Environmental Protection Agency
An Ghníomhaireacht um Chaomhnú Comhshaoil

Water Quality in Ireland

2019-2024

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 wastewater 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.

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- 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 wastewater 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.

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- 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.

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- 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.

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- 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.

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

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- 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.

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Executive Summary

This report provides an assessment of the condition of Ireland's waters (rivers, lakes, canals, groundwaters, transitional (estuaries) and coastal waters) against the objectives and standards set out in the Water Framework Directive and Ireland's River Basin Management Plan (Water Action Plan 2024)[1].

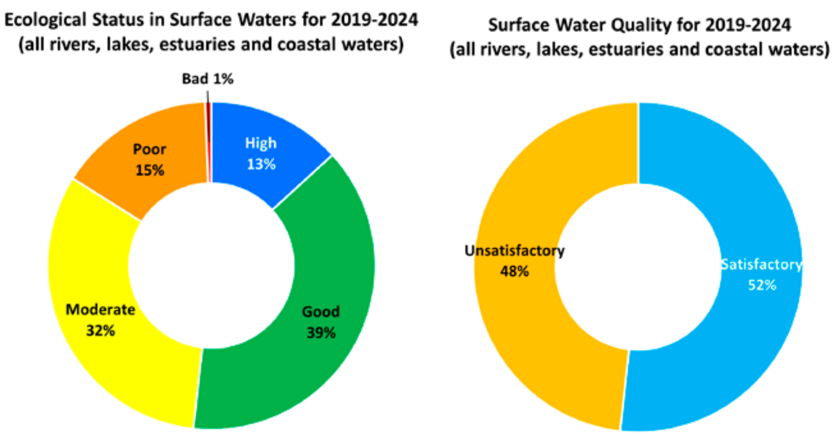
The assessments are made using data collected from over 4000 surface water bodies and 514 ground water bodies between 2019 and 2024. Comparisons are made between the results from this period and those before to give insight into trends in the condition of our waters over time.

How Healthy are our Waters?

Ecological Status

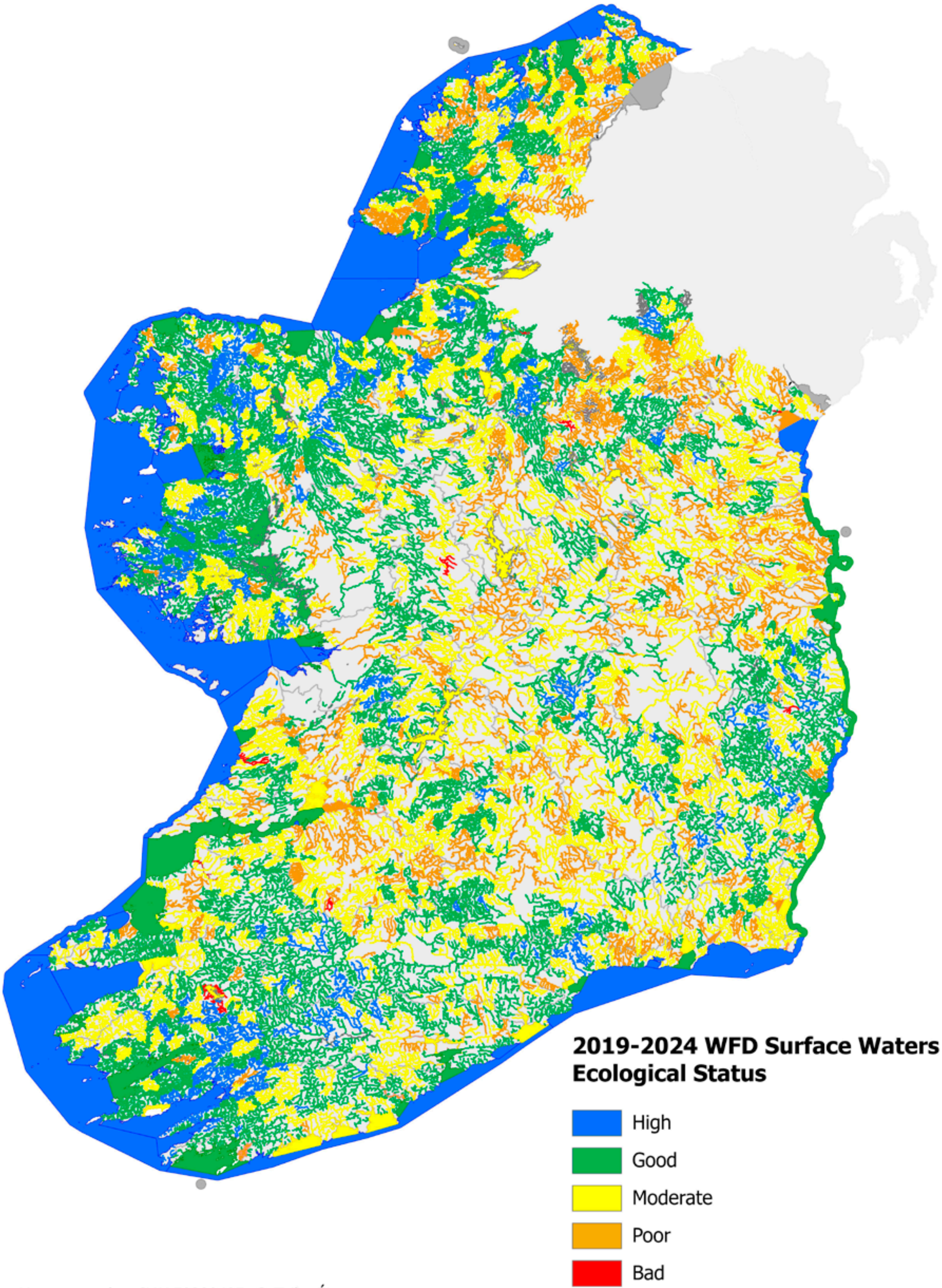
This assessment shows that over half (52%) of our surface waters are in satisfactory ecological health being in either good or high ecological status. This means that 48% of the surface water bodies in Ireland are not as ecologically healthy or resilient as they should be. This is a decline from the previous assessment when 54% were satisfactory.

Proportion of all surface water bodies in each ecological status class 2019-2024



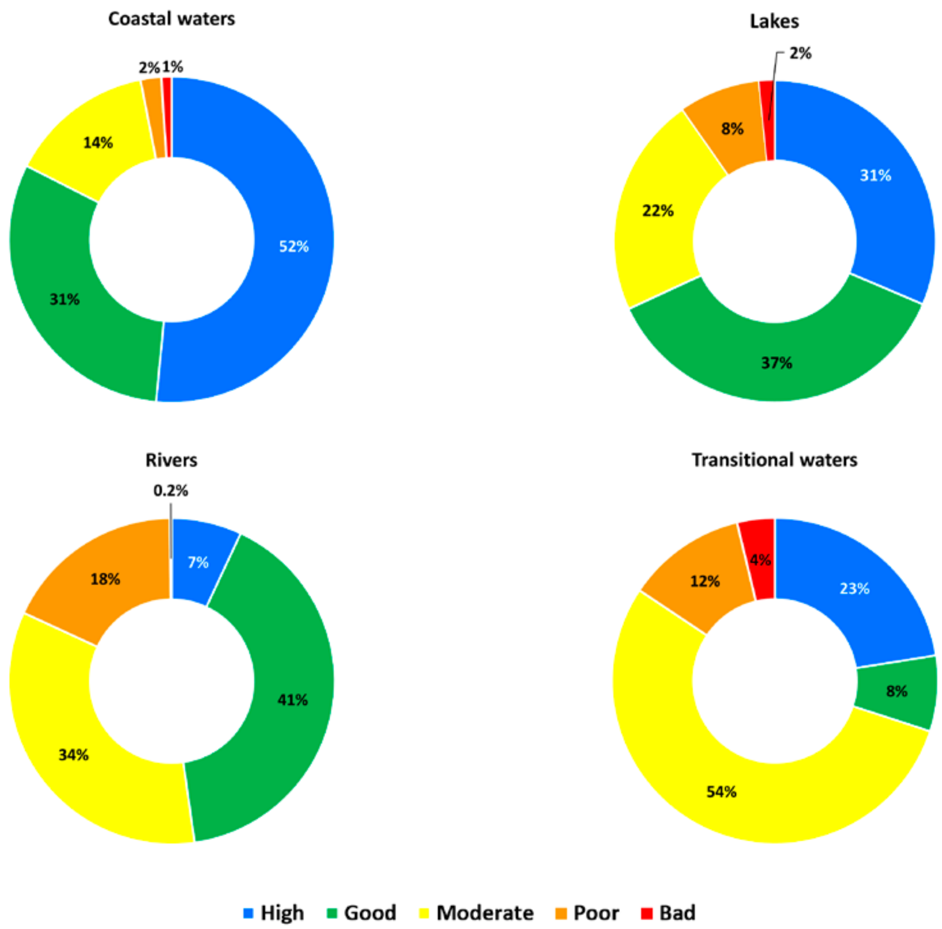
1 https://www.gov.ie/en/department-of-housing-local-government-and-heritage/policy-information/river-basin-management-plan-2022-2027/

Surface water ecological status 2019-2024



Coastal waters had the highest percentage of waters in high or good ecological status (82%) followed by lakes (68%), rivers (48%) and transitional waters (30%), which have the worst water quality.

