary, Co. Limerick (River Deel)

In 2020, the next pesticide with the most exceedances was 2,4-D (12%) and glyphosate (12%), followed by triclopyr (6.2%), mecoprop (3.7%), fluroxypyr (2.5%) and bentazone (2.5%). Clonroche is currently the only supply which abstracts water solely from a groundwater source where bentazone exceedances have been detected. Bentazone is used for post-emergence control of broadleaved weeds in a variety of vegetable crops. Surveys of the Clonroche Zone of Contribution have been undertaken by the DAFM with no evidence of this pesticide being used or applied.

Figure 4 shows the percentage of pesticide exceedances relative to the number of sample analysis undertaken nationally for seven indicator pesticides².

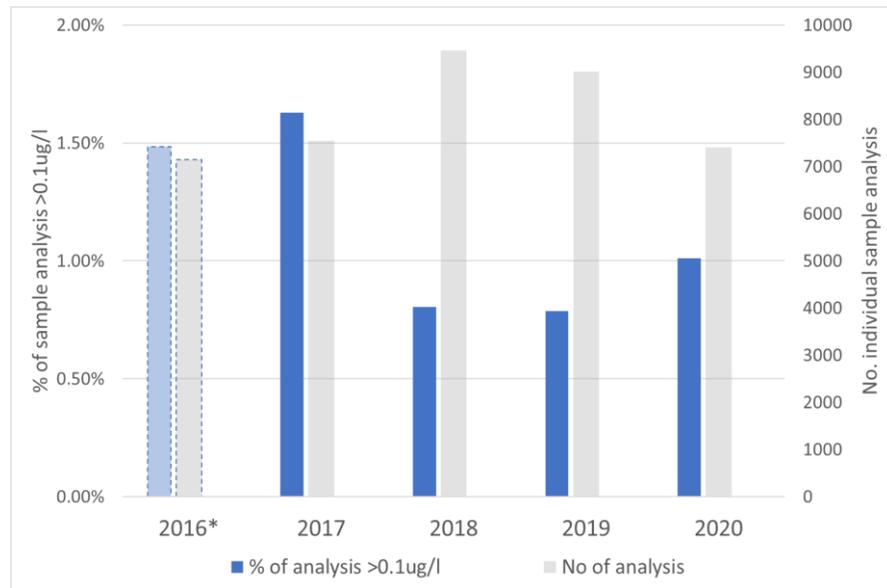


Figure 4 Percentage of pesticide exceedances relative to the number of sample analysis for seven indicator pesticides

*Data for 2016 may include Total pesticides because some individual pesticide concentrations were not reported. Reporting of pesticide results was standardised in 2017.

In terms of the proportion of sample analysis exceeding the 0.1 µg/l DWD limit, the average of the last three years was 44% lower than the average of the 2016/2017 period. In any one year, reductions from 2016/2017 results exceeding 0.1 µg/l vary, ranging from a 35 to 49% reduction but there has been no increase in exceedances compared to the 2016/2017 period. In addition, the average of the maximum concentration has reduced by 82% and the annual average (of the exceedances) by 37% in the last three years, when compared to the average of 2016/2017 period. This overall improvement in pesticide levels can be attributed to the collaborative actions of the NPDWAG to date.

Note:

If pesticides monitored in drinking water were to reach levels where a risk to public health was imminent or realised, we would immediately restrict the use of the water for the affected consumers, following consultation and agreement with the HSE – in accordance with Regulation 9(1) of the Drinking Water Regulations.

² Indicator pesticides are the most frequently occurring pesticides MCPA, 2,4-D,

glyphosate, triclopyr, mecoprop, fluroxypyr, bentazone, mecoprop.

Scope and Aim of the Interim Pesticide Strategy

Scope

This Interim Pesticide Strategy provides a risk management framework to objectively understand and manage pesticide risk on a prioritised basis within drinking water catchments for public water supplies.

It covers our collaboration with the National Pesticide and Drinking Water Action Group (NPDWAG) and other stakeholders who seek to deliver a common goal of reducing the risk of pesticides reaching drinking water sources.

The strategy can also be used / applied by the stakeholders of the NPDWAG and other stakeholders. Although this strategy refers to other organisations' roles, responsibilities and activities, it is not intended to define these or endeavour to steer / influence the needs of any organisation and its objectives.

DAFM is the only stakeholder with enforcement powers to deal with the misuse of pesticides in drinking water catchments, therefore enforcement is not included within the scope of this strategy.

This Interim Pesticide Strategy sets out our approach to help meet the wider environmental challenge of progressively reducing the risk of pesticide contamination of our drinking water sources. Its intended to cover the period from 2021 to 2024. During this period:

- National source protection legislation and policy is being reviewed,
- Pilot source protection projects are ongoing,
- DWSP methodologies are being established, and
- Collaborative working relationships will continue to be developed.

Once these developments and learnings have been realised, the interim strategy will be replaced by a more holistic catchment management strategy for source protection which will cover other catchment activities.

Strategic Aim and Objectives

The over-arching aim of this Interim Pesticide Strategy is:

“To protect drinking water sources from pesticide contamination and improve the quality of sources, in order to safeguard human health and the aquatic environment.”

We propose to achieve this aim primarily through working in

collaboration with all relevant stakeholders, who share the common goal of reducing the risk of pesticide contamination of our drinking water sources.

Irish Water's Interim Pesticide Strategy includes three strategic objectives:

- To work collaboratively with all stakeholders who seek to deliver a common goal of reducing pesticides in drinking water.
- To ensure that we understand the risk to our drinking water sources from pesticides by assessing the sources and improving our understanding of their interactions in the environment.
- To undertake collaborative management of pesticide risk that has been identified, assessed and prioritised.

The aim and objectives are in line with the requirements of the WFD (Article 7) and the revised DWD, which requires the protection of drinking water sources and a reduction of the level of purification treatment requirements. This recognises that the catchment is the first line of defence. The co-benefits of catchment management are highlighted below.

Co-benefits of Catchment Management

Co-benefits from drinking water source protection are widely recognised as a sustainable way to ensure good quality drinking water and healthy waterways in the long-term, through reducing pollution at source before it reaches rivers and lakes, and in turn water treatment plants.



In Ireland, many habitats and species have declined over recent decades as the environment has come under increasing pressure from development, changing farming practices and climate change. Pollinators are declining because the areas where they can nest and the amount of food our landscape provides for them have drastically been reduced (National Biodiversity Centre, 2015). Pesticides can also make it difficult for them to complete their life-cycles, therefore using pesticides sustainably has the added benefit of minimising the impact on non-target species such as bees (National Biodiversity Centre, 2015). This is also highlighted in our Biodiversity Action Plan which is available to download at www.water.ie.

