Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Ireland's National Water Quality Monitoring Programme

2022 - 2027

ENVIRONMENTAL PROTECTION AGENCY

The EPA is responsible for protecting and improving the environment as a valuable asset for the people of Ireland. We are committed to protecting people and the environment from the harmful effects of radiation and pollution.

The work of the EPA can be divided into three main areas:

Regulation: *Implementing regulation and environmental compliance systems to deliver good environmental outcomes and target those who don't comply.*

Knowledge: *Providing high quality, targeted and timely environmental data, information and assessment to inform decision making.*

Advocacy: *Working with others to advocate for a clean, productive and well protected environment and for sustainable environmental practices.*

Our responsibilities include:

Licensing

- Large-scale industrial, waste and petrol storage activities;
- Urban waste water discharges;
- The contained use and controlled release of Genetically Modified Organisms;
- Sources of ionising radiation;
- Greenhouse gas emissions from industry and aviation through the EU Emissions Trading Scheme.

National Environmental Enforcement

- Audit and inspection of EPA licensed facilities;
- Drive the implementation of best practice in regulated activities and facilities;
- Oversee local authority responsibilities for environmental protection;
- Regulate the quality of public drinking water and enforce urban waste water discharge authorisations;
- Assess and report on public and private drinking water quality;
- Coordinate a network of public service organisations to support action against environmental crime;
- Prosecute those who flout environmental law and damage the environment.

Waste Management and Chemicals in the Environment

- Implement and enforce waste regulations including national enforcement issues;
- Prepare and publish national waste statistics and the National Hazardous Waste Management Plan;
- Develop and implement the National Waste Prevention Programme;
- Implement and report on legislation on the control of chemicals in the environment.

Water Management

- Engage with national and regional governance and operational structures to implement the Water Framework Directive;
- Monitor, assess and report on the quality of rivers, lakes, transitional and coastal waters, bathing waters and groundwaters, and measurement of water levels and river flows.

Climate Science & Climate Change

- Publish Ireland's greenhouse gas emission inventories and projections;
- Provide the Secretariat to the Climate Change Advisory Council and support to the National Dialogue on Climate Action;
- Support National, EU and UN Climate Science and Policy development activities.

Environmental Monitoring & Assessment

- Design and implement national environmental monitoring systems: technology, data management, analysis and forecasting;
- Produce the State of Ireland's Environment and Indicator Reports;
- Monitor air quality and implement the EU Clean Air for Europe Directive, the Convention on Long Range Transboundary Air Pollution, and the National Emissions Ceiling Directive;
- Oversee the implementation of the Environmental Noise Directive;
- Assess the impact of proposed plans and programmes on the Irish environment.

Environmental Research and Development

- Coordinate and fund national environmental research activity to identify pressures, inform policy and provide solutions;
- Collaborate with national and EU environmental research activity.

Radiological Protection

- Monitoring radiation levels and assess public exposure to ionising radiation and electromagnetic fields;
- Assist in developing national plans for emergencies arising from nuclear accidents;
- Monitor developments abroad relating to nuclear installations and radiological safety;
- Provide, or oversee the provision of, specialist radiation protection services.

Guidance, Awareness Raising, and Accessible Information

- Provide independent evidence-based reporting, advice and guidance to Government, industry and the public on environmental and radiological protection topics;
- Promote the link between health and wellbeing, the economy and a clean environment;
- Promote environmental awareness including supporting behaviours for resource efficiency and climate transition;
- Promote radon testing in homes and workplaces and encourage remediation where necessary.

Partnership and networking

- Work with international and national agencies, regional and local authorities, non-governmental organisations, representative bodies and government departments to deliver environmental and radiological protection, research coordination and science-based decision making.

Management and structure of the EPA

The EPA is managed by a full time Board, consisting of a Director General and five Directors. The work is carried out across five Offices:

- Office of Environmental Sustainability
- Office of Environmental Enforcement
- Office of Evidence and Assessment
- Office of Radiation Protection and Environmental Monitoring
- Office of Communications and Corporate Services

The EPA is assisted by advisory committees who meet regularly to discuss issues of concern and provide advice to the Board.

Ireland's National Water Quality Monitoring Programme
2022–2027

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Disclaimer

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Executive Summary

This document presents Ireland's national Water Quality Monitoring Programme for the period 2022-2027. The main purpose of the programme is to provide a coherent and comprehensive national overview of the ecological and chemical status of surface waters (rivers, lakes, transitional and coastal waters) and the quantitative and chemical status of groundwaters. This information is used, amongst other things, to track progress towards the achievement of the environmental objectives required by the Water Framework Directive (WFD) and set out in Ireland's national River Basin Management Plan (RBMP) and to assess change in the quality of Ireland's aquatic environment over time.

The document provides a description of the type of monitoring to be undertaken (i.e. surveillance, operational or investigative), the number of water bodies and quality elements (biological, physico-chemical, chemical and hydromorphological) to be monitored, and the frequency of this monitoring.

The programme is comprised of 2,899 surface and groundwater bodies representing 60 per cent of the total number of water bodies nationally. This includes 2,429 river water bodies, 224 lakes, 80 transitional water bodies, 45 coastal waters, 16 canals and 121 groundwater bodies including 159 sites used to assess groundwater quantitative status.

The public bodies involved in undertaking the programme include the Environmental Protection Agency, Marine Institute, Inland Fisheries Ireland, Waterways Ireland, National Parks and Wildlife Service and local authorities The different elements of the programme carried out by each public authority is indicated.

Specific information on individual water bodies in terms of the quality elements to be monitored and the frequency of monitoring is provided to public authorities electronically via the Water Framework Directive Application (WFDApp). The information collected by the programme, including data and water status for individual water bodies can be viewed by the public on www.catchments.ie.

This document also highlights where new technologies are being used in the programme and discusses how information collected in the programme can be used to help identify water bodies most at risk from the impacts of climate change.

Any changes to the content of the programme for either operational or logistical reasons will be updated on an annual basis as necessary. Changes to the programme will be made with the full knowledge of the relevant public bodies.

1. Introduction

Ireland's national Water Quality Monitoring Programme was established in 2006 (EPA, 2006) and was designed to meet the specific monitoring requirements of the EU Water Framework Directive and to support the development and implementation of Ireland's first-cycle river basin management plan (RBMP). The programme was subsequently reviewed to ensure it remained fit for purpose in supporting Ireland's second-cycle river basin management plan and in meeting the monitoring obligations of other water related legislation (EPA, 2021).

The WFD is the main water policy instrument in operation across the member states of the European Union. The Directive, which came into force in 2000, aims to maintain and restore all surface waters and groundwaters to at least good water status by 2027 at the latest.

An important component of the Directive is the requirement for each member state to establish a national monitoring programme which is capable of providing a 'coherent and comprehensive picture of water status in a river basin district' (Article 8).

The structure and content of the programme must be consistent with the requirements specified in Annex V of the Directive which sets out the type of monitoring to be undertaken, the elements to be monitored and the frequency of monitoring.

The programme must be capable of providing an assessment of the ecological status and chemical status of surface waters and the chemical status and quantitative status of groundwaters. Surface waters include rivers, lakes, transitional waters and coastal waters. These groupings are referred to as water categories. For heavily modified or artificial water bodies, which are incapable of achieving good ecological status without impairing an existing specified water use (e.g. a reservoir), the environmental objective is to achieve good ecological potential. Examples of artificial or man-made water bodies include canals and these are included in the programme.

The purpose of this document is to set out the structure and content of the programme for the period 2022-2027 which will be in place during the lifetime of Ireland's third-cycle RBMP. The programme includes updates such as the inclusion of new assessment methods, the monitoring of new elements/substances as required by new legislation and some modifications based on the knowledge gained and lessons learned since the programme's inception in 2006. The programme also highlights where new technologies are being used. The impact of climate change both in terms of its impact on the aquatic environment and its impact on the programme itself and assessment methodologies (e.g. the impact of changing baselines and reference conditions) is also being taken into consideration for the first time.

The specific details of the programme in terms of lists of water bodies to be monitored in each water category, the quality elements to be monitored and their frequency is provided on the WFD Application which is accessible to public bodies through the Environmental Data Exchange Network (www.edenireland.ie). The location of national monitoring stations can be publicly viewed on EPA Maps (https://gis.epa.ie/EPAMaps/).

2. DESIGN OF THE PROGRAMME

Ireland's national water quality programme was designed to meet the specific requirements of the EU Water Framework Directive. The design of the programme is similar to the previous programme.

Surface Waters

The programme for surface water is divided into three main monitoring networks: surveillance, operational and investigative.

The purpose of the surveillance network is to provide a comprehensive and long-term picture of water body status across the State.

The **surveillance network for surface water** is designed to:

- assess long-term changes in natural conditions, and
- assess long-term changes resulting from widespread anthropogenic activity,
- supplement and validate the risk assessment process (see section 3),
- ensure efficient and effective design of future monitoring programmes.

The purpose of the operational network is to assess the status of water bodies at risk of failing to meet their environmental objectives and to assess if a change in the status of a water body is the result of a programme of measures.

The **operational network for surface water** is designed to:

- establish the status of water bodies identified as being at risk of failing to meet their environmental objectives, and
- assess any change in the status of such bodies resulting from the programmes of measures.

Investigative monitoring for surface waters is required where the reason for any exceedance is unknown or to ascertain the extent and impact of accidental pollution. Investigative monitoring can also be used to help select measures needed to achieve environmental objectives or to remedy the effects of accidental pollution.