Proportion of surface water bodies across categories in each ecological status class 2019-2024



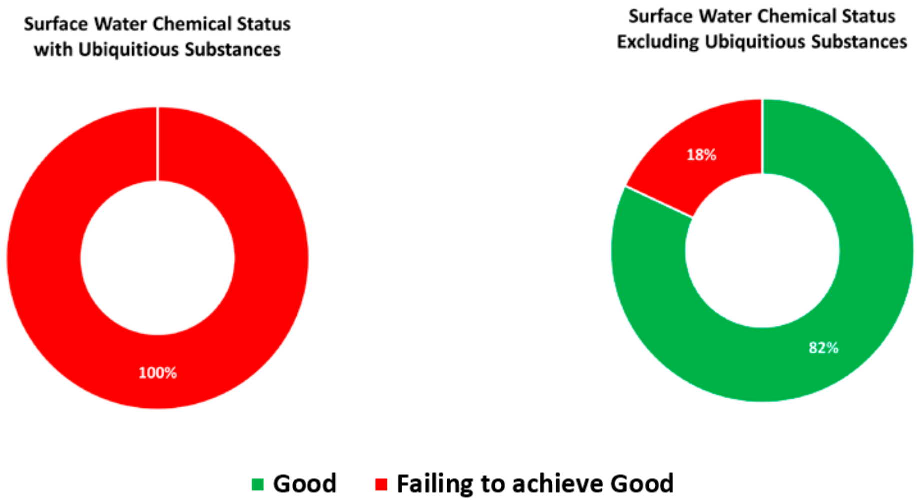
Chemical Status

All surface water bodies failed to achieve good chemical status in 2019-2024 when the assessment included what are known as ubiquitous substances. Ubiquitous substances are found nearly everywhere in the environment and they persist in the environment for many years after their use has ceased. Many of the failures were due to the presence of Poly Brominated Diphenyl Ethers (PBDEs) and mercury in fish, which were found at concentrations above environmental standards almost everywhere where they were monitored for. These are both ubiquitous substances and their use is restricted. PBDEs are banned in Europe (since 2010), while Ireland is signatory to the Minamata Convention that has led to many mercury containing materials being phased out.

When ubiquitous substances (PBDEs and mercury in fish) are excluded, only 18% of surface water bodies fail to achieve good chemical status, indicating 82% are in good chemical status. Mercury in water and other metals in water, pesticides, and per- and poly-fluoroalkyl (PFAS) chemicals in water are the main causes of non-ubiquitous failures.

The information on chemical status is presented in this way to help identify those water bodies which are being impacted by non-ubiquitous substances likely to have come from local sources. These water bodies may benefit from measures to eradicate these substances from the environment.

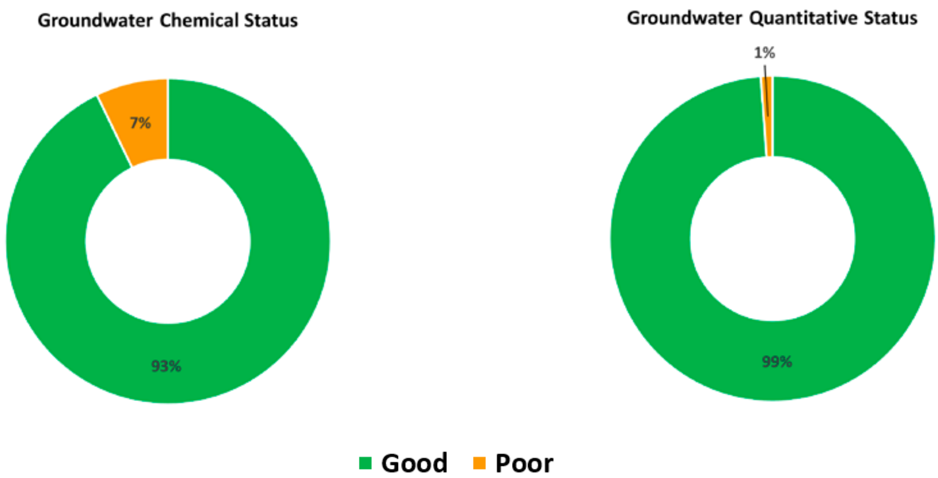
Surface water chemical status; including and excluding ubiquitous substances



Groundwater – Chemical and Quantitative Status

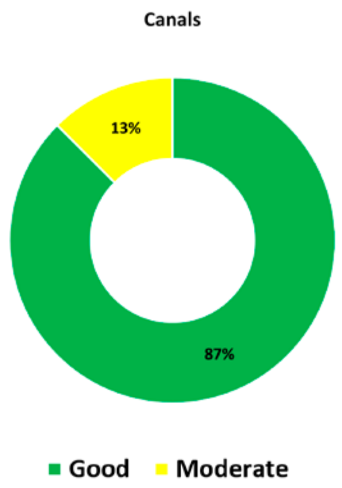
With a few localised exceptions, the quality of groundwater in Ireland is generally good. 93% of groundwater bodies are in good chemical status and 99% are in good quantitative status. Overall, 92% met both objectives, accounting for 95% of the country (68,012 km^2) by area. Groundwater quality in the country has been stable generally, with nine groundwater bodies improving to good status and eight groundwater bodies declining to poor status.

Chemical and quantitative status of groundwaters



Canals – Ecological Potential

Water quality in the canals is generally relatively good with 87% of canal water bodies achieving good ecological potential in 2019-2024. This is a slight decline since the last assessment (2016-2021) with one fewer water body achieving good ecological potential.



Is Water Quality Improving or Declining?

In the latest assessment, covering the years 2019 to 2024, the number of water bodies in satisfactory condition (high or good status) across rivers, lakes, estuaries and canals declined since the last assessment which covered the period 2016-2021. In contrast, coastal waters and groundwaters improved slightly over the assessment period. Overall, there has been a net decline in our water quality. The slight decline reported in this assessment reflects the ongoing pattern of continuing declines in water quality seen since the first assessment of ecological status was undertaken in the period 2007-2009.

Rivers: There has been a **2% decline** (79 water bodies) in the number of river water bodies in satisfactory condition.

Lakes: There has been **0.5% decline** (4 water bodies) in the number of lake water bodies in satisfactory condition. The majority of high and good ecological status lakes are found in the southwest, west and northwest of the country. The catchments with the highest percentage of lakes with unsatisfactory water quality are situated in the northeast.

Estuaries: There has been **5% decline** (7 water bodies) in the number of estuarine water bodies in satisfactory condition. This decline is most evident in the south and south west of the country.

Coastal waters: There has been a **1% improvement** (1 water body) in the number of coastal water bodies in satisfactory condition**.**

Canals: 87% of canal water bodies assessed achieved good ecological potential, representing a decline in one canal water body.

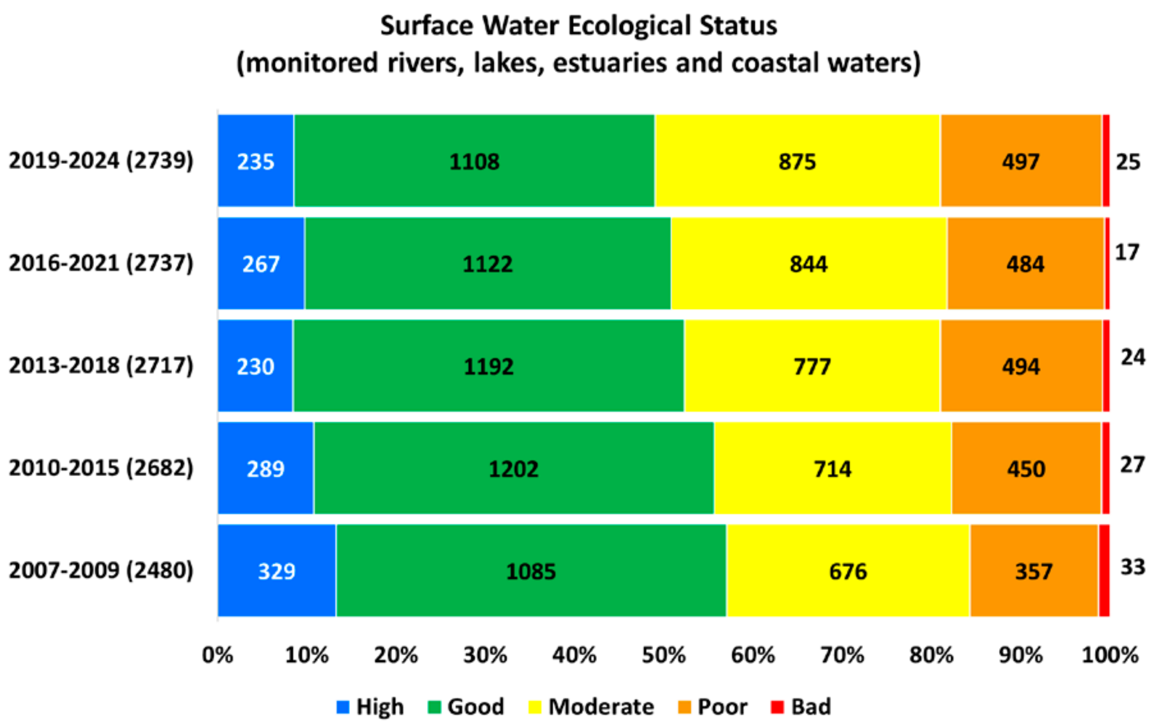
Groundwater: There has been a **0.2% improvement** in the quality of our groundwaters with just over **8%** of groundwater bodies (1 water body) in poor condition.