Other benefits of source protection through catchment management include mitigation against climate change. For example, drinking water treatment options for pesticides can require energy intensive processes.

Strategy

Overview and Structure of the Strategy

The Interim Pesticide Strategy is a risk management framework that consists of three key pillars (Figure 5). This strategy's risk management framework for pesticide risk is in line with the Irish Standard for Risk management – Principles and Guidelines (I.S. ISO 31000:2009). Collaboration with stakeholders is an integral part of the risk management process as shown in Figure 5.

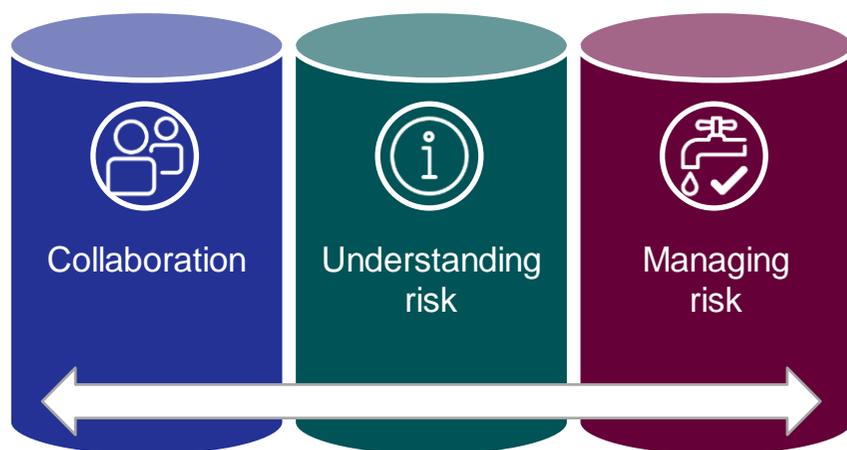


Figure 5 Three key pillars of the Interim Pesticide Strategy

Figure 6 sets out the high-level structure of the strategy and identifies specific actions to be carried out collaboratively by

Irish Water and key stakeholders under each pillar. The following sections describe the actions under each pillar to be undertaken by Irish Water and its key stakeholders, which is also summarised in **Appendix B**.

Pillar 1: Collaboration

The objective of this pillar is to ensure that we work in collaboration with all stakeholders who seek to deliver a common goal of reducing pesticides in drinking water. Communication with key stakeholders is an integral and essential component of risk management and will take place during all stages. Establishing good methods of communication is an essential part to our approach to addressing the challenge of addressing pesticide exceedances in drinking waters (Table 1). We will ensure that Irish Water is viewed as a key stakeholder and consultee and, is represented on appropriate external stakeholder groups.

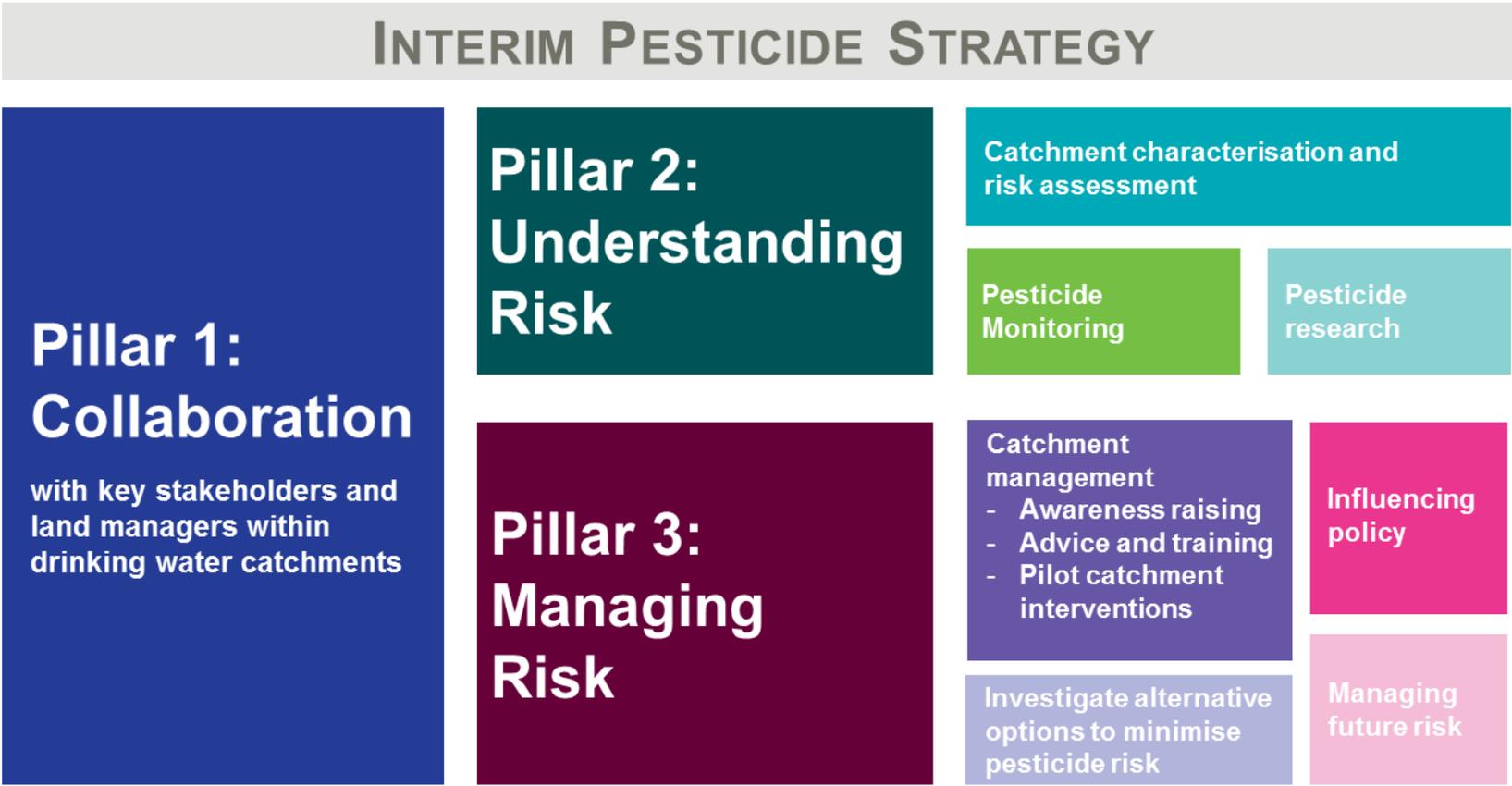


Figure 6 Overview of the structure of the Interim Pesticide Strategy with specific actions for Irish Water and stakeholders

Table 1 Pillar 1 Collaborative actions and stakeholders

Ref.	Collaborative actions	Stakeholders
1.1	National Pesticides and Drinking Water Action Group (NPDWAG)	All
1.2.	NPDWAG Catchment Focus Groups	NPDWAG sub-set as required
1.3	Irish Water Pesticide Updates	Irish Water
1.4	Irish Water Approach to Responding to Pesticide Exceedances	Irish Water

Sub-Pillar 1.1 National Pesticides and Drinking Water Action Group (NPDWAG)

We are an active member of the National Pesticides and Drinking Water Action Group (NPDWAG). The NPDWAG is chaired by DAFM and was formed to provide a coordinated and collaborative approach to prevent the ongoing prevalence of pesticides in catchments used for the abstraction of drinking water.