The investigative network is, by its nature, reactive and transient. Consequently this network will continue to evolve to meet new monitoring requirements.

In Ireland, this type of monitoring is largely undertaken by the Local Authority Waters Programme (LAWPRO) who carry out local catchment-based assessments of issues affecting water quality (see https://lawaters.ie/).

Groundwater

The programme for groundwater is also comprised of a surveillance and operational networks and in addition a network for measuring groundwater quantitative status.

The **surveillance network for groundwater quality** is designed to:

- supplement and validate the risk assessment process,
- provide information for the assessment of long-term trends both as a result of changes in natural conditions and through anthropogenic activity.

The **operational network for groundwater quality** is designed to:

- establish the status of at risk groundwater bodies and establish the presence of significant upward trends in the concentration of pollutants;
- provide appropriate monitoring to support the objectives of protected areas for drinking water and for species and habitats

The **network for monitoring groundwater quantity** is designed to:

- supplement and validate the Annex II risk assessment procedure,
- determine the quantitative status of groundwater bodies,
- support the chemical status assessment and trend analysis,
- support the design and evaluation of programmes of measures.

Investigative groundwater monitoring data for EPA licensed activities and from other public authorities is also available, and these data are used in the assessment of groundwater body status for those groundwater bodies.

3. RISK CHARACTERISATION

Knowing which water bodies are at risk of not meeting their environmental objectives is an important component in the design of the programme as indicated in the section above. In preparation for the third-cycle River Basin Management Plan a risk characterisation exercise was undertaken to identify such water bodies. The outputs from this exercise have been used in the design of the programme for the period 2022-2027.

Risk Categorisation

In the characterisation exercise each water body is categorised into one of three risk categories, namely, **'at risk'**, **'not at risk'** and **'review'**. Water bodies are put in the 'review' category if there is insufficient information to determine if a water body is 'at risk' or 'not at risk' of meeting its environmental objective.

In total, over 1600 water bodies were identified as being 'at risk' of not meeting their environmental objectives. The distribution of risk across each of the main surface water categories and groundwater is shown in Figure 1.

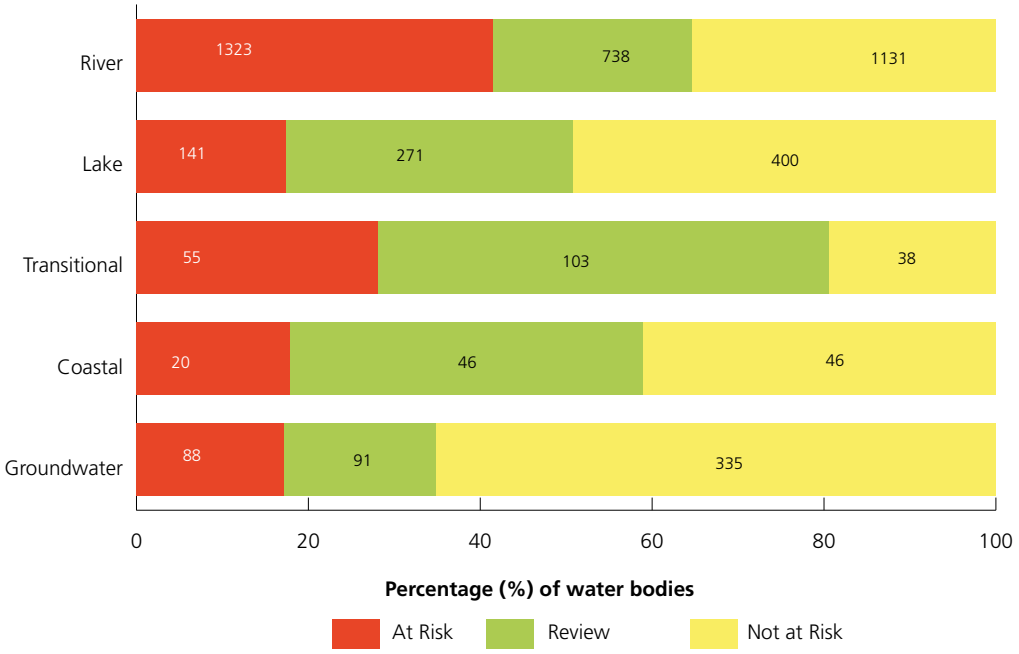


Figure 1: Distribution of risk across each of the five individual water categories

Significant Pressures

In addition to identifying whether or not a water body is at risk of not meeting its environmental objectives the risk characterisation exercise also identified the main human activities or significant pressures impacting on water bodies.

The main significant pressures impacting on water bodies at risk are agriculture, hydromorphology (changes to the shape, form and flow of a water body), forestry, and urban waste water discharges. The different pressures and their relative impact on at risk water bodies is illustrated in Figure 2.

The information on risk characterisation and significant pressures has been used to ensure that the design and distribution of the type (operational, surveillance and investigative) and location of monitoring is sufficient to ensure that the right information is being collected not only to assess water status but also the effectiveness of measures put in place to address water quality issues.