High Status Objective Waters: We are failing to protect our highest quality water bodies; only **42%** of 402 water bodies which should be at high status are achieving that standard.

Fish Kills: There were 142 fish kills recorded, an average of 24 per year, from 2019 to 2024. Any fish kill is unacceptable, and their causes need to be identified and prevented.

Priority Areas for Action: There is evidence that within the Priority Areas for Action, where actions are being coordinated and targeted, phosphorus concentrations are reducing and on average have reached the levels required to support good ecological status. Ecological status has not yet improved overall in these areas but the reductions in phosphorus are a welcome first step. Further assessment to relate specific actions that have been implemented to the water quality improvements in these areas is essential to help assess the effectiveness of measures.

Ecological status of monitored surface water bodies across each of the main assessment periods from the first assessment in 2007-2009 to the present assessment period (number of water bodies indicated)



What are the Problems?

The quality of our freshwater and marine ecosystems is being damaged by activities that release pollutants into the water environment and damage the physical integrity of water habitats.

The main causes are:

- Run-off of nutrients, sediment and pesticides from agricultural lands and farmyards;
- Activities such as land drainage, dredging and the presence of barriers such as dams, weirs or culverts in water courses;
- Discharges of poorly treated sewage from urban waste water treatment plants, domestic treatment systems and storm water overflows;
- Run-off from hard surfaces in urban environments of sediment and contaminant loaded water;
- Run-off of nutrients and sediment from forestry operations.

Excess nutrients such as nitrogen and phosphorus entering our waters cause increased growth of plants and algae. When photosynthesis is most active this increases oxygen saturation, but at night the opposite occurs. The oxygen saturation may drop to a level that harms other aquatic life such as insects and fish. Additionally, when excess plant material dies the increased organic material in the water can facilitate bacterial decomposition leading to further drops in oxygen availability.

The concentration of nutrients in many of our waters is too high. 44% of river sites, mostly in the south and southeast of the country, have high nitrate concentrations while over a quarter of river sites (27%) and a third of lakes (32%) have elevated phosphorus concentrations. Phosphorus levels are particularly high in lakes in the northeast of the country.

Transitional and coastal water bodies are the ultimate receptors of the excess nutrients in our rivers and lakes. The amounts of nitrogen and phosphorus flowing into our estuaries have been too high in recent decades and the ecology of our estuaries, particularly in the south and southeast has declined precipitously as a result. Transitional water bodies are in the poorest condition of any water body type with 70% in unsatisfactory condition which is a 5% decline on the previous assessment.

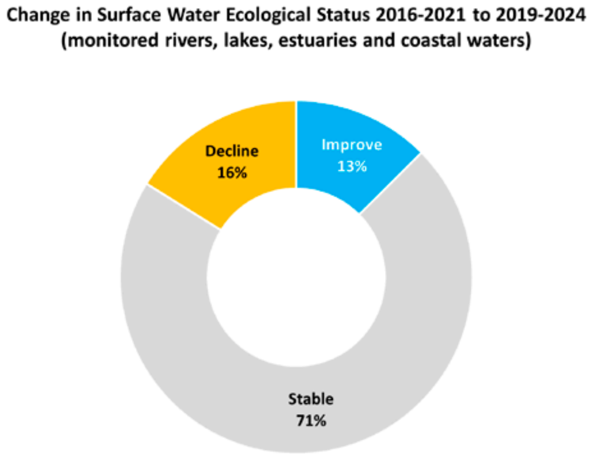
Many of our water bodies are being damaged by activities that alter their physical shape, flow or form or how they function within their surrounding landscapes. These changes, referred to as hydromorphological alterations, are most common in our river and estuarine water bodies. Physical barriers such as dams, weirs or culverts can block the movement of fish and other wildlife and alter natural sediment transport patterns, while activities such as land drainage and dredging can result in the loss of important habitats. Over 450 surface water bodies are known to be affected by these activities and modifications.

All our surface water bodies are impacted by chemical pollution. This is mostly owing to the presence of ubiquitous substances, such as Poly Brominated Diphenyl Ethers (PBDEs) and mercury in fish, which were found at concentrations above accepted environmental standards. These substances are known as ubiquitous substances because they can be found nearly everywhere in the environment. 18% of our surface waters are impacted by non-ubiquitous substances. These substances include Polycyclic Aromatic Hydrocarbons (PAHs), heavy metals such as mercury, cadmium, nickel and lead in water, pesticides like cypermethrin, and other chemicals such as perfluoro-octanyl sulphonic acid (PFOS) in water.

As with our rivers and marine environment, nitrate concentrations are too high at many of our groundwaters, especially in the south east region and midlands and eastern region of the country. Historical contamination from point sources, including mines, landfills and industry, are driving failures in chemical status in 29 groundwater bodies, while abstraction pressures at 7 groundwater bodies are responsible for quantitative status failures.

While our waters are being impacted by numerous human activities it is important to point out that water quality is improving in some places. However, in many cases these improvements are not sufficient to bring a water body into satisfactory condition and the number of water bodies improving in status is exceeded by the number of water bodies declining. The result being that any improvements in water quality are being offset by declines occurring elsewhere.

Change in ecological status of monitored surface waters from 2016-2021 to 2019-2024



What Needs to be Done?

Water quality continues to be under pressure from various human activities. This is particularly evident in our estuaries which are in the worst condition overall, and have seen the largest proportional decline in quality since the previous assessment.

The evidence presented in this report shows that the goal of restoring all waters to good status by 2027 is not going to be achieved. There are many actions underway to improve water quality. However, the improvements we are seeing in some places, across all sectors, are being cancelled out by declines elsewhere. In order to achieve ecological improvements nationally, the scale and pace of implementation needs to be increased. Ireland needs to take significant actions which include the following:

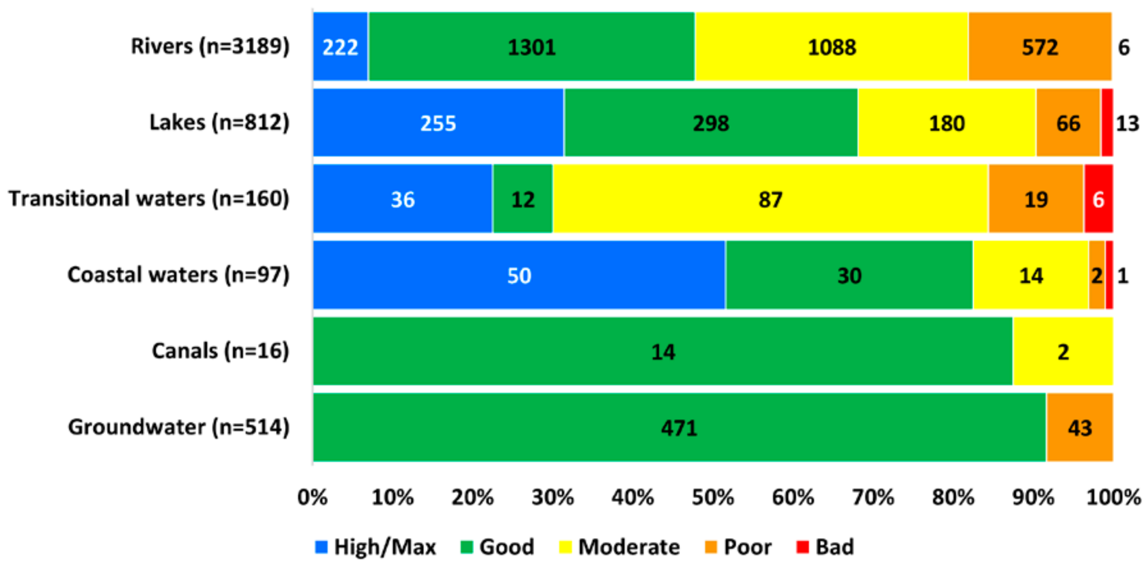
- Coordinated implementation and tracking of River Basin Management Plan actions, through Sectoral and Catchment Management Plans.
- Improved data sharing and integration between implementing bodies, water quality programmes and state agencies.
- Targeted measures to address the pressures and issues, specific to each water body.
- Measure effectiveness needs be quantified, communicated and shared.
- The Nitrates Action Programme must deliver reductions in nutrient losses to our waters.
- Accelerated and sustained investment is needed by Uisce Éireann.
- A regulatory framework for the protection of waters from hydromorphological pressures is urgently needed.

Main Findings

Overall

- 52% of our surface waters are in high or good ecological status and the remaining 48% are in moderate, poor or bad status. This represents a slight decline since the 2016-2021 assessment when 54% of surface waters were in high or good status.
- 100% of surface water bodies failed to achieve good chemical status when failures for ubiquitous substances such as mercury in fish and Poly Brominated Diphenyl Ethers (PBDEs) are included in the assessment. When ubiquitous substances are not included, 82% of surface water bodies are in good chemical status.
- 92% of groundwaters are in good status.