Through the NPDWAG we actively engage with the following catchment stakeholders:

Current NPDWAG members

- Animal and Plant Health Association
- Agricultural Consultants Association
- Department of Agriculture, Food and the Marine
- Department of Housing, Local Government and Heritage
- Environmental Protection Agency
- Health Service Executive
- Federation of Agrochemical Retail Merchants
- Golf Course Superintendents Association of Ireland
- Confederation of Golf in Ireland
- Hardware Association of Ireland
- Irish Water and Ervia
- Irish Farmers Association of Ireland
- Irish Creamery Milk Suppliers Association of Ireland
- Local Authorities
- Local Authority Water Programme
- National Federation of Group Water Schemes
- Teagasc/ Agricultural Sustainability Support and Advisory Programme

The main objectives of the group are to:

- Enhance collaboration between key stakeholders
- Facilitate communications regarding pesticides exceedances in drinking water
- Raise awareness at a national and regional level
- Promotes best practice of pesticide use
- Support Catchment Focus Groups for Priority Catchments
- Identify policy and implementation gaps

When made aware of a pesticide exceedance, all group participants engage with their own network of staff and stakeholders to raise awareness of the issue in the area relevant to the supply and its catchment. We help to highlight priority areas to members of the NPDWAG for escalation of collaborative efforts. The roles and responsibilities of the key NPDWAG members are outlined in **Appendix C**.

Sub-Pillar 1.2 NPDWAG Catchment Focus Groups

When a drinking water supply has more persistent exceedances of the pesticide DWD standards a sub-group of the NPDWAG is formed to try to tackle the issues locally. These are **called NPDWAG Catchment Focus Groups**. The key stakeholders include: DAFM, Teagasc, Local

Authority Water Programme (LAWPRO), local authorities, APHA and farming organisations. NPDWAG Catchment Focus Groups are an important step to leverage local knowledge and data, identify synergies and coordinate efforts between stakeholders. Information and data obtained from catchment monitoring programmes can be efficiently disseminated through these groups, so that stakeholder resources can be focussed and mobilised to respond to pesticide related issues within the catchment.

Sub-Pillar 1.3 Irish Water Pesticide Updates

As part of our commitment to supporting a coordinated and collaborative approach to protecting catchments used for the abstraction of drinking water from pesticide contamination, and regular updates are provided to members of the NPDWAG. The update provides details of our monitoring programmes to alert members to issues that may require immediate attention or can be easily resolved.

Sub-Pillar 1.4 Irish Water Approach to Responding to Pesticide Exceedances

In 2019 we established an **approach to responding to pesticide exceedances** in drinking water. The approach covers external communication and ensures a standardised

response and outlines how we endeavour to ensure compliance with the pesticides parametric values, protect public health and prevent escalation of EPA pesticide file(s). This is done by notifying stakeholders of pesticide exceedances, monthly pesticide monitoring of the supply and engaging and working collaboratively with key stakeholders.

Pillar 2: Understanding Risk

The objective of Pillar 2 is ensuring that we understand the risk to our public drinking water sources from pesticides by assessing the sources and improving our understanding of their interactions in the environment. It will be an evidence-based approach that will enable more informed decision making. Pillar 2 (Understanding Risk) will also be achieved in collaboration with stakeholders.

A pesticide risk profile of drinking water catchments will be developed based on the three sub-pillars in order to understand the risk in the catchments. This will include catchment characterisation and risk assessment, monitoring of pesticides and pesticide research (Table 2). This will help identify and assess risk and prioritise catchments at greatest risk from pesticides and will be used to target the collaborative management of the risk described in Pillar 3.

Table 2 Pillar 2 Risk assessment actions and stakeholders

Ref.	Risk assessment actions	Stakeholders
2.1	Catchment characterisation and risk assessment – following DWSP approach	Irish Water, EPA, LAWPRO ¹ and local authorities
2.2	Pesticide monitoring – drinking water compliance monitoring and collaborative catchment monitoring to investigate specific issues	Irish Water, APHA, local authorities, EPA, LAWPRO ¹ , EPA and NFGWS
2.3	Support pesticide research	All stakeholders and research institutions as appropriate

Note 1: LAWPRO work alongside 31 local authorities, and their role includes catchment assessment within the Priority Areas for Action. As part of their catchment assessment function, investigative monitoring for pesticides in catchment where there is a pesticide issue can be undertaken.

Sub-Pillar 2.1 Catchment characterisation and risk assessment

The objective of Pillar 2.1 is the catchment characterisation and risk assessment of drinking water sources. This pillar will be supported by Sub-Pillar 2.2 and 2.3 and undertaken in collaboration with other stakeholders.

The first step is the **delineation of the abstraction catchment boundaries** for both surface water and groundwater catchments. It is essential to define the contributing catchment areas for a river or lake abstraction and the land area that contributes water to the well or spring (also known as a Zone of Contribution (ZOC)). These areas represent catchment areas that influence the water quality of their respective abstractions and therefore the area that needs to be protected. These abstraction catchment areas are not the same as safeguard zones or source protection zones, with further assessment required by the appropriate authorities to define these (see Pillar 3.2).

The next step is to **develop an understanding the risk of pesticides** used within the catchment areas and their likelihood of reaching the receptor, i.e. the abstraction location. This requires an understanding of the pathways that pesticides might travel and whether surface or ground water would be a receptor. These pathways are different depending the characteristics of environmental components such as soils, subsoils and geology. As part of the DWSP approach we have adopted, a GIS based methodology to assess the risk of pesticides to drinking water sources is being developed. The methodology will be finalised by the end of 2021, with risk of pesticides to all drinking water sources assessed. This methodology will follow the source

pathway receptor approach and characterisation datasets produced by the EPA and Geological Survey of Ireland (GSI) will be used. This work will be supported by ongoing Irish research such as the EPA/UCD Diffuse Tools project (2021). This data and information can be used to prioritise higher risk areas of land which have the potential to cause pesticide exceedances in drinking waters, where catchment management measures would be most beneficial.