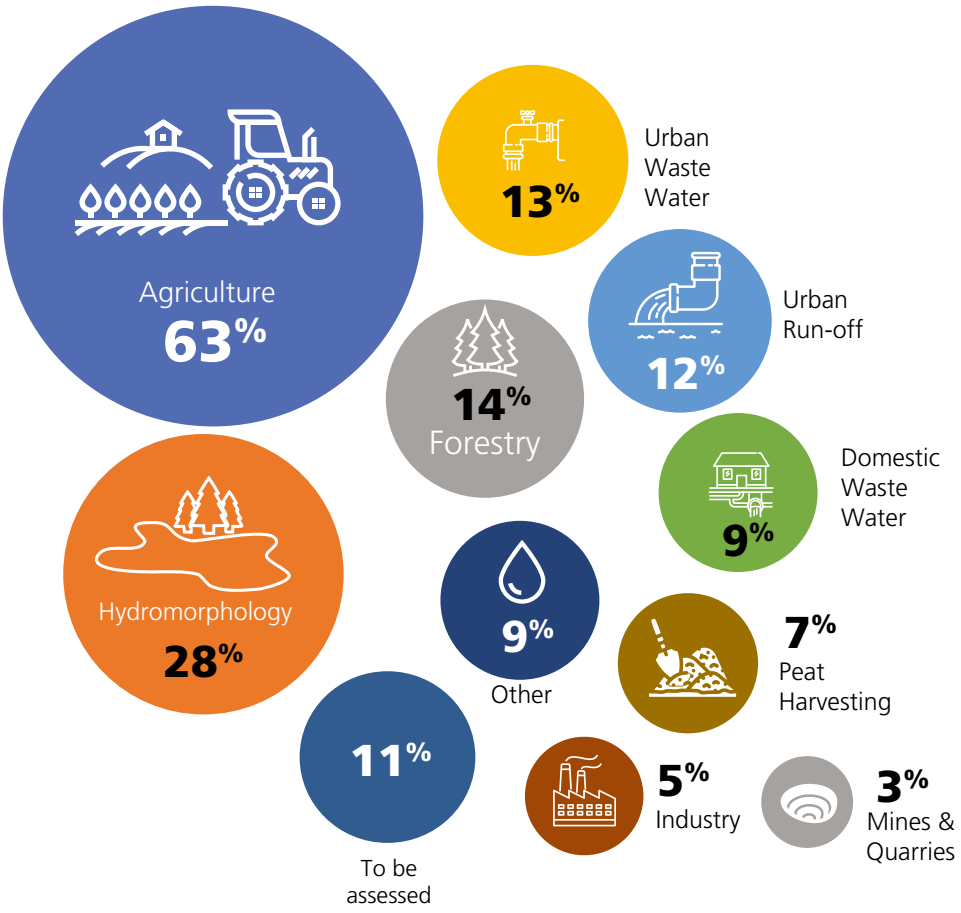


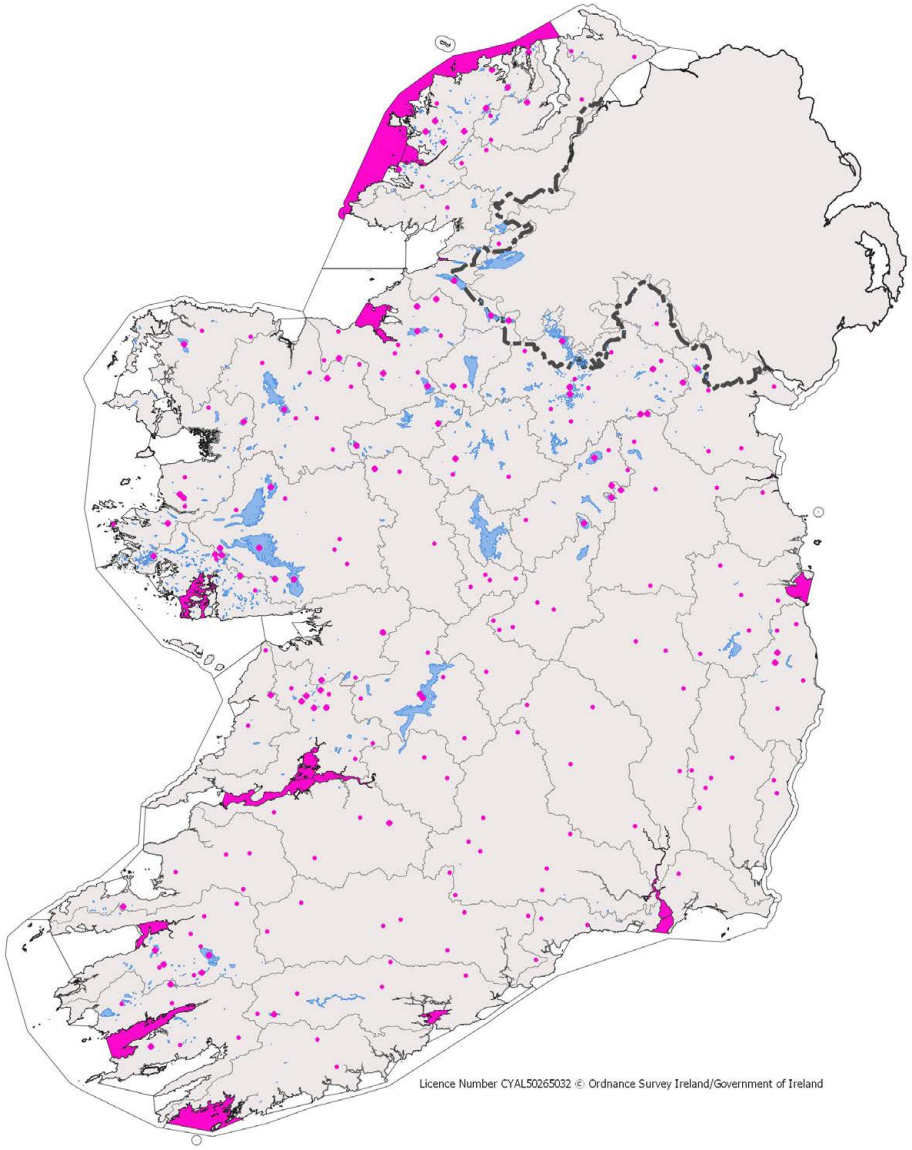
Figure 2: Percentage of 'at risk' water bodies affected by different activities. Some water bodies are affected by more than one activity so the summed total for all activities is greater than 100%.

4. SURVEILLANCE NETWORK

Surface Waters

The surveillance network for surface waters is comprised of 179 river water bodies, 75 lakes, 20 transitional waters and 9 coastal water bodies. The distribution of this network is shown in Map 1.

The selection of water bodies is based on their representation of different physical typologies, risk and significant pressures across Ireland's national river basin district.



Map 1: Distribution of the surface water surveillance network 2022-2027

Groundwater

The groundwater quality surveillance monitoring programme is comprised of 244 surveillance monitoring points in 121 groundwater bodies, as summarised in Table 1.

There are 128 groundwater level and 24 spring flow monitoring sites in the groundwater quantitative monitoring programme.

Table 1: Groundwater Quality Monitoring Network.

Groundwater Monitoring Programme (2022-2027)	Number
Surveillance monitoring points	244
Groundwater bodies with surveillance monitoring points	121
Operational monitoring points	64
Groundwater bodies with operational monitoring points	34
Total number of groundwater bodies	514

5. OPERATIONAL NETWORK

Surface Waters

The operational network for surface waters is much larger than the surveillance network and is made-up of 2,495 water bodies. The distribution of these water bodies is shown in Map 2.

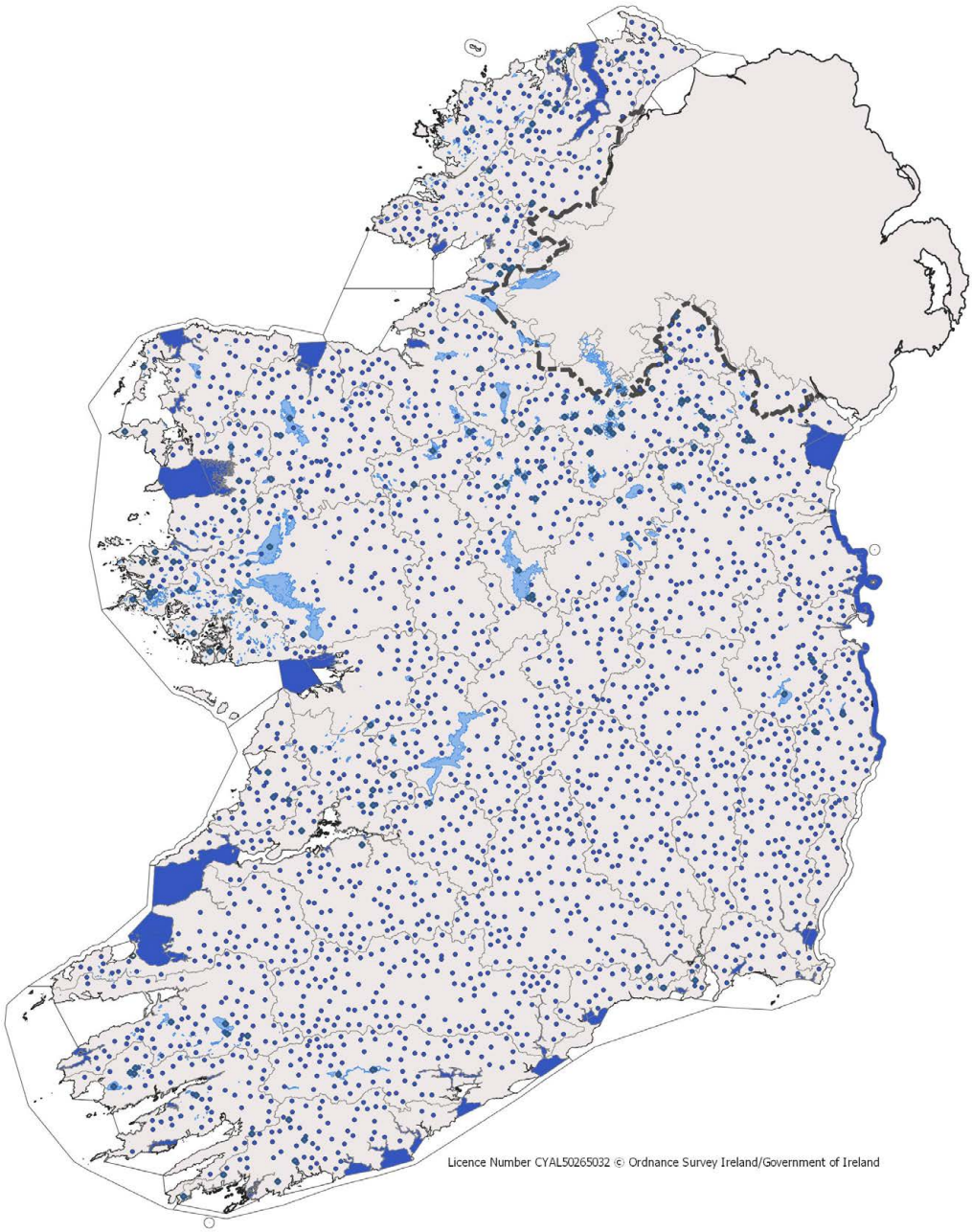
The operational network for surface waters has been further divided into **12** subnetworks; 10 of these are related to significant pressures or groups of pressures identified in the risk characterisation exercise, one is designed to assess the effectiveness of measures to protect and restore high and good status water bodies and one is designed to assess protected areas at risk.

The number of water bodies in each of the operational subnetworks (Table 2) reflects the magnitude of that pressure. The highest number of water bodies are in the agriculture, hydromorphology, forestry and urban waste water subnetworks. It is important to point out that an individual water body can be included in more than one subnetwork if that water body is being impacted by more than one significant pressure.

Table 2: Number of water bodies in each operational subnetwork by surface water category in the national WFD monitoring programme 2022-2027.

Operational Subnets	Rivers	Lakes	Transitional	Coastal
Agriculture	845	85	36	8
Hydromorphology	429	14	4	0
Forestry	215	14		
Urban Waste Water	177	10	22	4
Urban Run-off	183	3	11	4
Unknown Pressures	122	22	2	1
Domestic Waste Water	124	9	7	3
Extractive Industry (Peat, Mines and Quarries)	144	2		
Industry	62	1		
Other Anthropogenic pressures*	78	44	4	8
Protected areas at risk		17		
Protect high and good status		77		

*Includes other pressures (e.g. Invasive Species, Abstraction, Waste, Historically Polluted Sites)



Map 2: Distribution of the surface water operational network 2022-2027.

Groundwater

The groundwater operational quality monitoring programme is comprised of 64 operational monitoring points, which monitor a total of 34 groundwater bodies, as summarised in Table 1.

Investigative groundwater monitoring data for EPA licensed activities and from other public authorities are used in the assessment of groundwater body status for 97 groundwater bodies.