Surface Water Ecological Status or Potential Assessed in Surface Waters and Groundwaters for 2019-2024



Rivers

- Nationally, 48% of river water bodies are in high or good ecological status and just over 52% are unsatisfactory, moderate, poor or bad ecological status.
- The number of river water bodies in a satisfactory ecological status have declined by 2% since the 2016-2021 period.
- Nitrate concentrations are too high at 44% of rivers sites. These are predominantly located in the east, south east and south of the country. Despite this, concentrations of nitrate have reduced at 39% of sites when compared with 2016-2021. In contrast, 6% of river sites showed increasing concentrations, and 55% were unchanged.
- 27% of river sites have high phosphorus concentrations. Since the last assessment in 2016-2021, 16% of sites have increasing concentrations, 12% of sites showed reductions and 73% unchanged.

Lakes

- Nationally, 68% of lake water bodies were in a satisfactory ecological status (high or good) with 32% in unsatisfactory ecological (moderate, poor or bad status) condition.
- There has been a 0.5% decline in the number of lakes in satisfactory ecological status (high or good) since 2016-2021.
- A third (32%) of lakes have high phosphorus concentrations. Compared with the previous period, 2016-2021, 96% of sites have unchanged phosphorus concentrations, while 3% have increasing concentrations and 1% have concentrations that are reducing.

Transitional and Coastal Waters

- 30% of transitional water bodies (i.e. estuaries) are in high or good ecological status and 70% are in moderate, poor or bad ecological status.
- 82% of coastal water bodies are in high or good ecological status.
- There has been a 5% decline in transitional waters and a 2.4% improvement in monitored coastal water since 2016-2021.
- 20% of transitional and coastal water bodies have high nitrogen concentrations.
- Loadings of phosphorus and nitrogen to the marine environment have shown reductions in 2024 after a period of increases since 2013. The largest inputs are in the south east of the country and in many areas are still too high.

Chemical Status of Surface Waters

- 100% of surface water bodies failed to achieve good chemical status due to the presence of PBDEs and mercury in fish at concentrations above environmental standards.
- If failures for ubiquitous substance are omitted, then 18% of surface water bodies fail to achieve good chemical status.
- Most of the non-ubiquitous failures were due to mercury in water and other metals, pesticides and per- and poly-fluoroalkyl (PFAS) chemicals in water.

Groundwater

- 92% of groundwater bodies are in good chemical and good quantitative status.
- There has been a slight improvement of 0.2% (1 water body) in the number of groundwater bodies at good status since the last assessment.
- The south east, and midlands and eastern regions of the country have elevated nitrate concentrations, with an increase in nitrate concentration most notable in the midlands and eastern region.

Canals

- 14 (87%) of the 16 canal water bodies assessed are in good ecological potential.
- Water quality in the canals has declined slightly since the last assessment in 2016-2021, with one canal water body declining to unsatisfactory ecological potential.

Progress in Priority Areas for Action

- One of the key measures in the second and third river basin management plans was the creation of Priority Areas for Action (PAAs) within which actions are being targeted by the Local Authority Waters Programme (LAWPRO), the Agricultural Sustainability Support and Advice Programme (ASSAP) and other stakeholders to achieve water quality outcomes.
- While ecological status has not yet improved in the PAAs, there is evidence that phosphorus concentrations have improved which is a welcome first step. Ongoing and sustained actions will be needed by all stakeholders to maintain and continue this trajectory of progress. It is important that data on the specific measures being implemented are collated and related to the water quality outcomes to gain insights into the effectiveness of the measures.

1. Introduction

1. Introduction

1.1 About this Report

This is a report on the ecological and chemical status of Ireland's surface waters (rivers, lakes, canals and transitional (estuarine) and coastal waters) and the quantitative and chemical status of our groundwaters. This assessment is based on information collected over a 6-year period from 2019 to 2024 under Ireland's national water quality monitoring programme[2]. Information on monitoring and assessment are available in Box 1.1.

Clean, unpolluted water is essential to life, it supports healthy and thriving ecosystems that are a home for our many native plants and animals that enrich our lives daily. Unpolluted water is vital for our health and well-being, as well as supporting many important economic activities such as agriculture, manufacturing and tourism. Unfortunately, the quality, health and resilience of our waters and aquatic ecosystems is being damaged by many human activities that cause water pollution and impact on the physical integrity of water habitats. We need to reduce and halt pollution and the associated loss of healthy aquatic habitats and protect this vital national resource.

1.2 Data Sources and Methodology

There are over 4,800 identified water bodies in the state and just over two-thirds of these are included in Ireland's national water quality monitoring programme. Typically, rivers and estuaries are made up of several water bodies, whereas lakes and most coastal waters are represented by a single water body[3].

Water status is presented in this report on[4]:

- 3,189 river water bodies
- 812 lakes
- 160 transitional water bodies
- 97 coastal water bodies
- 514 groundwater bodies
- 16 canal water bodies

The public bodies involved in the collection of this information include the Environmental Protection Agency, Marine Institute, Inland Fisheries Ireland, Waterways Ireland, National Parks and Wildlife Service, Local Authority Waters Programme (LAWPRO), and Local Authorities.

2 https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/irelands-national-water-quality-monitoring-programme-20222027.php

3 A 'water body' is the basic assessment unit used in the WFD to check compliance against the environmental quality objectives that have been set; water bodies can have a single or multiple monitoring points called 'sites' or 'stations'.

4 Note that no ecological status was assigned to 54 water bodies: 3 rivers, 36 transitional waters and 15 coastal waters.

There are thousands of water bodies, so it is not possible to monitor all of them. However, to provide an accurate and complete picture of water quality across the country, unmonitored water bodies are classified using the information collected from monitored water bodies that have similar characteristics and pressures. Water body status is reported here for monitored and unmonitored rivers, lakes, transitional and coastal waters and groundwaters. When assessing water quality changes across multiple assessment periods, we use data from the monitored water bodies, as unmonitored water bodies have not always been classified in this way.

1.3 Accessing Information on Water Quality

The data presented in this report are available at a water body and monitoring station level via the www.catchments.ie website. In addition to providing access to data, the site provides access to a large range of information connected to our water environment including examples of good practice to help protect our local water catchments.

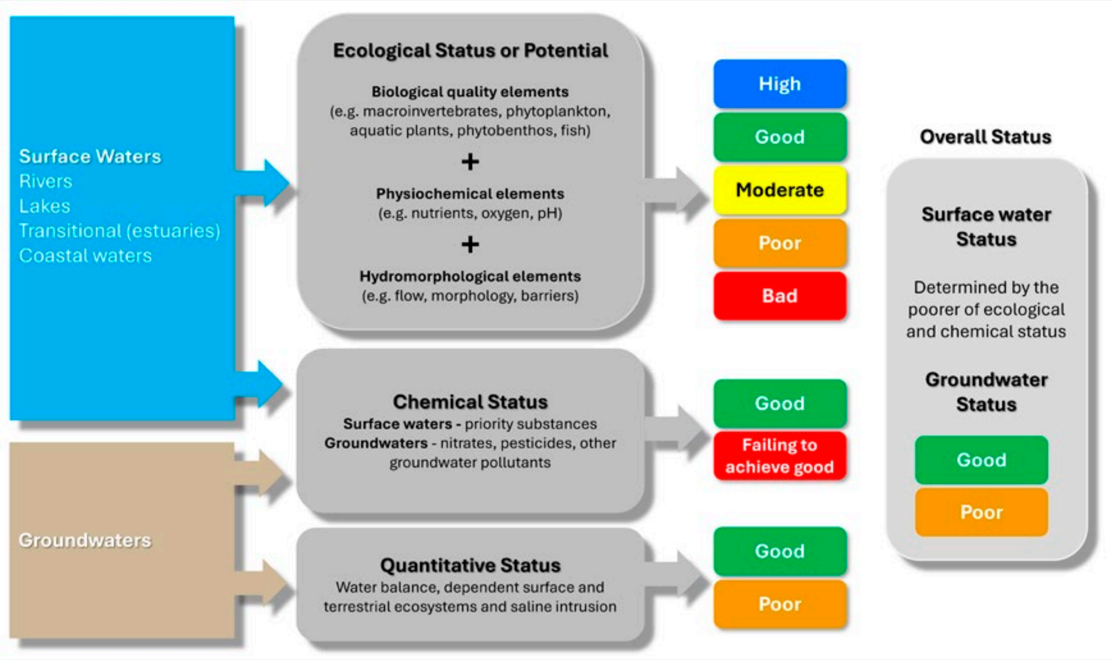
Information on how water quality In Ireland compares to that of Europe is also available on the European Environment Agency's website through its WISE Water Framework Directive Data Viewer (https://www.eea.europa.eu/data-and-maps/dashboards/wise-wfd).

Box 1.1 – Monitoring and Assessing Water Status

The information collected in Ireland's national water quality monitoring programme is used to assess the status of surface waters and groundwaters. Surface waters are classified by their ecological status (biology, water quality and hydromorphology combined) and chemical status (level of harmful chemicals in the water). Groundwaters are classified according to their chemical status and quantitative status (the amount of water present). The way this information is combined to provide an overall status of surface waters and groundwaters is illustrated below. The element with the lowest status in each step of the process determines the overall classification. This is called the 'one out, all out' principle.