In combination with collaborative catchment monitoring Sub-Pillar 2.2, **the conceptual understanding of the catchments** may be refined for prioritised catchments. This may involve further analysis of the water quality data along with available hydrometric data. Fieldwork may also be required e.g. ground-truthing of catchment boundaries, measurements of stream flows and pumping tests for borehole supplies, as necessary.

Sub-Pillar 2.2 Pesticide monitoring

We have implemented a drinking water pesticide monitoring programme in line with EPA and DAFM guidance, taking a **risk-based approach to monitoring**. The programme focusses on priority pesticides, the time of year for sampling, and increased monitoring for supplies at higher risk of having pesticide exceedances. The pesticides to be monitored in drinking water will be prioritised based on their

likelihood to end up in the water environment and potential to cause drinking water exceedances. This programme will be reviewed periodically to ensure that the most appropriate pesticides are being monitored.

APHA coordinate an industry funded herbicide monitoring programme within four Priority Catchments. **Collaborative catchment monitoring** is also required to be undertaken by a range of stakeholders to pool available resources. This will help to verify DWSP source risk assessment methodologies for pesticides and help to identify potential hot spot locations where catchment management actions can be targeted. The responsibility for monitoring of pesticides in the catchment for this purpose is unclear, however since 2019 stakeholders have been collaboratively working together to develop targeted catchment monitoring programmes. Collaborative catchment monitoring is currently being undertaken to investigate pesticide exceedances, by a range of stakeholders including APHA, EPA, local authorities, LAWPRO (within Priority Areas for Action) and NFGWS in some Priority Catchments.

Sub-Pillar 2.3 Pesticide research

The objective of Pillar 2.3 is to engage with stakeholders to identify research gaps in relation to pesticides and influence research to find effective ways to resolve these gaps. The

following are potential research areas that may inform the strategy for pesticides and help to understand the risk to drinking water sources:

- Pesticide risk mapping of sources and pathways; and
- How to quantify multiple benefits achieved by catchment management.

Pillar 3: Managing Risk

The objective of Pillar 3 is to undertake collaborative management of pesticide risk that has been identified, assessed and prioritised in Pillar 2. The Managing Risk Pillar is based on the following four sub-pillars:

- a) **Sub-Pillar 3.1** Catchment management;
- b) **Sub-Pillar 3.2** Influencing policy;
- c) **Sub-Pillar 3.3** Investigate alternative options to minimise pesticide risk; and
- d) **Sub-Pillar 3.4** Managing future pesticide risk.

We are committed to working collaboratively with stakeholders using the catchment management-based approach to protect source waters from contamination of pesticides. Catchment management is therefore the primary approach identified in this interim strategy for managing pesticide risk.

Sub-Pillar 3.1 Catchment management

The objective of Pillar 3.1 Catchment Management is to develop and implement measures aimed at delivering effective improvements in the quality of raw water or maintaining water quality within **Priority Catchments**. Awareness raising activities will be undertaken within Priority Catchments as well as catchments with less frequent exceedances of pesticides and areas of higher pesticide risk. This Pillar will be undertaken in collaboration with other stakeholders (Pillar 1) and will be informed by outputs of Pillar 2.

The engagement of relevant stakeholders is required to develop catchment action plans **under the DWSP** process. These catchment action plans will identify the catchment management actions to be undertaken within specific drinking water catchments, the responsible bodies, and the timeframes for when these actions must be undertaken. The catchment management action categories specific to pesticides are outlined in Table 3 and described in the following sections. To illustrate the approach to date for managing pesticide risk through catchment management, case studies of our current activities are provided in **Appendix D**.

Table 3 Pillar 3 DWSP actions for managing catchment risks and stakeholders

Ref.	Managing catchment risks actions	Stakeholders
3.1.1	Awareness raising	All
3.1.2	Training and advice services	DAFM, Teagasc/ ASSAP, Agricultural Consultants Association
3.1.3	Piloting catchment scale interventions	Various partners

Awareness raising

As identified under Pillar 1 Collaboration of this interim strategy, we are an active member of the NPDWAG. We work with the stakeholders of the NPDWAG to manage pesticide risk by raising awareness of the issue in the area relevant to the supply and its catchment. The risk assessment results from Pillar 2 will be used to highlight higher risk areas of land which have the potential to cause pesticide exceedances in drinking waters, where awareness raising activities would be most beneficial.

The target audience for the awareness raising campaign is all pesticide users and pesticide use is common across many sectors. For example, in recent years more frequent exceedances of active substances found in amateur products have been detected in drinking water sources. NFGWS are implementing awareness raising campaigns targeted at both domestic and agricultural users in drinking water catchments including “I’ve Planted A Tree and My Garden Is Pesticide Free” and “Let it Bee”³ and are collaborating with Irish Water and LAWPRO in relevant catchments through the NPDWAG Catchment Focus Groups.

Since the start of 2018, we have taken a proactive approach to raising awareness regarding responsible use of pesticides by **issuing regular updates to local media and coordinating media engagement undertaken by NPDWAG members** and engaging with relevant stakeholders. An annual spring pre-spraying media campaign specific to every county targets the farming community and other users of pesticides. This is enhanced by regional radio interviews and local stakeholder updates and is boosted by Irish Water website and social media posts. Communications support is given by Irish Water to

other agencies where necessary in order to pool resources to maximise audience reach and media coverage.

Other means of raising awareness and engagement have included:

- a) Development and dissemination of best practice guides. This includes the use of the DAFM/Teagasc educational video depicting the control of rushes using best practices to protect water quality is available.
- b) Using targeted social media posts.
- c) Audience specific online advertising on platforms which are commonly used by the target audience.
- d) Positive messaging highlighting the benefits to biodiversity from reduced pesticide use.

New ways of getting the message out to more people and increasing engagement will continue to be explored through the implementation of this interim strategy.

In partnership with the DHLGH, EPA, and HSE we developed a communications approach to inform the public about exceedances of DWD standards. This came into effect in 2018 and **individuals were issued letters** advising that their public water supply is included on the

³ For further information on the project please visit: <https://nfgws.ie/>

Remedial Action List (RAL) for elevated levels of pesticides above the DWD standards.

The industry led **Herbicide Stewardship Programme** deploys best practice information to the end user. The key message being delivered is that pesticides should not enter waters directly, or through spray drift, or seepage. This message is delivered and reiterated through multiple communication routes including:

- a) The point of sale
- b) Marts
- c) Directly (by mail/farm call/farm audit)
- d) Group meetings
- e) APHA members

Irish Water is also the sponsor of the Water Theme of An Taisce's Green Schools Programme which raises awareness about water sources and why they should be protected. In the 2019/2020 academic year, 570 schools participated.