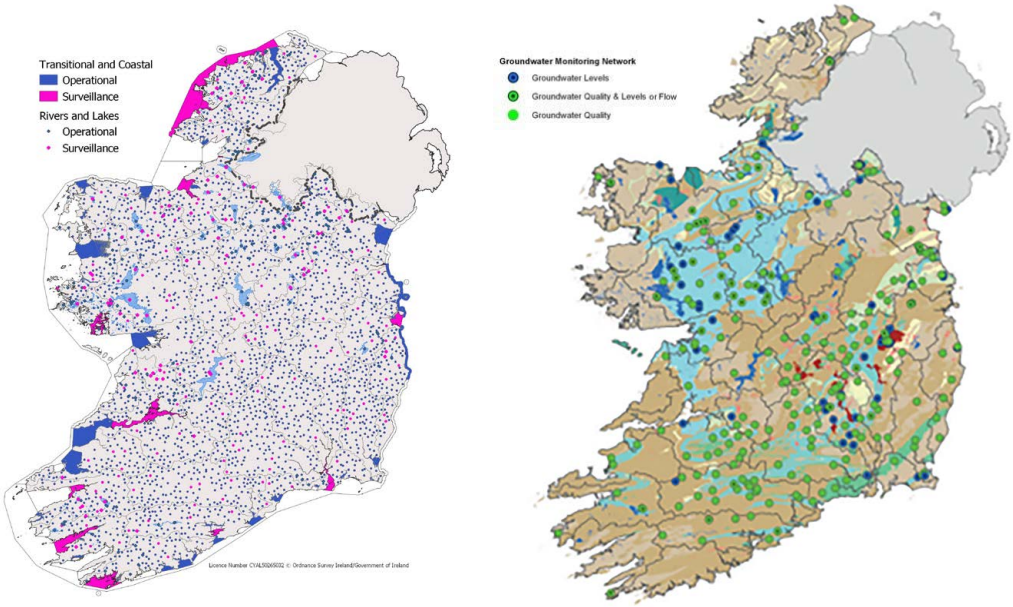
6. THE NATIONAL NETWORK

In total, the combined surveillance and operational networks of the national WFD monitoring programme for the period 2022-2027 is comprised of 2,778 surface and 121 groundwater bodies (Table 3). This represents 60% of the total number of water bodies nationally (4,821). This includes 2,429 river water bodies, 224 lakes, 80 transitional water bodies, 45 coastal waters and 121 groundwater bodies (Map 3).

In addition, 16 canals, which are artificial water bodies, are also included in the programme.

Table 3: Number of water bodies in each monitoring network by water category in the national WFD monitoring programme 2022-2027.

Type of monitoring	Rivers	Lakes	Transitional	Coastal	Groundwater
Surveillance	179	75	20	9	121
Operational	2250	149	60	36	34
Water Category Total	**2429**	**224**	**80**	**45**	**121**
Surface Water Total	2778				
Groundwater Total	121				
Total	**2899**				



Map 3: Distribution of the (a) surface and (b) groundwater monitoring networks 2022-2027

7. ELEMENTS MONITORED

A range of different elements are monitored to assess the status of both surface waters and groundwaters.

For surface waters these include:

- Biological quality elements (plants and animals living in and around water bodies)
- Physio-chemical quality elements (nutrients, dissolved oxygen, pH, etc.)
- Priority substances, priority hazardous substances and river basin specific pollutants (chemical substances such as pesticides and metals)
- Hydromorphological quality elements (the physical condition of water bodies)

For ecological status a number of biological elements and supporting elements are monitored and these are listed and described further in Box 1. The methods used to assess these elements are described in the following sections.

Further information is also provided on the priority substances and priority hazardous substances that are monitored to assess chemical status.

For groundwater, there are two quality elements used to determine status

- Chemical
- Quantitative

Box 1. Biological Quality Elements and Supporting Quality Elements

Macroinvertebrates are small animals that live on the bottom of rivers, lakes, estuaries and coastal areas. They include aquatic insects, snails, worms, clams and brittlestars and are a key source of food for other animals such as fish. Macroinvertebrates are sensitive to many pressures, such as organic enrichment causing oxygen depletion, physical alterations to habitats, siltation and acidification.

Aquatic plants include macrophytes (large plants and angiosperms (flowering plants)) that grow in and along river banks and on the bottom of lakes. Seagrass, a type of angiosperm, grows on soft sediment in estuaries and is an important habitat and nursery for juvenile fish.

Macroalgae are large algae visible to the human eye. They can grow in rivers and lakes and on soft substrates and rocky shores in transitional and coastal waters. Some types of macroalgae can respond quickly to the presence of too much nutrient in the water by forming dense algal mats that can smother other animals and plants.

Phytoplankton are microscopic algae that drift along with water movements. Their small size and ability to grow quickly means that this biological element is often the first to respond to the presence of too much nutrient in the water by forming blooms which can cause the colour of the water to change. Cyanobacteria are a type of phytoplankton which are known to bloom in Irish lakes.

Phytobenthos are microscopic algae that grows on rocks and other types of substrate. Phytobenthos are sensitive to nutrient enrichment.

Fish are particularly sensitive to physical changes to their environment and changes in water flows. Barriers that prevent fish from travelling along a water way will limit their ability to forage for food or to reach upstream breeding areas. Fish are also harmed by pollution that causes oxygen depletion or the introduction of non-native fish species which may out compete native species for food resources.

Physico-chemical quality elements support the biological quality elements listed above. They generally consist of nutrient conditions such as nitrate (as total oxidised nitrogen), phosphate and ammonia, oxygenation conditions such as dissolved oxygen and biochemical oxygen demand and river basin specific pollutants. In rivers and lakes, they also include acidification conditions (pH). These supporting elements are set at levels to protect the most sensitive plants and animals.

Hydromorphological quality elements support the biological quality elements. They generally consist of flow conditions (i.e. quantity of flow and connection to other surface water bodies and groundwater bodies) and morphological conditions (i.e. shape, depth, width and substrate of the bed).

Biological Quality Elements

Eighteen different biological assessment methods have been developed to assess the condition of biological communities across the four surface water categories. All of these different assessment methods will be used in the 2022-2027 programme (Table 4).

For surveillance monitoring all biological elements specific to that water category will be monitored. In some cases it is not possible to monitor all biological elements in a water body due to the absence of its natural habitat (e.g. the absence of soft-sediment benthic invertebrates from coastal waters with rocky habitats) or the suitability of that element to detect environmental change. For example, phytoplankton are not a suitable indicator of nutrient enrichment in rivers because they do not have sufficient time to respond due to the short residence time of many Irish rivers.

For operational monitoring purposes the biological element most sensitive to the pressure impacting on status will be monitored. The elements currently monitored in the programme are sensitive to a range of environmental stressors including nutrient and organic enrichment, acidification, morphological alterations and general habitat degradation. For example, benthic macroinvertebrates, which are sensitive to nutrient and organic enrichment, two of the most common stressors impacting on rivers, will continue to be the main biological element monitored in the rivers operational network.

Work will also continue to develop other biological assessment methods that are sensitive to other stressors such as changes in river flow regime and sediment pollution. These methods will be trialled over the period of the 2022-2027 programme.

Table 4: Biological assessment methods in the national WFD monitoring programme 2022-2027.

	Water Category			
Quality Element	**Rivers**	**Lakes**	**Transitional Waters**	**Coastal Waters**
Macroinvertebrates	Quality Rating System (Q-value)	Lake Acidification Macroinvertebrate Metric (LAMM)	Infaunal Quality Index (IQI)	Infaunal Quality Index (IQI)
	Acid Water Indicator Community Score (AWICs)			
Aquatic Plants	Mean Trophic Rank (MTR)	Free Macrophyte Index	Intertidal Seagrass tool	Intertidal Seagrass tool
	LEAFPACS		Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE)	Saltmarsh Angiosperm Assessment Tool for Ireland (SMAATIE)
Macroalgae	Mean Trophic Rank (MTR)	Not applicable	Opportunistic Green Macroalgal Abundance (OGA tool)	Opportunistic Green Macroalgal Abundance (OGA Tool)
	LEAFPACS			RSL - Rocky Shore reduced species List
Phytoplankton	Not applicable	IE Lake Phytoplankton Index	Phytoplankton biomass & composition	Phytoplankton biomass & composition
Phytobenthos	Revised form of Trophic Diatom Index (TDI)	Lake Trophic Diatom Index (IE)	Not applicable	Not applicable
Fish	Fish Classification Scheme (FCS2)	Fish in lakes 2 (FIL2)	Transitional Fish Classification Index (TFCI)	Not applicable
			Estuarine Multi-metric Fish Index (EMFI)	

Physico-Chemical Quality Elements

Physico-chemical elements such as nutrients, dissolved oxygen, salinity, pH, etc., are measured to provide an indication of how these elements support the achievement of good or better ecological status. The physico-chemical quality elements and parameters that will be monitored in the 2022-2027 programme are shown in Table 5. Transparency in rivers is not measured due to the shallow nature of most Irish rivers.

Table 5: Physico-chemical quality elements monitored in each water category.

	Water Category			
Quality Element	**Rivers**	**Lakes**	**Transitional Waters**	**Coastal Waters**
Transparency	Not measured	Secchi Depth, colour	Secchi Depth	Secchi Depth
Thermal conditions	Temperature	Temperature	Temperature	Temperature
Oxygenation conditions	DO, BOD	DO	DO, BOD	DO, BOD
Acidification	pH, alkalinity, cations and anions, DOC	pH, alkalinity, cations and anions, DOC	pH	pH
Salinity	Conductivity	Conductivity	Salinity	Salinity
Nutrient conditions	MRP, TA, TON	MRP, TA, TON, TP, Si	DIN, MRP, Si	DIN, MRP, Si

DO = dissolved oxygen; BOD = biochemical oxygen demand; MRP = molybdate reactive phosphorus; TA = total ammonia; TON = total oxidised nitrogen; TP = total phosphorus; DIN = dissolved inorganic nitrogen; Si = silica

Hydromorphological Quality Elements

In rivers and lakes, the hydromorphological status of all surveillance and high status sites will be assessed using the River Hydromorphological Assessment Technique (RHAT) and the lake Morphological Impact Assessment System (MImAS), respectively. RHAT will also be used at sites where hydromorphological pressures are suspected of impacting on ecology. In transitional and coastal waters, the Hydromorphological Quality Index will be used to assess the hydromorphological condition of all surveillance water bodies and operational water bodies identified as being at risk from hydromorphological pressures.