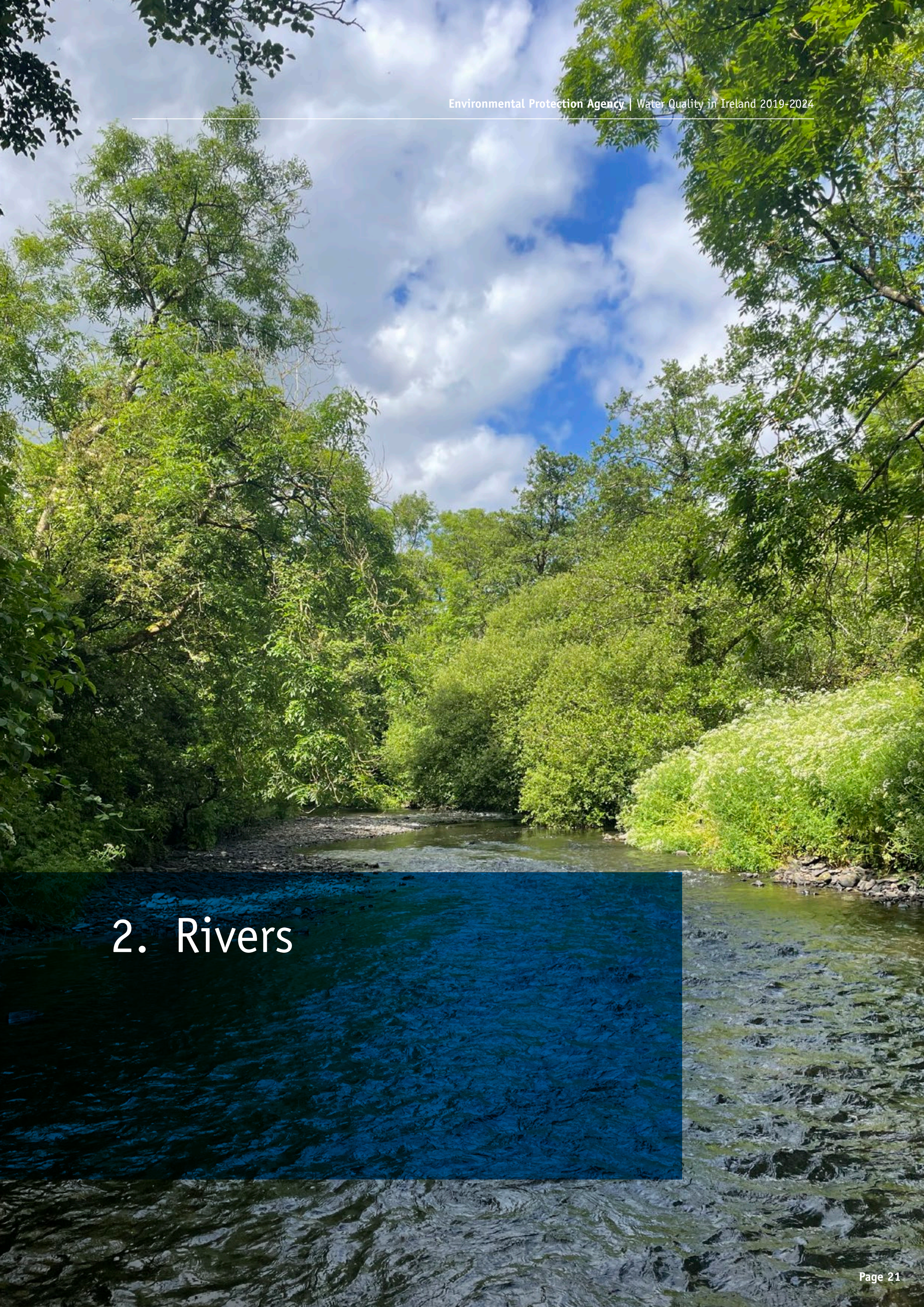
The ecological status of our surface waters is assessed by looking at the range and abundance of the plants and animals that live in them. These include phytoplankton, phytobenthos (diatoms), algae, plants, invertebrates and fish. Supporting elements such as oxygen or nutrient concentrations (physico-chemical elements) or the hydromorphological condition of a water body are also assessed. This information tells us how healthy our waters and the ecosystems they support are.

Waters in high and good ecological status show only minor or slight changes from natural conditions whereas waters in less than good status (moderate, poor or bad) range from moderately to severely damaged by pollution or habitat degradation



Schema detailing how the status of a water body is derived under the Water Framework Directive

More detail is available in the fact sheet ‘How We Assess Water Quality’ on the EPA website at https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/how-we-assess-water-quality---fact-sheet.php



2. Rivers

2. Rivers

2.1 Introduction

Ireland has over 84,800km of river channel with streams and rivers flowing from their headwaters through a network of channels that reaches almost every community and townland in the country. Ireland's national water quality monitoring programme is designed to provide representative information on our entire river network through the monitoring of discrete sections of river called water bodies. There are 3,192 river water bodies delineated in Ireland and 2,404 (75%) of these are monitored as part of the national river monitoring programme.

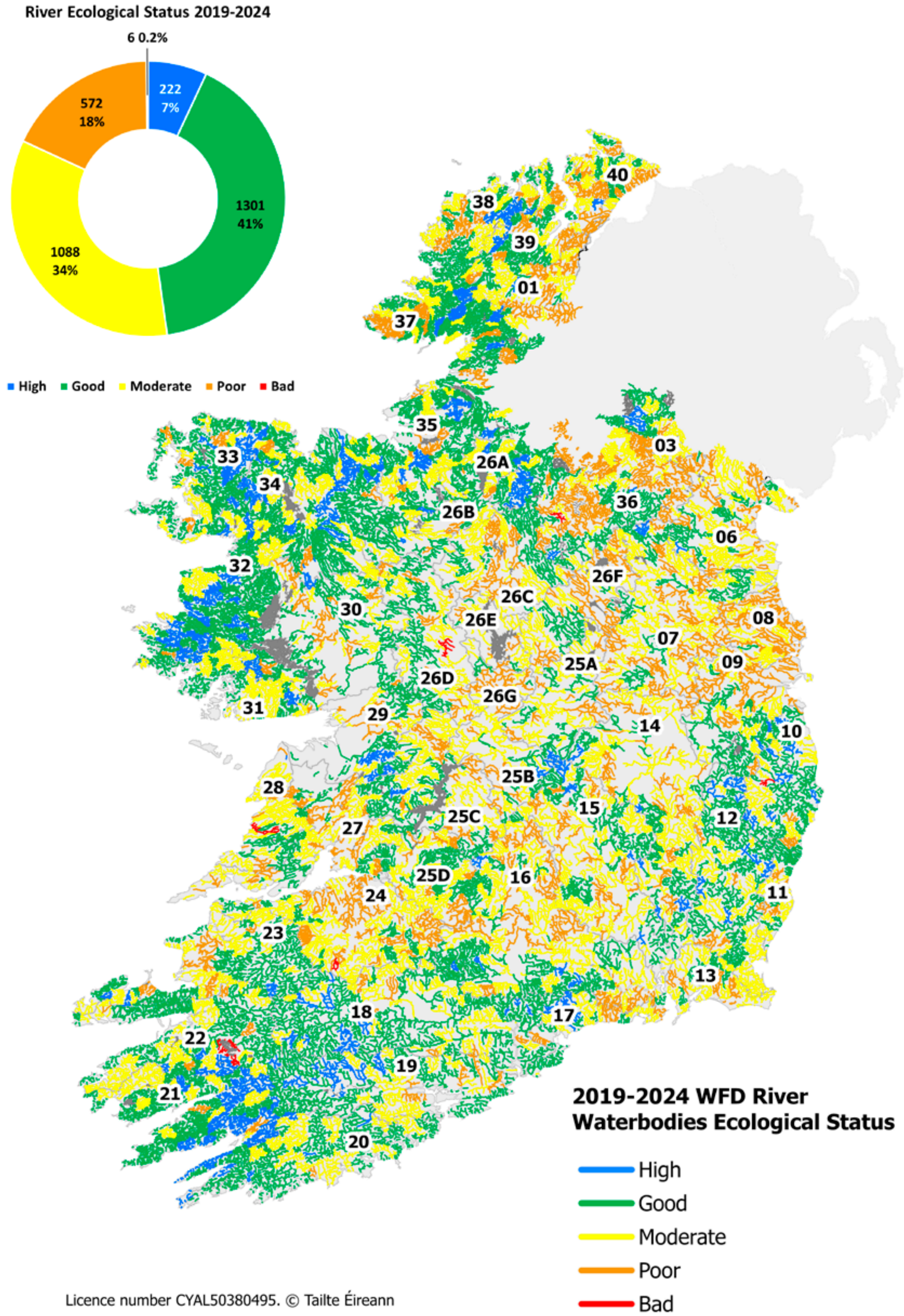
2.2 Summary for Rivers

- 1,523 (48%) of all river water bodies are in high or good ecological status and 1,666 (52%) are in moderate, poor or bad ecological status.
- There has been a 2% decline in the number of river water bodies at high or good ecological status since the 2016-2021 period.
- Nearly half (44 %) of monitored river sites had average nitrate concentrations above 8 mg/l NO_3 which is the level which supports good ecological status. This is slightly more than the 2019-2021 period (43%).
- Only 42% (139) of 334 river water bodies with a high-status objective are currently at high ecological status.

2.3 National Ecological Status

Nationally, high or good ecological status was assigned to 1,523 (48%) river water bodies in the period 2019-2024 while 1,602 (52%) were assigned moderate or worse ecological status (Figure 2.1 and Map 2.1) based on the monitoring data.

Figure 2.1 Ecological status of river water bodies 2019-2024



Map 2.1 The ecological status of river water bodies 2019-2024. Numbers refer to the 46 catchment areas (See Appendix for more details).