Advice and training services

Through the NPDWAG, we notify **Teagasc and the Agricultural Sustainability Support and Advisory Programme (ASSAP)**, and other agricultural advisors through the **Agricultural Consultants Association (ACA)**,

of pesticide exceedances and request the provision advice through their local advisor and best practice events in the relevant catchment. The message is targeted to make farmers aware of their location within a drinking water abstraction catchment and that the misuse of pesticides can impact on raw water quality. For example, when ASSAP are working one-to-one with a farmer, they agree on where to focus improvements or actions on the farm which include the promotion of best management practices for pesticide use and pesticide storage (ASSAP, 2019).

In order to register as Professional Users (PUs) of pesticides, formal training in the safe use and application of pesticides is required. Experience alone does not qualify individuals to register as professional users. DAFM provides a list of training providers.

Training will be facilitated by stakeholders where needs above the regulatory training are identified. For example, Trained Operators to Promote best Practice & Sustainability (TOPPS) was a training course organised by APHA. The course disseminates Best Management Practices (BMPs) to reduce PPP losses to water from point sources. The training aims to increase awareness of the need to protect water from pesticide contamination, while simultaneously providing practical information on how it can be done. It

informs operators and stakeholders on how to improve equipment and infrastructure.

Piloting catchment scale interventions

We are actively involved in pilot source protection projects that are currently underway. The overarching aim of these projects are to trial catchment scale interventions to reduce the risk of pesticides causing exceedances in water supplies. The two key projects are described below.

Source to Tap⁴ is a cross-border partnership project that focuses on the River Erne and the River Derg catchments which cross the border between Ireland and Northern Ireland. Irish Water is a project partner. The project is funded by INTERREG and match-funding has been provided by the Department of Agriculture, Environment and Rural Affairs in Northern Ireland and DHLGH in Ireland. The project began in 2018 and will continue until 2022. It aims to develop sustainable, catchment-scale solutions for the protection of rivers and lakes. An Agricultural Land Incentive Scheme is being



delivered in the Derg catchment focused on changing land management practices for the protection of our water. Source to Tap also delivers a learning and outreach programme, targeted at informing and empowering the public about their role in protecting our clean and healthy freshwater environment.

Pilot Drinking Water Source Protection Project: as committed under the RBMP 2018-2021, we are coordinating a pilot drinking water source protection project to “*trial innovative monitoring and management strategies aimed at reducing the risk of pesticide contamination of drinking waters*”. Catchment management interventions to be undertaken as part of the project may involve a combination of behavioural-change initiatives and promotion of the sustainable use of pesticides. Scoping, stakeholder engagement and planning of the project began in 2019 and the project will launch this year.

Sub-Pillar 3.2 Influencing policy

The objective of Pillar 3.2 is to be proactive in influencing local and national policy to ensure that drinking water sources are protected from pesticide contamination. This sub-pillar will be undertaken in collaboration with other

⁴ For further information on the project please visit: www.sourcetotap.eu

stakeholders and Irish Water will support the activities of the responsible stakeholders. This sub-pillar will be informed by outputs of Pillar 2. The following actions in Table 4 are identified under Sub-Pillar 3.2.

Table 4 Pillar 3.2 Actions for influencing policy

Ref.	Influencing policy actions	Stakeholders
3.2.1	River Basin Management Plan– Identification of drinking water protected areas and WFD Areas for Action	DHLGH, EPA, LAWPRO, NFGWS
3.2.2	Safeguard zones – Identification of safeguard zones under WFD and SUDs for “high risk” drinking water catchments	DHLGH, DAFM
3.2.3	Membership of national groups (e.g. National Aquatic Environmental Chemistry Group (NAECG)) and European groups (e.g. EurEau ⁵), and engagement with Government Departments	DHLGH, EPA, DAFM, Irish Water and others

⁵ <http://www.eureau.org/>

Ref.	Influencing policy actions	Stakeholders
3.2.4	Consultations – Responding to statutory and non-statutory consultations to ensure that drinking water quality is improved and protected	All

Sub-Pillar 3.3 Investigate alternative options to minimise pesticide risk

We are committed to working collaboratively with relevant stakeholders using the catchment management-based approach, as our primary approach for managing the risk of pesticides and achieving co-benefits for the environment. However, there may be some instances where a catchment management approach alone may not be sufficient to manage the risk of pesticides to our drinking water sources. The success of the pesticide risk reduction actions will be assessed on a case-by-case basis for each Priority Catchment as described in the next section on Evaluation of Effectiveness.

Where the collaborative catchment management approach has not been able to deliver the required results within an appropriate time frame for a particular catchment, **enforcement action** by DAFM may be considered. DAFM

is responsible for enforcement of all relevant pesticide's legislation including implementation of the SUD, e.g. in relation to the misuse of pesticides or failure to abide by setback distances. We are committed to engaging with and supporting DAFM on implementation of the SUD, through the provision of information and advice about catchment characterisation, risk assessment and monitoring.

Once all options have been exhausted by Irish Water, DAFM and NPDWAG stakeholders, and catchment management and enforcement action have not proved successful, we will investigate alternative or additional options to catchment management and enforcement action to minimise the pesticide risk. These alternative options will not achieve the co-benefits that the catchment management approach can.

Alternative options including blending, abstraction management schemes, alternative sources or relocation of abstraction points and treatment for pesticides, are described in Table 5, along with the considerations for their feasibility. The feasibility of each option would be considered on a case-by-case basis and pilot trials may be required to help inform the development of business cases.

We will endeavour to participate in ongoing and new research on potential sustainable (low carbon / low energy) alternatives to catchment management such as physical

pesticide mitigation measures in the catchment, abstraction management schemes and water treatment options.

To progress a feasible option, a business case is required to be developed. Options outlined in Table 6 which are disproportionately expensive compared to the public health risk may be deemed non-viable due to funding constraints and competing investment priorities. The concentrations of pesticides found to occur in drinking water or within drinking water sources are at concentrations well below those of health concern according to WHO guidelines. For example, for MCPA, WHO have applied a lifetime guideline value of 700 µg/l – i.e. consuming water with this level of MCPA only becomes an appreciable health risk if consumed every day over the consumer's lifetime. The WHO guideline value for MCPA is significantly higher than the concentrations detected in drinking water and is 7,000 times higher than the current regulatory limit of 0.1 µg/l. In the unlikely event that pesticides levels in drinking water were to reach levels where a risk to public health was imminent or realised, we would immediately restrict the use of the water for the affected consumers.