The aspects of these assessment techniques which correspond to the specific hydromorphology quality elements of continuity, hydrology and morphology required to be assessed for each water category is shown in Table 6. The assessment method used to provide the basis of each hydromorphology assessment is indicated. Some gaps remain in terms of assessing continuity in rivers and hydrology in rivers and lakes and these will be addressed during the period of the monitoring programme.

Table 6: Hydromorphological quality elements monitored in each water category.

	Water Category		
Quality Element	**Rivers**	**Lakes**	**Transitional and Coastal Waters**
Continuity	Presence of barriers (To be Developed)	Presence of barriers between and within water bodies (Lake MimAS)	Presence of barriers between and within water bodies (TraC HQI)
Hydrology	River flow regime (To be Developed)	Water level, residence time (To be Developed)	Tidal regime, wave regime, river flow, residence time, stratification and salinity (TraC HQI)
Morphology	Substrate condition, channel form, channel vegetation, bank structure (RHAT)	Shoreline alteration (Lake MimAS)	Shoreline alteration, bed disturbance, change in the spatial extent of seagrass and saltmarsh habitats (TraC HQI)

Priority Substances and Specific Pollutants

Of the 48 substances listed in Directive 2013/39/EC (amending Directive 2008/105/EC) as priority substances or priority hazardous substances, 25 will be monitored in rivers and lakes and 31 will be monitored in transitional and coastal waters. The substances to be monitored and the matrix (i.e. water, sediment or biota) is shown in Table 7. In addition, 8 of 16 substances listed as River Basin Specific Pollutants (RBSPs), see Table 8., are also included in the monitoring programme. The list of RBSP substances is currently under review by the National Aquatic Environmental Chemistry Group. The outcome of this review is expected in 2023 and is likely to require changes to the monitoring programme. Some other substances of interest (e.g. herbicides MCPA, Mecoprop and 2,4-D) will also be monitored as part of the programme.

Substances were selected for inclusion in the 2022-2027 monitoring programme based on reviews of the evidence acquired from the previous monitoring programmes from 2006-2021, other monitoring programmes (e.g. drinking water) and other available information on the use of these substances in Ireland. These substances will be monitored across the surface waters surveillance network as well as at operational sites where specific substances are considered to pose a risk to the aquatic environment. Criteria for the inclusion and exclusion of substances from the monitoring programme and the appropriate monitoring frequency has been developed as part of Guidance on Assessment of Priority Substances/ Priority Hazardous Substances and River Basin Specific Pollutants and Chemical Status.

The EU has established a watch list of emerging pollutants and other substances for Union-wide monitoring where additional information is required to assess the risk posed by these substances to the aquatic environment. This list is updated regularly. In Ireland, short term targeted monitoring of substances on the watch list commenced in 2016. Watch list substances found to pose a significant risk will be included in the national monitoring programme.

When new substances are designated in changes to EU or national legislation, or otherwise identified as a risk to Irish waters, they will be assessed for inclusion in the monitoring programme. A review of the evidence base for the inclusion or exclusion of all substances will be conducted on a regular basis. Tables 7 & 8 below includes the outcome of the most recent review for the 2023 monitoring programme.

Table 7: Priority substances and priority hazardous substances included in the national WFD monitoring programme.

No	Name of Substance	Inland Surface Waters	TRAC Waters	Rational for not monitoring (2023)
1	Alachlor	No	No	Not detected 2007-2009. Banned prior to 2007.
2	Anthracene	Yes (water)	Yes (sediment, biota, water and passive)	n/a
3	Atrazine	Yes (water)	Yes (water)	n/a
4	Benzene	No	Yes (water)	Inland waters: Not detected 2010-2017. Ceased 2018
5	Brominated diphenylethers	Yes (biota)	Yes (sediment, biota, water and passive)	n/a
6	Cadmium and its compounds	Yes (water)	Yes (water, sediment & biota)	n/a
7	Chloroalkanes, C10-C13	Yes (water)	No	n/a
8	Carbon-Tetrachloride	No	Yes (water)	Inland waters: Not detected 2010-2017. Ceased 2018
9	Chlorfenvinphos	No	No	Not detected 2007-2009. Banned prior to 2007.
10	Chlorpyrifos	No	No	Rarely detected 2007-2009. Not approved for use.
11	Cyclodiene pesticides Aldrin, Dieldrin, Endrin, Isodrin	No	No	Not detected 2007-2009. Banned prior to 2007.
	DDT total & pp-DDT	No	No	
12	1,2-dichloroethane	No	Yes (water)	Inland waters: Not detected 2010-2017. Ceased 2018
13	Dichloromethane	No	Yes (water)	Inland waters: Not detected 2010-2017. Ceased 2018
14	DEHP	Yes (water)	Yes (water)	n/a
15	Diuron	Yes (water)	Yes (water)	n/a

No	Name of Substance	Inland Surface Waters	TRAC Waters	Rational for not monitoring (2023)
16	Endosulfan	No	No	Not detected 2007-2009. Banned as plant protection product.
17	Fluoranthene	Yes (water & biota)	Yes (sediment, biota, water and passive)	n/a
18	Hexachloro benzene	Yes (biota)	Yes (water, sediment & biota)	n/a
19	Hexachloro butadiene	Yes (biota)	Yes (biota)	n/a
20	Hexachloro cyclohexane	Yes (biota)	Yes (water, sediment & biota)	n/a
21	Isoproturon	Yes (water)	Yes (water)	n/a
22	Lead and its compounds	Yes (water)	Yes (water, sediment & biota)	n/a
23	Mercury and its compounds	Yes (water & biota)	Yes (water, sediment & biota)	n/a
24	Naphthalene	No	Yes (sediment, biota, water and passive)	Inland waters: Not detected 2010-2017. Ceased 2018
25	Nickel and its compounds	Yes (water)	Yes (water, sediment & biota)	n/a
26	Nonylphenols	No	Yes (water)	Inland waters- not detected 2007-2009. Restricted prior to 2007. No EQS failures in TRAC 2016-2021
27	Octylphenols	No	Yes (water)	
28	Pentachloro benene	No	No	Not detected 2007-2009. Banned 2010.
29	Pentachloro phenol	No	No	Rarely detected 2007-2009. Banned as plant protection product.
30	PAH	Yes (water)	Yes (water, sediment & biota)	n/a
	Benzo(a)pyrene	Yes (water)	Yes (water, sediment & biota)	n/a
	Benzo(b) fluoranthene	Yes (water)	Yes (water, sediment & biota)	n/a
	Benzo(k) fluoranthene	Yes (water)	Yes (water, sediment & biota)	n/a
	Benzo(g,h,i) perylene	Yes (water)	Yes (water, sediment & biota)	n/a
31	Simazine	Yes (water)	Yes (water)	n/a

No	Name of Substance	Inland Surface Waters	TRAC Waters	Rational for not monitoring (2023)
32	Tributyltin compounds	No	Yes (water)	Not relevant in in-land waters
33	Tetrachloro-ethylene	No	No	Inland waters: Not detected 2010-2017. Ceased 2018. TRAC water: 2016-2021 no EQS failures. Ceased 2021.
	Trichloro-ethylene	No	No	
34	Trichloro benzenes	No	Yes (water)	Inland waters: Not detected 2010-2017. Ceased 2018
35	Trichloromethane	No	No	Inland waters: No detects above EQS 2010-2017. Ceased 2018.
36	Trifluralin	No	No	Not detected 2007-2009. Not approved for use.
37	Dicofol	Yes (water)	Yes (water)	n/a
38	PFOS	Yes (water & biota)	Yes (water, sediment & biota)	n/a
39	Quinoxyfen	No	Yes (water)	Inland waters: study 2017/2018 suggested not of concern in Ireland. TRAC 2016-2021 no detections
40	Dioxin and Dioxin like compounds	Yes (biota)	No	n/a
41	Aclonifen	No	Yes (water)	Inland waters: study 2017/2018 suggested not of concern in Ireland. TRAC 2016-2021 no detections
42	Bifenox	Yes (water)	Yes (water)	n/a
43	Cybutryene	Yes (water)	Yes (water)	n/a
44	Cypermethrin	Yes (water)	Yes (water)	n/a
45	Dichlorvos	No	Yes (water)	Inland waters: study 2017/2018 suggested not of concern in Ireland. TRAC 2016-2021 some detections
46	HBCDD	Yes (water & biota)	Yes (water & biota)	n/a
47	Heptachlor and heptachlor epoxide	Yes (biota)	Yes (biota)	n/a
48	Terbutryn	Yes (water)	Yes (water)	n/a

Table 8: River Basin Specific Pollutants included in the national WFD monitoring programme.