2.4 Catchment Level Ecological Status

For this report, data are presented for the 46 catchment areas (see Appendix). A catchment is an area of land draining towards a river, lake or other body of water. River ecological status (monitored) for each of the 46 catchments is shown in Map 2.2 and Figure 2.2 and for each county in Figure 2.3. The catchments with the highest proportion of high and good ecological status river water bodies are located mainly in the west and southwest of the country.

Mayo and Wicklow had the highest percentage (>70%) of monitored river water bodies at high or good ecological status while Kildare, Louth and Meath have the lowest percentage (≤20%) (Figure 2.3).

Map 2.2 Ecological status of monitored river water bodies at the catchment level for 2019-2024. Shaded areas represent catchments where ecological status is worse than the national average.

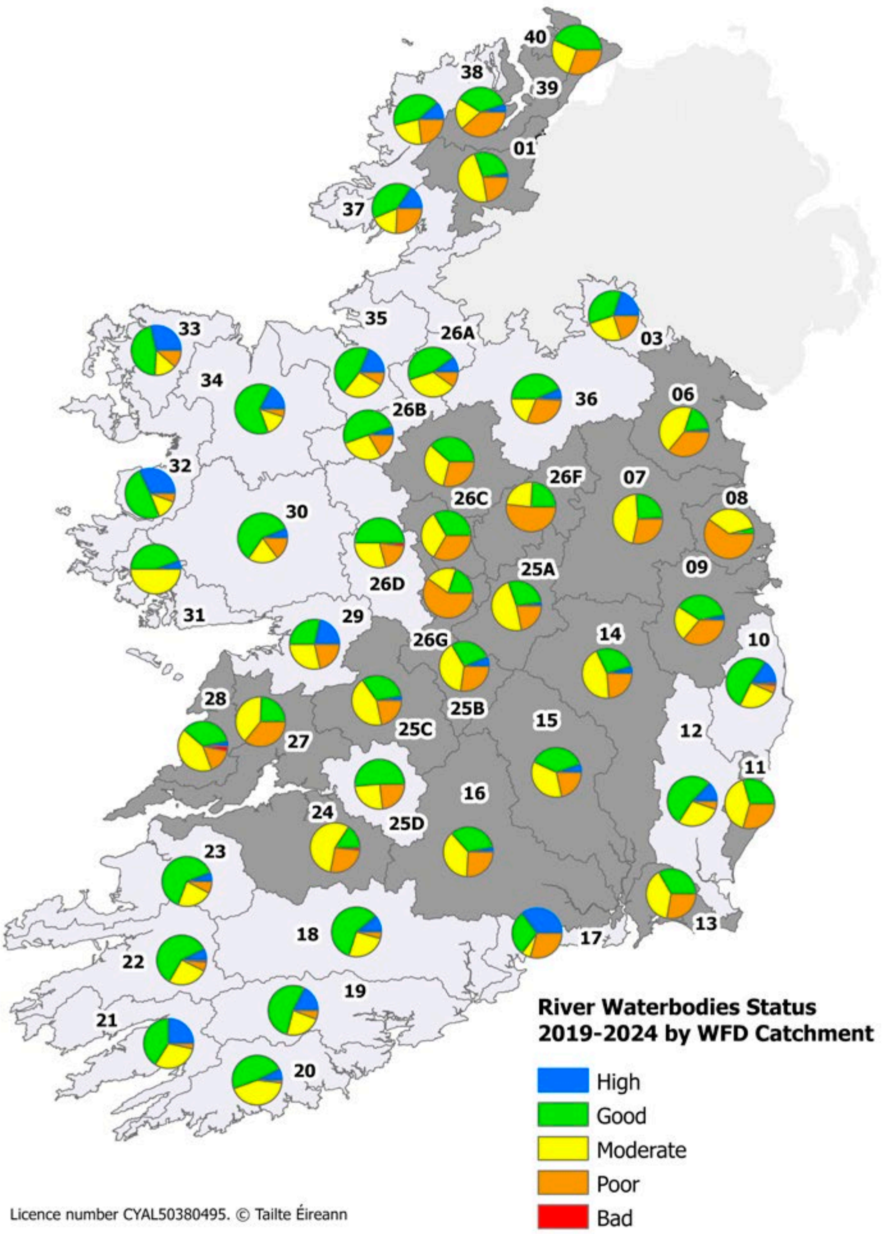


Figure 2.2 Ecological status of 2404 monitored river water bodies by catchment region for 2019-2024 (number of water bodies in each status class displayed)

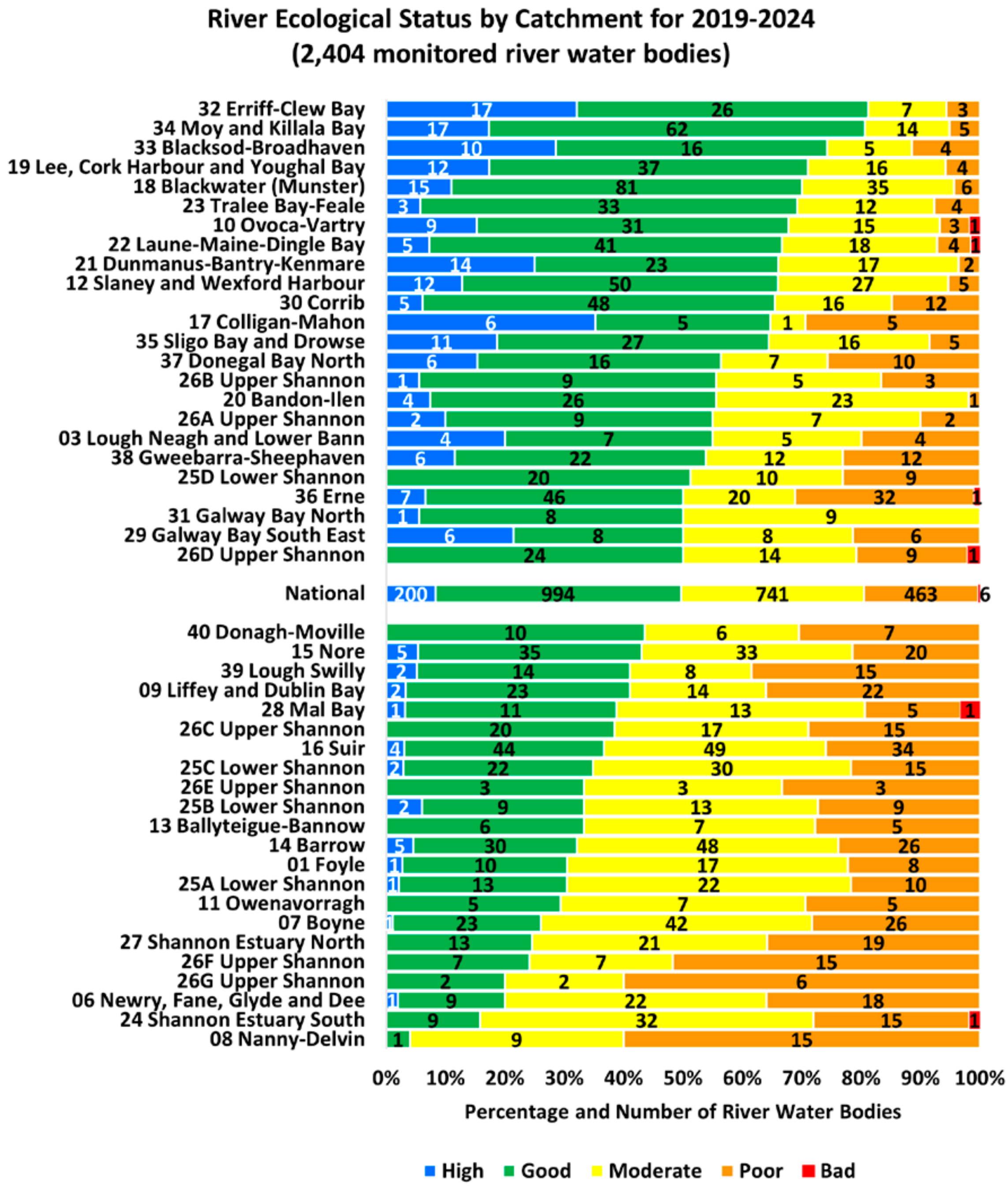
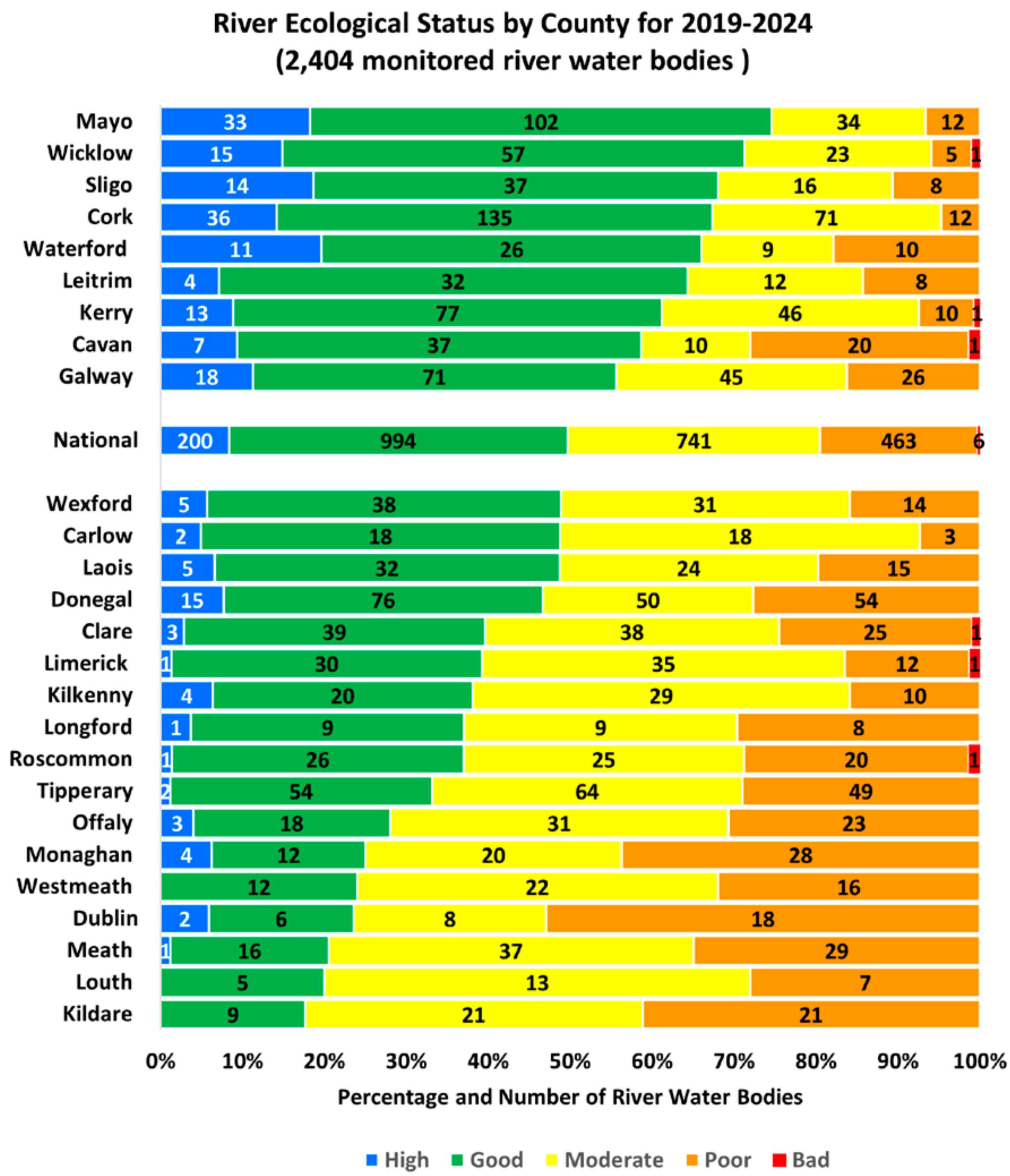