Table 5 Options to be investigated to help reduce pesticide risk once other options have been exhausted

Options to be investigated	Option description	Option feasibility	Other important considerations
Blending options	Investigate opportunities for blending of source waters to control levels of pesticides in the supply	Dependent on water resource availability and quality and infrastructure capability.	Unlikely to be feasible for supplies >5000 m ³ /day. Usually a new groundwater source is required.
Abstraction management schemes	Investigate opportunities and feasibility for implementing abstraction management schemes i.e. stopping abstraction when risk of pesticide exceedances is higher	Dependent on infrastructure capability and raw water storage available or potential for constructing new storage.	Significant amount of catchment monitoring data and modelling is required to understand feasibility and develop operational protocols. Unlikely to be feasible for supplies >1000 m ³ /day due to storage requirements.
Alternative sources or relocation of abstraction point	Investigate opportunities for better quality alternative sources	Dependent on water resource availability – large alternative sources are not likely to be available nearby.	See National Water Resources Plan for more information ⁶
Treatment for pesticides	Assess effectiveness of potential treatment options for pesticides	Dependent on organic content of the raw water	Installation of treatment does not guarantee 100% compliance for pesticides in drinking water

⁶ National Water Resources Plan (NWRP) <https://www.water.ie/projects-plans/our-plans/nwrp/>

Sub-Pillar 3.4 Managing future pesticide risk

The objective of Pillar 3.4 is to reduce the risk to new drinking water sources from pesticide contamination. It is proposed that this will be undertaken by integrating source protection into the decision making and planning processes within Irish Water; for example, the National Water Resources Plan (NWRP) and selection of new water sources.

Evaluation and Review

Evaluation of Effectiveness

The catchment management approach is not a short-term solution to minimising pesticide levels in drinking water and needs an appropriate period of time to implement and verify the effectiveness of this approach. The UKWIR evidence review on catchment management projects indicated that on average 4 years of post-intervention monitoring data is required to detect the effect of catchment management on water quality for pesticides but up to 10 years may be required in some instances.

Monitoring and evaluation are key to delivering the Interim Pesticide Strategy. Progress towards reducing the risk of pesticide contamination in our drinking water sources will be assessed and reported on an annual basis and at the end of the implementation period of the interim strategy. This will include tracking progress of all the actions under the strategies three key pillars as summarised in **Appendix B** and an evaluation of the effectiveness of the interim strategy.

The evaluation of effectiveness of the interim strategy will be undertaken at a national scale for all supplies and also at the catchment scale for the Priority Catchments. The evaluation of the reduction in pesticide risk in the Priority Catchments will therefore be assessed on a case-by-case

basis and alongside the efforts to understand the risk (Pillar 2) will help to inform and prioritise Pillar 3 risk management actions, both in the short-term and the long-term. Input to the evaluation reports will be sought from the relevant stakeholders on the NPDWAG.

The effectiveness of this interim strategy will be monitored using a variety of indicators and evaluated using the weight of evidence approach. The evaluation will include information on both outputs (activities) and outcomes (impact) as shown in Figure 7.

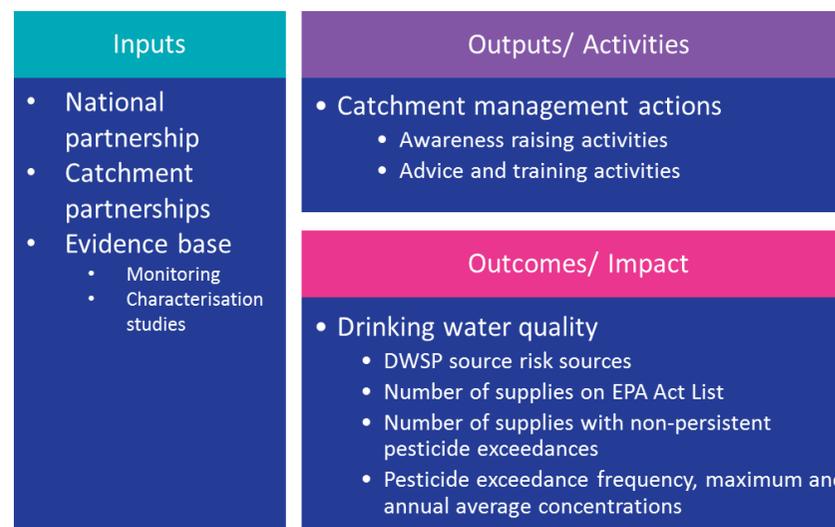


Figure 7 Weight of evidence approach for monitoring effectiveness of catchment management

This approach has been adapted from a well-established method developed by Catchment Sensitive Farming in the UK (Environment Agency, 2019). Information on engagement activities within the catchment will be collated for Priority Catchments using a stakeholder activity tracker (or similar).

There are substantial challenges to understanding the processes through which catchment management translates into improved drinking water quality outcomes. In addition, there are complicating factors, for instance the time lag between the intervention and effects being realised and external influences such as:

- Land-use change;
- Pesticide usage and its seasonality;
- Weather patterns e.g. droughts and storm events;
- River flow or groundwater recharge.

Opportunities to assess the outcome/impact, in terms of changes in behaviour at a catchment scale will be sought by stakeholders. For example, the Teagasc pesticide survey which examines attitudes and knowledge of best practice for pesticide use and storage will be used to monitor change before and after catchment management activities have been undertaken in a location.

The monitoring and evaluation will be used to shape the Interim Pesticide Strategy and drive continuous improvement.

Review

This interim strategy is intended to cover the period from 2021 to 2024. During this period national source protection legislation and policy is being reviewed, pilot source protection projects will be ongoing and collaborative working relationships will be further developed and strengthened.

This interim strategy document will be reviewed every 2 years and updated to reflect collaborative actions on the ground.

Summary

The levels of pesticides found in drinking waters do not present a risk to human health, however their presence is undesirable in drinking waters. Protection of drinking water sources is a key part of our Water Services Strategic Plan and essential to our Drinking Water Safety Plan approach.

This Interim Pesticide Strategy is a way of progressively reducing the risk of pesticide contamination of our drinking water sources. It aims to protect drinking water sources from pesticide contamination and improve the quality of sources, in order to safeguard human health and the aquatic environment.

The interim strategy provides a risk management framework to be implemented collaboratively by Irish Water and key stakeholders:

- **Collaboration:** is the most important pillar of this interim strategy and will be undertaken during all stages of the risk management process;
- **Understanding risk:** to identify and risk assess and prioritise catchments at greatest risk from pesticides. This is an important step to enable targeting of collaborative management of the risk of pesticides; and
- **Managing risk:** to undertake collaborative management of pesticide risk. Catchment

management is identified as the primary approach in this interim strategy for managing the risk of pesticide contamination to drinking water sources. It provides co-benefits for biodiversity and climate change. Other actions include influencing policy, investigation of alternative options to minimise pesticide risk and managing future pesticide risk.

A summary of the specific actions for Irish Water and stakeholders is provided in **Appendix B**.

The effectiveness of this strategy will be evaluated using a variety of indicators and the weight of evidence approach. Progress towards reducing the risk of pesticide contamination in our drinking water sources will be assessed and reported on an annual basis and at the end of the implementation period of the interim strategy. The evaluation will be undertaken at a national scale for all supplies and also at the catchment scale for the Priority Catchments.