No	Name of Substance	Inland Surface Waters	TRAC Waters	Rational for not monitoring (2023)
1	Arsenic	Yes (water)	Yes (sediment & biota)	n/a
2	Chromium III	Yes (water)	Yes (sediment & biota)	Monitoring for Total Cr and comparing with EQS
3	Chromium VI	Yes (water)	Yes (sediment & biota)	Monitoring for Total Cr and comparing with EQS
4	Copper	Yes (water)	Yes (water, sediment & biota)	n/a
5	Cyanide	No	No	Inland waters: Not detected 2010-2015. Ceased 2018
6	Diazinon	No	Yes (water, sediment & biota)	Awaiting outcome of RBSP review in 2023
7	Dimethoate	No	No	Awaiting outcome of RBSP review in 2023
8	Fluoride	Yes (water)	No	n/a
9	Glyphosate	Yes (water)	Yes (water)	n/a
10	Linuron	No	No	Ceased in TRAC 2022. Awaiting outcome of RBSP review in 2023
11	Mancozeb	No	No	Awaiting outcome of RBSP review in 2023
12	Monochloro benzene	No	No	Inland waters: Not detected 2010-2015. Ceased 2018
13	Phenol	No	Yes (water)	Awaiting outcome of RBSP review in 2023
14	Tolune	No	Yes (water)	Inland waters: Not detected 2010-2015. Ceased 2018
15	Xylenes	Yes (water)	Yes (water, sediment & biota)	Inland waters: Not detected 2010-2015. Ceased 2018
16	Zinc	Yes (water)	Yes (water, sediment & biota)	n/a

Groundwater Quality Elements

For the groundwater chemical quality element, all surveillance and operational monitoring sites are monitored for the parameters listed in Table 9 below. The EU identified a groundwater watch list of parameters that member states should consider monitoring. This was a voluntary programme and monitoring and analysis was completed in 2020. Further monitoring will be undertaken over the 2022-2027 monitoring programme.

Groundwater quantity is measured using data logging pressure transducers, which record the groundwater level and by measuring the flow/discharge arising from groundwater springs.

Table 9: Groundwater quality parameters monitored in the national WFD monitoring programme.

Suite	Parameters
Standard Suite (tested 3times a year)	pH, temperature, dissolved oxygen, conductivity, Oxidation Reducing Potential (ORP), coliform bacteria, E.coli, alkalinity, total hardness, colour, turbidity, total oxidised nitrogen (as N), ammonia-total (as N), nitrite, nitrate, total phosphorus, ortho-phosphate, total organic carbon, silica, chloride, fluoride, sulphate, sodium, potassium, magnesium, calcium, iron, manganese, boron, aluminium, chromium, nickel, copper, zinc, arsenic, cadmium, antimony, barium, lead, uranium, mercury, cobalt, molybdenum, strontium, beryllium, selenium, thallium, vanadium.
Additional Suite (tested every 6 years)	Pesticides, organic compounds & voluntary watch list compounds such as the non-relevant pesticide metabolites (Propamocarb, Boscalid and Fluxapyroxad), pharmaceutical compounds (Carbamazepine and Erythromycin) and several PFAS compounds (including PFOS and PFOA).

8. FREQUENCY

Surface Waters

Surface water quality elements (biological, physico-chemical, hydromorphological, specific pollutants and priority substances) will be monitored at the minimum frequency recommended in Annex V of the Directive (Table 10). In some cases, the frequency will be higher, to take into account greater natural variation associated with some quality elements (e.g. phytoplankton in coastal waters). In general, the majority of biological quality elements are monitored once every three years.

Physio-chemical quality elements (i.e. nutrients, dissolved oxygen, pH) will be monitored at least four-times per annum in each water category. In canals, microbiological parameters such as faecal coliforms will also be monitored at the same frequency. In the rivers surveillance programme, general physico-chemical parameters will be monitored at a higher frequency of eight times per annum while in the lakes surveillance programme, these parameters will be monitored 12 times per annum every three years and at a minimum of four times per annum in the intervening years. The higher frequencies in the surveillance programmes are required to look at seasonal variation and for trend assessment.

Priority substances will continue to be monitored monthly during one year of each river basin management plan cycle. Specific pollutants are monitored monthly during one year of the river basin management plan cycle in rivers and lakes and quarterly in transitional and coastal waters.

Increased frequency at Priority Sites

The frequency of monitoring will be higher at certain sites where additional information is required to establish their status, monitor changes over time or the effectiveness of measures. These include high status sites which are at risk, sites that have been impacted by suspected chemical pollution (e.g. pesticides) and sites within Areas for Action to assess the effectiveness of planned measures. Biological monitoring will also be at a higher frequency in acid sensitive waters to better understand the temporal nature of acidification impacts.

The frequency of monitoring will also be higher in water bodies where the ecological status of a water body is currently bad or where the status of a water body has declined significantly and where the water body or site has been identified as a Red Dot+ notification site (see Topic Box 2). In these circumstances, monitoring will be undertaken on an annual basis until the water body has recovered. Monitoring will then return to the default frequency.

In summary, the following sites and water bodies will be monitored at a higher frequency:

- high status sites at risk,
- sites that have been impacted by suspected chemical pollution (e.g. pesticides),
- sites within Areas for Action to assess the effectiveness of planned measures,
- acid sensitive waters,
- water bodies in bad ecological status,
- water body that have declined significantly and where the water body or site has been identified as a Red Dot+ notification site (see Topic Box 2).

Table 10: Frequency of monitoring for each quality element in the national surface waters WFD monitoring programme 2022-2027. OM = operational monitoring; SM = surveillance monitoring.

	Water Category			
Quality Element	**Rivers**	**Lakes**	**Transitional Waters**	**Coastal Waters**
Biological				
Macroinvertebrates	Every 3 years	Every 3 years annually at selected acid lakes*	Every 3 years	Every 3 years
Aquatic Plants	Every 3 years (in canals annually)	Every 3 years	Every 3 years (seagrass) Every 6 years (saltmarsh)	Every 3 years (seagrass) Every 6 years (saltmarsh)
Macroalgae	Not applicable	Not applicable	Every year (opportunistic algae)	Every year (opportunistic algae) Every 3 years (RSL)
Phytoplankton	Not applicable	Twice per annum for taxonomic composition (SM) As per physico[1] chemical for chlorophyll a	4 times per annum	12 times per annum
Phytobenthos	Once per annum	Twice per annum every 3 years	Not applicable	Not applicable
Fish	Every 3 years	Every 3 years	Every 3 years	Not applicable
Physico-chemical				
Nutrient Conditions	4 times per annum (OM) 8 times per annum (SM)	4 or 6 times per annum (OM) 12 times per annum every three years and 4 or 6 times per annum in the other years (SM)*	4 times per annum	4 times per annum
Oxygen conditions	As above	As above	4 times per annum	4 times per annum
Acidification conditions	As above	As above	Not applicable	Not applicable
Hydromorphological	Every 6 years	Every 6 years	Every 6 years	Every 6 years
Priority substances	12 times per annum every 6 years	12 times per annum every 6 years	12 times per annum every 6 years	12 times per annum every 6 years
Specific pollutants	12 times per annum every 6 years	12 times per annum every 6 years	4 times per annum every 6 years	4 times per annum every 6 years

* non-acid lakes 4 times per annum, acid lakes 6 times per annum.

Note for Nutrient conditions frequency required: 4 times per annum except if (a) acid lake then 6 times or (b) Drinking water abstraction present then 8 times if serving population > 10,000-30,000 or 12 times if serving population > 30,000

Decreased Frequency at Stable Sites

In some circumstances if the status of a surface water body is stable (e.g. status has not changed over several assessment cycles) the frequency of monitoring will be decreased.

The frequency of some biological elements will be decreased from once every three years to once every six years if it can be demonstrated that the status of that element is unlikely to change due to the absence of risk or anthropogenic pressure (i.e. status is unlikely to deteriorate) or due to the absence of mitigation measures (i.e. status is unlikely to improve).

Following these principles, the frequency of monitoring of river macroinvertebrates will be reduced to once every six years at a selection of stable river sites and the frequency of monitoring of lake fish will also be reduced to once every six years at a selection of stable lakes.

Box 2. Red Dot+ Notification Programme

The Red Dot Programme was established by the Environmental Protection Agency to identify seriously polluted sites and seek action to improve them. In 2019, the programme was extended by introducing an early notification system whereby the relevant public body (e.g. the Local Authority) would be notified of any serious pollution event observed by the EPA during their river monitoring activities. The purpose of the Red Dot+ notification programme is to ensure that information on serious pollution gets to the relevant public body in a timely manner to allow action to be taken. Once identified as a Red Dot+ site the EPA will continue to monitor that site on an annual basis until evidence of recovery from pollution is detected.

Drinking Water Abstraction Points

For lakes with drinking waters abstraction points the frequency of monitoring is determined by the size of the human population served (Table 11). Lake monitoring sites in the vicinity of drinking water abstraction points will be monitored at a frequency of 4, 8 or 12 times per annum depending on the size of the population served as specified in Annex V of the WFD.

Table 11: Frequency of monitoring at Lake sites used as a drinking water abstraction points

Community served	Frequency
< 10 000	4 per year
10 000 to 30 000	8 per year
> 30 000	12 per year.

Groundwater

Physio-chemical parameters in groundwater will be monitored at a frequency of three samples per year, annually, in both the operational and surveillance programmes. Priority substances and relevant pollutants will be monitored during one year of the river basin management plan cycle or as dictated by risk.

Data loggers have been installed at all quantitative monitoring locations to allow continuous (15 minute) monitoring of changes in groundwater levels.

9. USE OF NEW TECHNOLOGIES

Since its inception in 2006 there have been a number of technological developments which can be used to monitor the health of the aquatic environment. These technologies include the use of aerial and underwater drones, earth observation imagery obtained from satellites, and the use of passive samplers to collect information on chemical pollutants over time. Developments in information technology are also playing a role in ensuring that environmental information collected in the field using ruggedized tablets or electronic data loggers is being collected and transmitted in near real-time across networked systems. The different technologies that will be used in the programme and their specific practical application is indicated in Table 12.