Figure 2.3 Ecological status of 2404 monitored river water bodies by county for 2019-2024 (number of water bodies in each status class displayed)



2.5 Elements Determining Ecological Status

In addressing areas with less than good ecological status it is important to know what element or combination of elements is responsible for the overall ecological status classification. The biological, physico-chemical and hydromorphological elements used to assess river water body ecological status are shown in Figure 2.4.

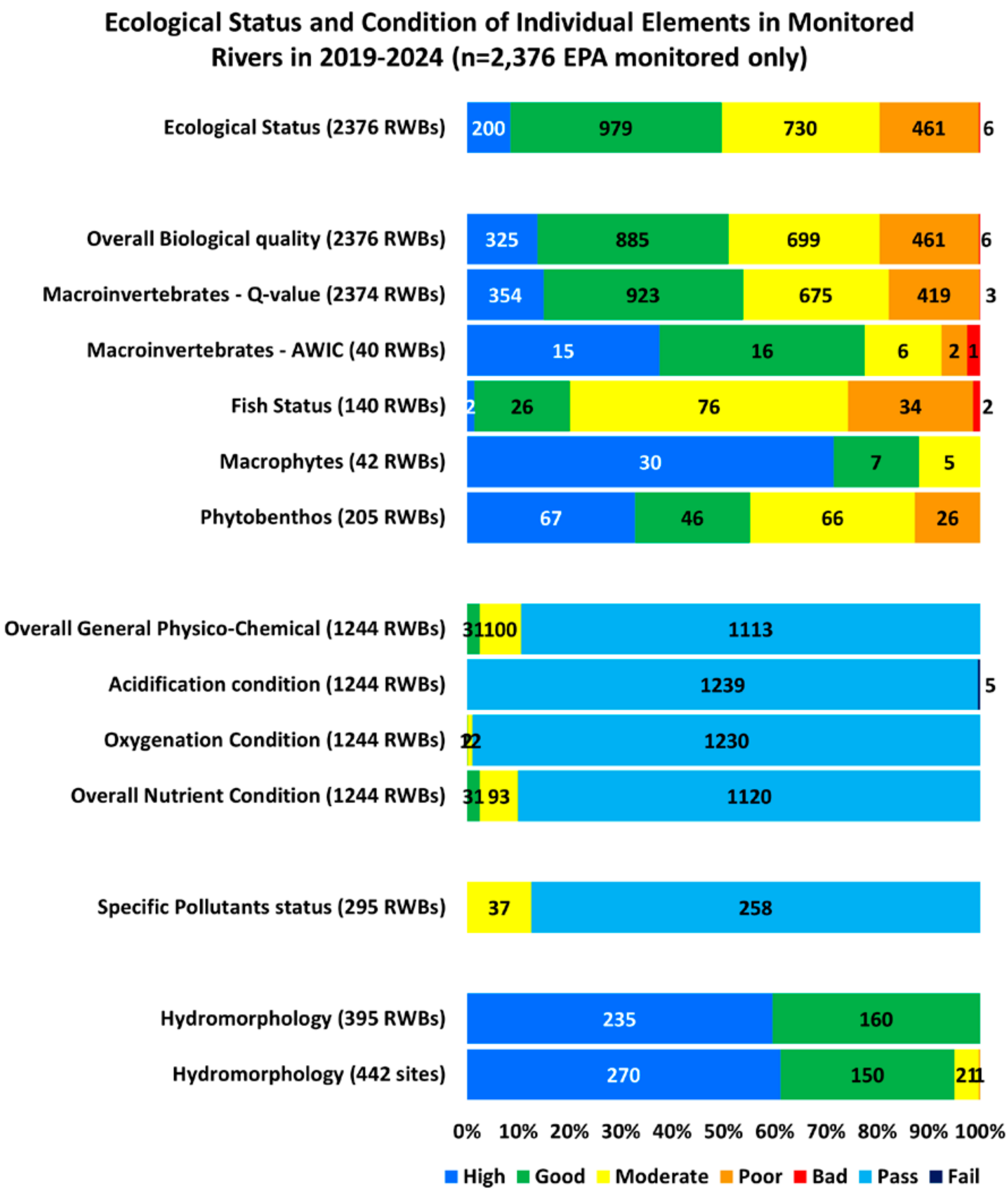
Macroinvertebrates (Q-value) remain the main biological element determining the status outcome in most river water bodies. This is to be expected as the Q-value is the main biological monitoring tool used at all monitoring sites.

There were six river water bodies that were assigned bad status:

- Gleneolo_020 – macroinvertebrate (AWIC)
- Laune_010 – macroinvertebrate (Q value)
- Ahavarraga Stream_010 – macroinvertebrate (Q value)
- Suck_120 – fish
- Annagh Clare_010 – macroinvertebrate (Q value)
- Cullies_030 – fish

The overall physicochemical status of rivers was mostly influenced by their nutrient status. With the expansion of the specific pollutant monitoring programme to include more areas at risk of specific pollutant impact, there was an increase in the number of river water bodies that failed specific pollutant status either on its own or in combination with other elements. This was due to environmental quality Standards (EQS) failures for heavy metals including zinc, copper and chromium and also the detections above the EQS for the insecticide Diazinon. Hydromorphology is only considered when assigning status to high status sites and this resulted in 160 river water bodies being classified as good rather than high status on their own or in combination with other elements.

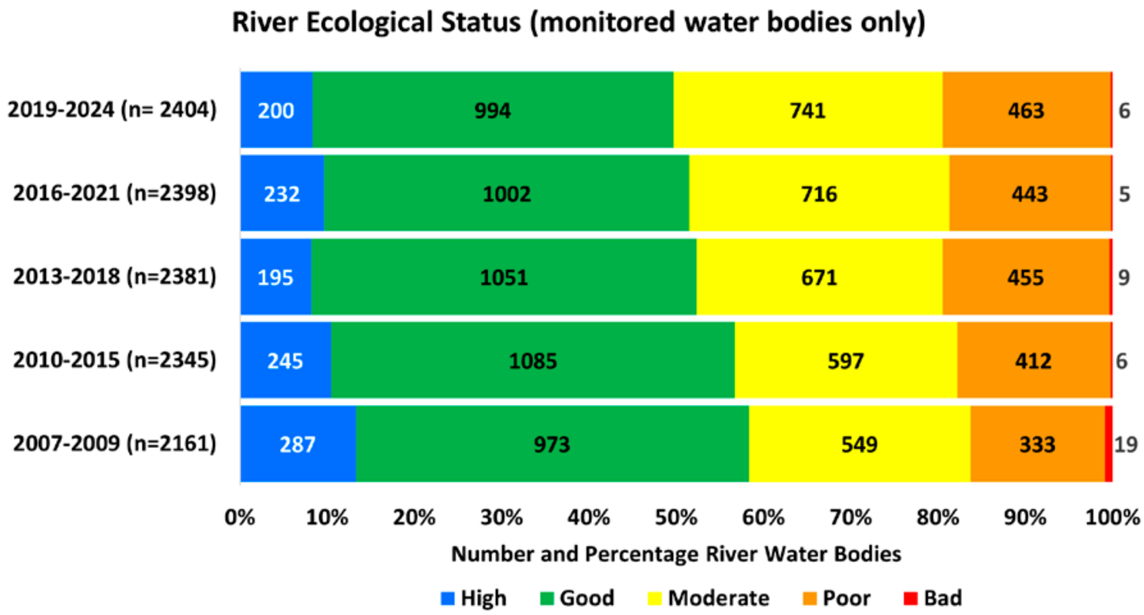
Figure 2.4 Ecological status and condition of individual elements monitored in rivers in 2019-2024 (number of rivers indicated for hydromorphology is at site level and river water body level). Note river water bodies where status was assigned by the Northern Ireland Environment Agency are not included in this figure.