This interim strategy is intended to cover the period from 2021 to 2024 and will ultimately be replaced with a holistic drinking water source protection strategy. The interim strategy document will be reviewed every 2 years and updated to reflect collaborative actions on the ground.

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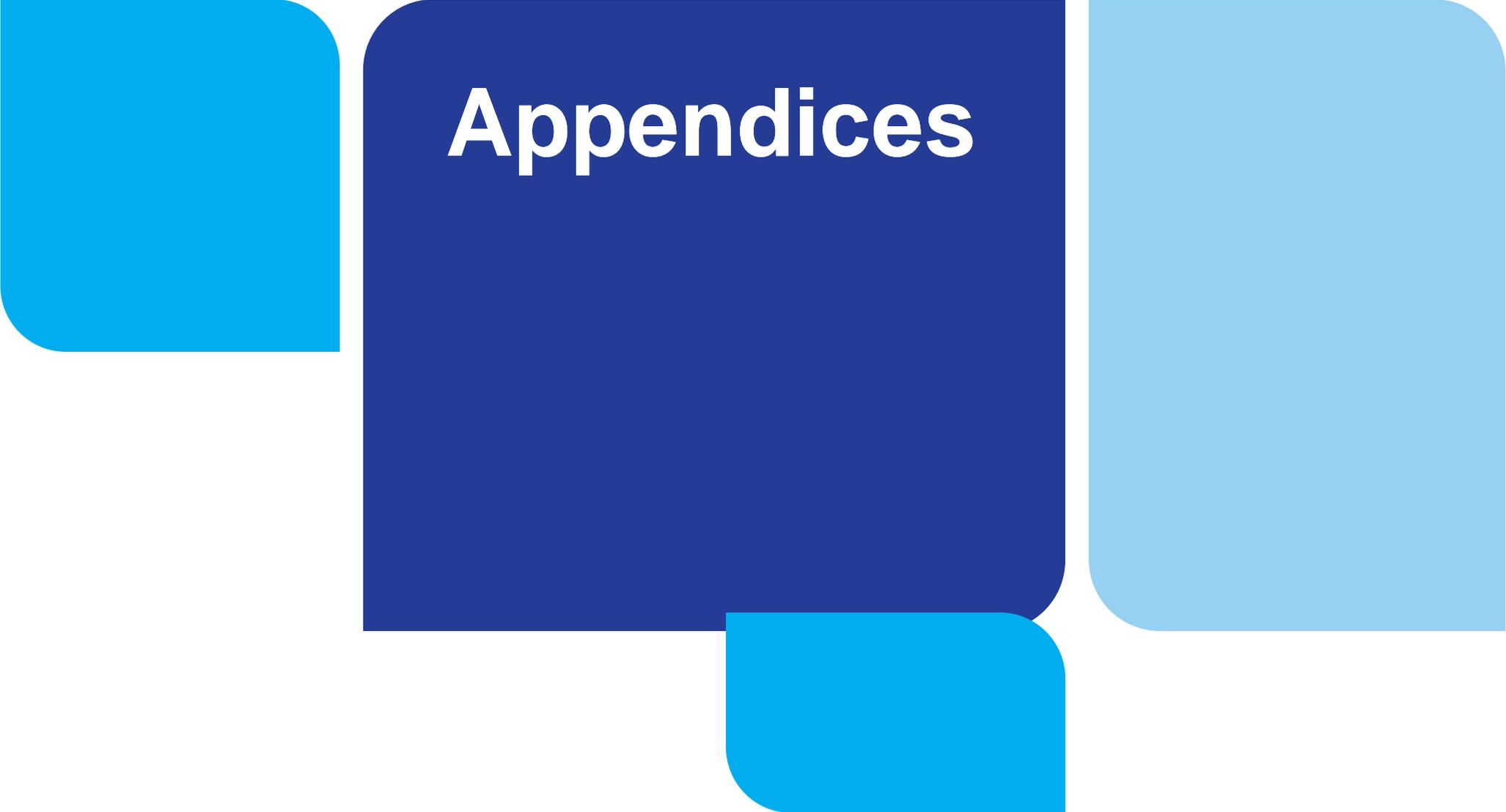
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Appendices

Appendix A: Acronyms used in the document

ASSAP – Agricultural Sustainability Support and Advisory Programme

BMP – Best Management Practices

DAFM – Department of Agriculture, Food and the Marine

DHLGH – Department of Housing, Local Government and Heritage

DWD – EU Drinking Water Directive

DWSP – Drinking Water Safety Plan

EPA – Environmental Protection Agency

EQS – Environmental Quality Standard

EU – European Union

HSE – Health Service Executive

IPM – Integrated Pest Management

LAWPRO – Local Authority Waters Programme

MCPA – (2-methyl-4-chlorophenoxy) acetic acid

NAECG – National Aquatic Environmental Chemistry Group

NAP – National (Pesticides) Action Plan

NFGWS – National Federation of Group Water Schemes

NPDWAG – National Pesticides and Drinking Water Action Group

NWRP – National Water Resources Plan

PCD – Pesticide Controls Division

PPP – Plant Protection Product

PU – Professional User

RAL – Remedial Action List

RBMP – River Basin Management Plan

SDG – United Nations Sustainable Development Goals

SUD – EU Sustainable Use (of Pesticides) Directive

TOPPS – Trained Operators to Promote best Practice & Sustainability

TOTEX – Total Expenditure

UKWIR – United Kingdom Water Industry Research

WFD – EU Water Framework Directive

WHO – World Health Organisation

WSSP – Water Services Strategic Plan

WSZ – Water Supply Zone

WTP – Water Treatment Plant

ZOC – Zone of Contribution

Appendix B: Summary of actions under the strategy's three key pillars

Pillar	Sub-Pillar	Action reference	Action description	Stakeholders
Pillar 1 Collaboration	1.1		National Pesticides and Drinking Water Action Group (NPDWAG)	All
	1.2		NPDWAG Catchment Focus Groups	NPDWAG sub-set as required
	1.3		Irish Water Pesticide Updates	Irish Water
	1.4		Irish Water Approach to Responding to Pesticide Exceedances	Irish Water
Pillar 2 Understanding Risk	2.1		Catchment characterisation and risk assessment – following DWSP approach	Irish Water, EPA and LAWPRO and local authorities
	2.2		Pesticide monitoring – drinking water compliance monitoring and collaborative catchment monitoring to investigate specific issues	Irish Water, APHA, local authorities, EPA, LAWPRO, EPA and NFGWS