The use of other technologies, such as environmental DNA (e-DNA), is currently being examined through specific research projects funded by the EPA and the use of this technology by other national agencies is also being examined by the EPA. For example, the Environment Agency in England, and SEPA in Scotland, are currently trialling the use of e-DNA to assess freshwater diatom and fish populations, respectively.

Table 12: Use of technology in the WFD monitoring programme 2022-2027

Technology	Water Category	Practical Application
Satellite Remote Sensing (Copernicus)	Lakes, transitional and coastal waters	Assessing the ecological status of lake macrophytes Mapping the extent of intertidal seaweed blooms in transitional waters Measuring phytoplankton biomass in coastal waters
Aerial and underwater drones	Lakes and transitional waters	Aerial verification of field-based lake hydromorphology assessments. Support for lake macrophyte assessments Measuring the spatial extent of seagrass habitats Collection of water samples from lakes
Chemical passive samplers	Surface waters and groundwaters	Used to screen for the presence of certain priority substances
Networked field tablets and data loggers	All categories	Near real-time capture of field data
In situ monitoring buoys	Lakes, transitional and coastal waters	Extended real-time monitoring of general-physico chemical parameters
Automated field water samplers triggered by real-time remote monitoring	Rivers	Improved supporting physico-chemistry sampling data for biological assessments

10. CLIMATE CHANGE AND OTHER CONSIDERATIONS

Ireland's aquatic environment will be impacted by climate change. The information collected in the national monitoring programme can be used to identify those water bodies that are likely to be most vulnerable to these changes and to detect the direct impacts of climate change.

The climate change variables that will be collected in the programme are shown in Table 13 together with an explanation of the relevance of this information in identifying water bodies potentially at risk from climate change or in detecting the direct effects of climate change on these different water categories.

This information and its assessment can be used to assist other public authorities who are involved in implementing mitigation measures to protect Ireland's surface and groundwater resources from the impacts of climate change. Under the National Climate Change Adaptation Framework, public authorities such as local authorities and state agencies have started to develop and implement adaptation strategies to respond to the changes that climate change will bring.

The information collected in respect of the environmental variables shown in Table 13 will be further examined and where possible, indicators, based on this information, will be developed to help identify water bodies that are most at risk from climate change. This information can then be used by the relevant public authorities to help determine what mitigation can be put in place to reduce this risk or impact. For example, Inland Fisheries Ireland, have embarked on a long-term research project to better understand how climate change is likely to impact on our native fish species and habitats and to find ways of reducing this impact.

Another important consideration is to ensure that the assessment methods currently being used to assess water status are still applicable under different climate change scenarios. For example, will reference conditions change under different climate change outcomes and will this affect the methods that are currently used to assess status? This topic is currently being discussed at a European level and Ecostat, the European working group who oversees the technical implementation of the Directive, is currently drafting a guidance document on the potential implications of climate change on WFD assessment methodologies and other related aspects.

Table 13: Potential climate change related variables collected in the programme

Variable	Water Category	Indicator of change	Potential Impact
Water temperature	Rivers, lakes and transitional waters	Increase in water temperature	Thermal stress; reduced oxygen levels; enhanced promotion of algal blooms
Flow regime	Rivers	Change in river flow regime	Low flows can increase pollution risk and lead to river fragmentation. High flows can cause erosion and affect the migration of some freshwater species.
Residence time	Lakes and transitional waters	Change in water residence time (i.e. the length of time a parcel of water spends in a water body)	Significant change in residence time can promote algal blooms and change the pattern of nutrient delivery to receiving waters.
Continuity/ connectivity	Rivers	Occurrence of very low river levels and rivers running dry	Fragmentation of aquatic ecosystems, loss of connectivity.
Bathymetry	Lakes	Change in water body volume	Shallow water bodies with smaller volumes are likely to be more sensitive to climate fluctuations than deeper water bodies with greater volume
Stratification	Lakes, transitional waters and coastal waters	Change in the strength and duration of water column stratification	Change in stratification patterns may impact on availability of dissolved oxygen concentrations
Deoxygenation	Rivers, lakes and transitional waters	Decrease in dissolved oxygen concentration	Impact on biodiversity and nutrient biogeochemistry
Nutrient delivery	Rivers, lakes and transitional waters	Increase in nutrient delivery to receiving waters due to increased precipitation	Increase in algal blooms resulting in potential deoxygenation and production of algal toxins
Biological Indicators	Rivers, lakes, transitional and coastal	Change in the timing of seasonal bloom events due to the earlier onset of water column stratification. Change in the composition of biological communities (shift from cold water species to more temperature tolerant species).	Change in community composition, loss of species diversity, disturbance in aquatic food chains, loss of resilience

11. DATA DISSEMINATION, QUALITY CONTROL AND CONFIDENCE

Data Management and Reporting

Systems have been put in place to improve the sharing and reporting of environmental data collected by the various organisations involved in the programme. These systems form part of an environmental data exchange network known as EDEN which facilitates the timely web-based reporting of monitoring results. Local authorities and other organisations have used EDEN since 2008 to report and share data. This data together with the data generated by the EPA is assessed and quality controlled before being reported to Europe.

The data collected by the programme can be viewed and analysed on the WFD Application. The WFD App, for short, provides a single point of access not only to monitoring data but to a database of GIS referenced catchment layers. The Application is accessible through EDEN https://wfd.edenireland.ie/ and is available to EPA staff and EPA-funded researchers, as well as staff in other public agencies.

The specific details in terms of lists of water bodies to be monitored in each water category, the quality elements to be monitored and their frequency is also provided on the WFD Application while the location of national surface and groundwater monitoring stations can be viewed on EPA Maps (https://gis.epa.ie/EPAMaps/).

WFD data can be viewed by the public on www.catchments.ie which includes information on WFD Status (including individual quality elements), WFD Risk, the WFD monitoring programme and also chemistry downloads for all water bodies. The EPA has published Catchment Assessments for each catchment at https://www.catchments.ie/data. WFD data can be downloaded by the public at https://gis.epa.ie/GetData and WFD Open Data APIs are available here: https://data.epa.ie/api-list/wfd-open-data/

Quality Control and Quality Assurance

A comprehensive Quality Control/Quality Assurance system has been put in place to ensure that the data generated by the programme is reliable and of sufficient accuracy and precision.

Each laboratory facility involved in WFD monitoring has put in place a documented Quality Assurance programme covering sample collection, transportation and analysis. Laboratories are required to develop systems capable of meeting the requirements of the current version of I.S. EN ISO 17025 "General requirements for the competence of testing and calibration laboratories". The Irish National Accreditation Board (INAB) undertakes assessment to this standard.

The technical specifications for chemical analysis and monitoring of water status are followed where methods allow (Directive 2009/90/EC). The minimum performance criteria, in terms of level of uncertainty and limit of quantification, have been established for a large range of physico-chemical parameters that are routinely monitored as part of the programme.

Field monitoring and sampling follows international standards and best practice (e.g. European CEN Standards). Standard operating procedures are in place for the sampling and analysis of all monitored biological elements. Personnel involved in the taxonomic species identification participate in international quality control schemes and inter-comparisons such

as the NE Atlantic Marine Biological Analytical Quality Control (NMBAQC) Scheme and the UK and Ireland Diatom Ring Test Scheme. Personnel also undertake regular training and participate in annual harmonisation exercises.

Confidence and Precision in Classification Results

In addition to providing confidence in the accuracy and precision of laboratory results, the confidence and precision in the classification of water status into one of the five WFD classes (i.e. high, good, moderate, poor and bad) is also determined. Statistical methods exist to provide information on the level of confidence that can be associated with the status classification for the majority of individual quality elements assessed in each of the water categories. The EPA have produced a technical document which explains how confidence in assessment was assessed for the purposes of reporting water status nationally and to Europe.

12. RESPONSIBILITY OF PUBLIC AUTHORITIES

The programme lists the specified authorities to implement the monitoring programme and there is a statutory obligation on the nominated authorities to undertake the monitoring assigned to them (Table 14). The principal rationale determining the assignment of a monitoring responsibility to a public authority was the established expertise, competency and capacity of the public authority to perform the task. For the biological, hydromorphological and physicochemical parameters, the assigned public authorities have been involved in the assessment of these parameters for several decades.

Table 14: Nominated authorities for elements of the surveillance and operational monitoring programmes

Element	Rivers	Lakes	Transitional and Coastal	Ground-water	Canals	Data Processing	Reporting
Phytoplankton	-	EPA	EPA, MI	-		EPA	EPA
Macrophytes	EPA	EPA	EPA	-	WI	EPA	EPA
Benthic Algae	EPA	EPA	-	-		EPA	EPA
Macro-invertebrates	EPA	EPA	MI	-	WI	EPA	EPA
Fish	IFI	IFI	IFI	-	IFI	IFI	IFI
Hydro-morphology	EPA, OPW	EPA	EPA, MI	-	EPA, WI	EPA	EPA
Physico-Chemical	LA, EPA	LA, EPA	EPA, MI	EPA	WI	EPA	EPA
Priority substances, river basin specific pollutants and other relevant pollutants	LA, EPA	LA, EPA	MI	EPA		EPA, MI	EPA

EPA = Environmental Protection Agency; IFI = Inland Fisheries Ireland; LA = Local Authorities; MI = Marine Institute; OPW = Office of Public Works; WI = Waterways Ireland

13. UPDATING THE PROGRAMME

The national WFD monitoring programme 2022-2027 for surface water and groundwater is available through the WFD Application which is accessible through EDEN https://wfd.edenireland.ie/. The content of this programme, in terms of individual stations and elements monitored, may be subject to periodic change, but will continue to be in keeping with the overall structure, frequency and extent of the programme as set out following this review. Changes to the programme will be made known to the relevant public bodies and interested parties and these changes will be updated via the WFD App.