Pillar	Sub-Pillar	Action reference	Action description	Stakeholders
	2.3		Support pesticide research	All stakeholders and research institutions as appropriate
Pillar 3 Managing Risk	3.1 Catchment Management	3.1.1	Awareness raising	All
		3.1.2	Training and advice services	DAFM, Teagasc/ ASSAP, Agricultural Consultants Association
		3.1.3	Piloting catchment scale interventions	Various partners
	3.2 Influencing policy	3.2.1	River Basin Management Plan – Identification of drinking water protected areas and WFD Areas for Action	DHLGH, EPA
		3.2.2	Safeguard zones – Identification of safeguard zones under WFD and SUDs for “high risk” drinking water catchments	DHLGH, DAFM
		3.2.3	Membership of national groups (e.g. National Aquatic Environmental Chemistry Group (NAECG)) and European groups (e.g. EurEau), and engagement with Government Departments	DHLGH, EPA, DAFM, Irish Water and others

Pillar	Sub-Pillar	Action reference	Action description	Stakeholders
		3.2.4	Consultations – Responding to statutory and non-statutory consultations to ensure that drinking water quality is improved and protected	All
	3.3		Investigate alternative options to minimise pesticide risk	DAFM, Irish Water with support from NPDWAG
	3.4		Managing future pesticide risk	Irish Water

Appendix C: Roles and responsibilities

Stakeholder	Responsibility relating to pesticides in drinking water
Irish Water	Irish Water is responsible for the provision of water in all public water supplies in Ireland. Regulation 4 of the Drinking Water Regulations requires Irish Water to ensure that the water it supplies is wholesome and clean.
Department of Housing, Local Government and Heritage (DHLGH)	Policy, legislation and funding in relation to public and private water supplies.
Department of Agriculture, Food and the Marine's (DAFM)	Authorisation and registration of pesticides on the market and used in Ireland. Enforcement of all relevant pesticide's legislation – especially marketing and use, and implementation of SUD.
Environmental Protection Agency (EPA)	<p>Pesticides in drinking water: Under regulation 3(1) of the Drinking Water Regulations 2014 (as amended) the EPA is defined as the supervisory authority for all public water supplies. The EPA is responsible for enforcement of compliance by Irish Water with the monitoring provisions, standards for drinking water and other requirements of the Regulations.</p> <p>Pesticides in the environment: The EPA monitors priority substances, including some but not all pesticides, to determine whether river and lake water bodies are maintaining good status.</p>
Health Service Executive (HSE)	Under the Drinking Water Regulations, the HSE agrees actions with the Water Services Authority (WSA) to protect consumers' health where pesticides are detected in drinking water.
LAWPRO	Working alongside 31 local authorities, LAWPRO's role includes regional coordination, catchment assessment (within the Priority Areas for Action) and community engagement in support of the River Basin Management Plan. As part of its catchment assessment function, LAWPRO will include investigative monitoring for pesticide in catchment where it is aware that there is a pesticide issue in the priority area for action. LAWPRO will participate on the NPDWAG, work closely with Teagasc ASSAP and support NPDWAG Catchment Focus Groups.
Teagasc/ ASSAP	The dissemination of knowledge transfer, promoting best practice and new technology.

Appendix D: Case studies

We have worked with the stakeholders of the National Pesticides and Drinking Water Action Group (NPDWAG) to tackle the issue of exceedances of the herbicide MCPA in drinking water supplies. Examples of our success to date are provided in the following two case studies.

River Nore: Kilkenny City (Troyswood) PWS

Issue

In 2017, persistent exceedances of the drinking water standard of 0.1 µg/l for pesticides were observed in the Kilkenny City (Troyswood) Public Water Supply which is supplied by raw water from the River Nore.

Action taken

Actions undertaken by the NPDWAG included:

- Raising awareness of the issue at a national and local level through media (radio, print and online) and direct engagement with landowners.
- Best practice information was developed and disseminated (e.g. guides and videos).
- Catchment monitoring programme undertaken by APHA highlighted a hotspot for pesticide detections on a tributary of the Nore, the Dinin River.

Results

- Significant reduction in the levels of MCPA detected in the Nore and its tributaries.
- Drinking water samples were compliant for 2018, 2019 and 2020.



Figure 8 DAFM/ Teagasc rush control guidance video on YouTube

Next steps

Continued engagement at a local level to help ensure that this positive change can be sustained over time.

Lough Forbes: Longford Central

Issue

Since 2017, persistent exceedances of the drinking water standard of 0.1 µg/l for pesticides were observed in the Longford Central public water supply which is supplied by raw water from Lough Forbes.

Lough Forbes is a very large catchment and understanding the sources and pathways of MCPA to the lake has been challenging. Eighty-six percent of the inflow to the lake is from the Upper Shannon.

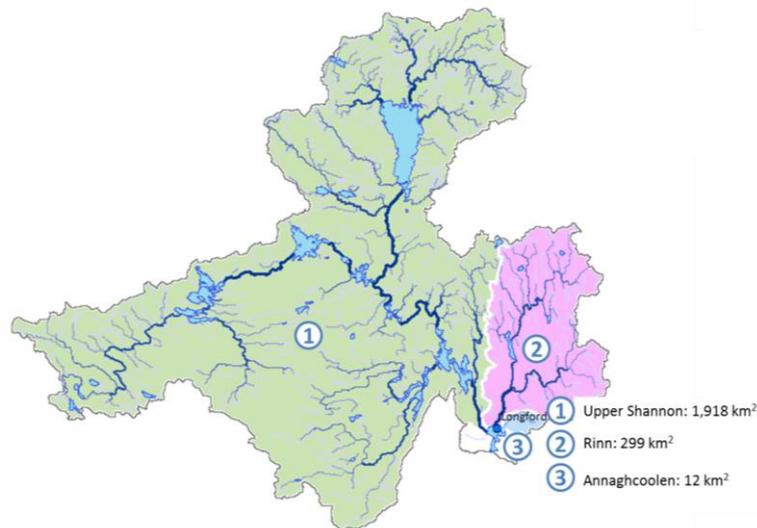


Figure 9 Lough Forbes abstraction catchment and river inflows

Action taken

Actions undertaken by the NPDWAG included:

- Establishment of a local Catchment Focus Group chaired by LAWPRO.
- Raising awareness of the issue at a national and local level through media (radio, print and online) and direct engagement with landowners.
- Best practice information was disseminated.
- To help understand the pesticide risk, a collaborative catchment sampling campaign was undertaken in 2020 and analysis to help determine higher risk areas of the catchment.

Results

- A reduction in pesticide risk since the 2016/2017 period: with 46% reduction in monitored pesticide concentrations exceeding 0.1µg/l. The risk of exceedances remains however, with 3 exceedances reported in 2020.
- Strong local stakeholder relationships.

Next steps

Further targeted catchment management actions (including advice services) will be undertaken in a higher risk portion of the catchment.

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