14. REFERENCES

EPA (Environmental Protection Agency), 2006. Water Framework Directive Monitoring Programme. EPA, Wexford, Ireland.

EPA (Environmental Protection Agency), 2021. Ireland's National Water Framework Directive Monitoring Programme, 2019-2021. Environmental Protection Agency, Wexford. 47 pp.

https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/irelands-national-water-framework-directive-monitoring-programme-2019-2021.php

AN GHNÍOMHAIREACHT UM CHAOMHNÚ COMHSHAOIL

Tá an GCC freagrach as an gcomhshaol a chosaint agus a fheabhsú, mar shócmhainn luachmhar do mhuintir na hÉireann. Táimid tiomanta do dhaoine agus don chomhshaol a chosaint ar thionchar díobhálach na radaíochta agus an truaillithe.

Is féidir obair na Gníomhaireachta a roinnt ina trí phríomhréimse:

Rialáil: *Rialáil agus córais chomhlíonta comhshaoil éifeachtacha a chur i bhfeidhm, chun dea-thorthaí comhshaoil a bhaint amach agus díriú orthu siúd nach mbíonn ag cloí leo.*

Eolas: *Sonraí, eolas agus measúnú ardchaighdeáin, spriocdhírithe agus tráthúil a chur ar fáil i leith an chomhshaoil chun bonn eolais a chur faoin gcinnteoireacht.*

Abhcóideacht: *Ag obair le daoine eile ar son timpeallachta glaine, táirgiúla agus dea-chosanta agus ar son cleachtas inbhuanaithe i dtaobh an chomhshaoil.*

I measc ár gcuid freagrachtaí tá:

Ceadúnú

- Gníomhaíochtaí tionscail, dramhaíola agus stórála peitril ar scála mór;
- Sceitheadh fuíolluisce uirbigh;
- Úsáid shrianta agus scaoileadh rialaithe Orgánach Géinmhodhnaithe;
- Foinsí radaíochta ianúcháin;
- Astaíochtaí gás ceaptha teasa ó thionscal agus ón eitlíocht trí Scéim an AE um Thrádáil Astaíochtaí.

Forfheidhmiú Náisiúnta i leith Cúrsaí Comhshaoil

- Iniúchadh agus cigireacht ar shaoráidí a bhfuil ceadúnas acu ón GCC;
- Cur i bhfeidhm an dea-chleachtais a stiúradh i ngníomhaíochtaí agus i saoráidí rialáilte;
- Maoirseacht a dhéanamh ar fhreagrachtaí an údaráis áitiúil as cosaint an chomhshaoil;
- Caighdeán an uisce óil phoiblí a rialáil agus údaruithe um sceitheadh fuíolluisce uirbigh a fhorfheidhmiú
- Caighdeán an uisce óil phoiblí agus phríobháidigh a mheasúnú agus tuairisciú air;
- Comhordú a dhéanamh ar líonra d'eagraíochtaí seirbhíse poiblí chun tacú le gníomhú i gcoinne coireachta comhshaoil;
- An dlí a chur orthu siúd a bhriseann dlí an chomhshaoil agus a dhéanann dochar don chomhshaol.

Bainistíocht Dramhaíola agus Ceimiceáin sa Chomhshaol

- Rialacháin dramhaíola a chur i bhfeidhm agus a fhorfheidhmiú lena n-áirítear saincheisteanna forfheidhmithe náisiúnta;
- Staitisticí dramhaíola náisiúnta a ullmhú agus a fhoilsiú chomh maith leis an bPlean Náisiúnta um Bainistíocht Dramhaíola Guaisí;
- An Clár Náisiúnta um Chosc Dramhaíola a fhorbairt agus a chur i bhfeidhm;
- Reachtaíocht ar rialú ceimiceán sa timpeallacht a chur i bhfeidhm agus tuairisciú ar an reachtaíocht sin.

Bainistíocht Uisce

- Plé le struchtúir náisiúnta agus réigiúnacha rialachais agus oibriúcháin chun an Chreat-treoir Uisce a chur i bhfeidhm;
- Monatóireacht, measúnú agus tuairisciú a dhéanamh ar chaighdeán aibhneacha, lochanna, uiscí idirchreasa agus cósta, uiscí snámha agus screamhuisce chomh maith le tomhas ar leibhéil uisce agus sreabhadh abhann.

Eolaíocht Aeráide & Athrú Aeráide

- Fardail agus réamh-mheastacháin a fhoilsiú um astaíochtaí gás ceaptha teasa na hÉireann;
- Rúnaíocht a chur ar fáil don Chomhairle Chomhairleach ar Athrú Aeráide agus tacaíocht a thabhairt don Idirphlé Náisiúnta ar Ghníomhú ar son na hAeráide;
- Tacú le gníomhaíochtaí forbartha Náisiúnta, AE agus NA um Eolaíocht agus Beartas Aeráide.

Monatóireacht & Measúnú ar an gComhshaol

- Córais náisiúnta um monatóireacht an chomhshaoil a cheapadh agus a chur i bhfeidhm: teicneolaíocht, bainistíocht sonraí, anailís agus réamhaisnéisiú;
- Tuairiscí ar Staid Thimpeallacht na hÉireann agus ar Tháscairí a chur ar fáil;
- Monatóireacht a dhéanamh ar chaighdeán an aeir agus Treoir an AE i leith Aeir Ghlain don Eoraip a chur i bhfeidhm chomh maith leis an gCoinbhinsiún ar Aerthruailliú Fadraoin Trasteorann, agus an Treoir i leith na Teorann Náisiúnta Astaíochtaí;
- Maoirseacht a dhéanamh ar chur i bhfeidhm na Treorach i leith Torainn Timpeallachta;
- Measúnú a dhéanamh ar thionchar pleananna agus clár beartaithe ar chomhshaol na hÉireann.

Taighde agus Forbairt Comhshaoil

- Comhordú a dhéanamh ar ghníomhaíochtaí taighde comhshaoil agus iad a mhaoiniú chun brú a aithint, bonn eolais a chur faoin mbeartas agus réitigh a chur ar fáil;
- Comhoibriú le gníomhaíocht náisiúnta agus AE um thaighde comhshaoil.

Cosaint Raideolaíoch

- Monatóireacht a dhéanamh ar leibhéil radaíochta agus nochtadh an phobail do radaíocht ianúcháin agus do réimsí leictreamaighnéadacha a mheas;
- Cabhrú le pleananna náisiúnta a fhorbairt le haghaidh éigeandálaí ag eascairt as taismí núicléacha;
- Monatóireacht a dhéanamh ar fhorbairtí thar lear a bhaineann le saoráidí núicléacha agus leis an tsábháilteacht raideolaíochta;
- Sainseirbhísí um chosaint ar an radaíocht a sholáthar, nó maoirsiú a dhéanamh ar sholáthar na seirbhísí sin.

Treoir, Ardú Feasachta agus Faisnéis Inrochtana

- Tuairisciú, comhairle agus treoir neamhspleách, fianaise-bhunaithe a chur ar fáil don Rialtas, don tionscal agus don phobal ar ábhair maidir le cosaint comhshaoil agus raideolaíoch;
- An nasc idir sláinte agus folláine, an geilleagar agus timpeallacht ghlan a chur chun cinn;
- Feasacht comhshaoil a chur chun cinn lena n-áirítear tacú le hiompraíocht um éifeachtúlacht acmhainní agus aistriú aeráide;
- Tástáil radóin a chur chun cinn i dtithe agus in ionaid oibre agus feabhsúchán a mholadh áit is gá.

Comhpháirtíocht agus líonrú

- Oibriú le gníomhaireachtaí idirnáisiúnta agus náisiúnta, údaráis réigiúnacha agus áitiúla, eagraíochtaí neamhrialtais, comhlachtaí ionadaíocha agus ranna rialtais chun cosaint chomhshaoil agus raideolaíoch a chur ar fáil, chomh maith le taighde, comhordú agus cinnteoireacht bunaithe ar an eolaíocht.

Bainistíocht agus struchtúr na Gníomhaireachta um Chaomhnú Comhshaoil

Tá an GCC á bainistiú ag Bord lánaimseartha, ar a bhfuil Ard-Stiúrthóir agus cúigear Stiúrthóir. Déantar an obair ar fud cúig cinn d'Oifigí:

- An Oifig um Inbhunaitheacht i leith Cúrsaí Comhshaoil
- An Oifig Forfheidhmithe i leith Cúrsaí Comhshaoil
- An Oifig um Fhianaise agus Measúnú
- An Oifig um Chosaint ar Radaíocht agus Monatóireacht Comhshaoil
- An Oifig Cumarsáide agus Seirbhísí Corparáideacha

Tugann coistí comhairleacha cabhair don Ghníomhaireacht agus tagann siad le chéile go rialta le plé a dhéanamh ar ábhair imní agus le comhairle a chur ar an mBord.

Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

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