2.6 Changes and Trends

Figure 2.5 provides a summary of the total number of monitored river water bodies within each ecological status class across the last six assessment periods.

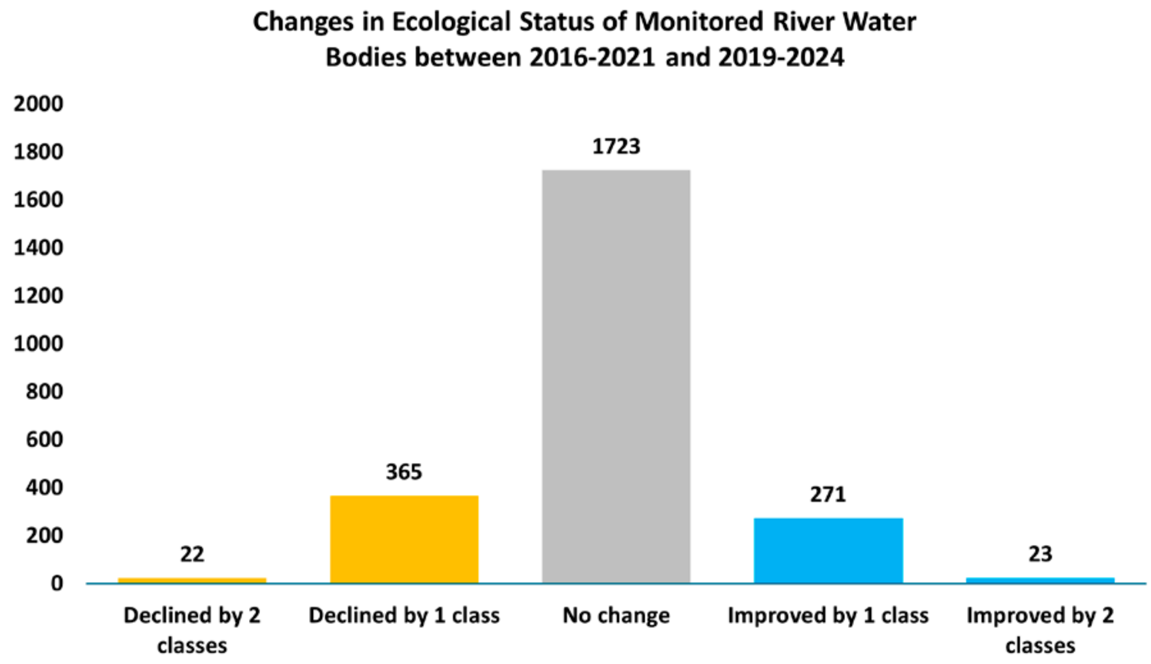
Figure 2.5 Change in ecological status for all monitored rivers since 2007 (number of water bodies is indicated)[5]



Comparing the current assessment period to the last period (2016-2021) the ecological status of 1,723 monitored river water bodies remains unchanged, 387 declined while 294 improved. This represents a net decline in status of 93 water bodies since 2016-2021. The number of water bodies improving and declining in status and by the number of classes is shown in Figure 2.6.

5 The numbers from the 2016-2021 period have been updated since the last published report.

Figure 2.6 Changes in ecological status of monitored (n = 2404) river water bodies between 2016-2021 and 2019-2024



Map 2.3 summarises the changes in monitored ecological status across the catchments between 2016-2021 and 2019-2024. More information is available in Figure A1 (and at county level in Figure A2) in the Appendix.

The five catchments with the highest number of declines were (catchment number is in parenthesis):

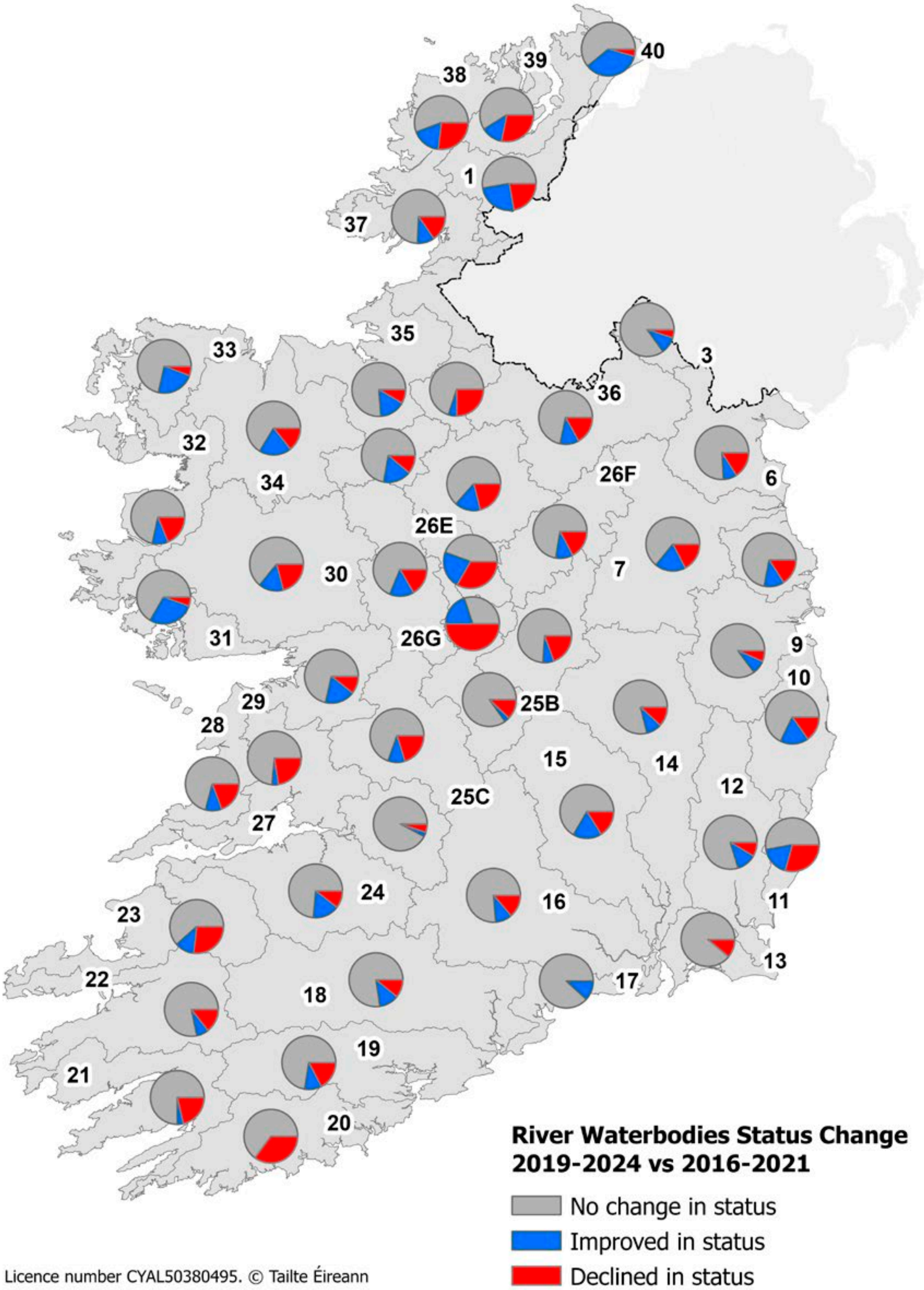
- Bandon-Ilen (20) – 19 water bodies declined
- Suir (16) – 18 water bodies declined
- Erne (36) – 18 water bodies declined
- Corrib (30) – 17 water bodies declined
- Boyne (07) – 16 water bodies declined

The Moy and Killala Bay and Boyne had the overall greatest number of monitored rivers improving.

The Colligan – Mahon (17) was the only catchment where no monitored water bodies declined in status and two water bodies improved. The Bandon – Ilen (20) and the Ballyteigue – Bannow (13) had no improvements in status. The five catchments with the highest number of status improvements were (catchment number is in parenthesis):

- Moy and Killala Bay (34) – 19 water bodies improved
- Boyne (07) – 17 water bodies improved
- Blackwater (Munster) (18) – 16 water bodies improved
- Nore (15) – 16 water bodies improved
- Suir (16) – 13 water bodies improved

Map 2.3 Ecological status change in monitored river water bodies between 2016-2021 and 2019-2024

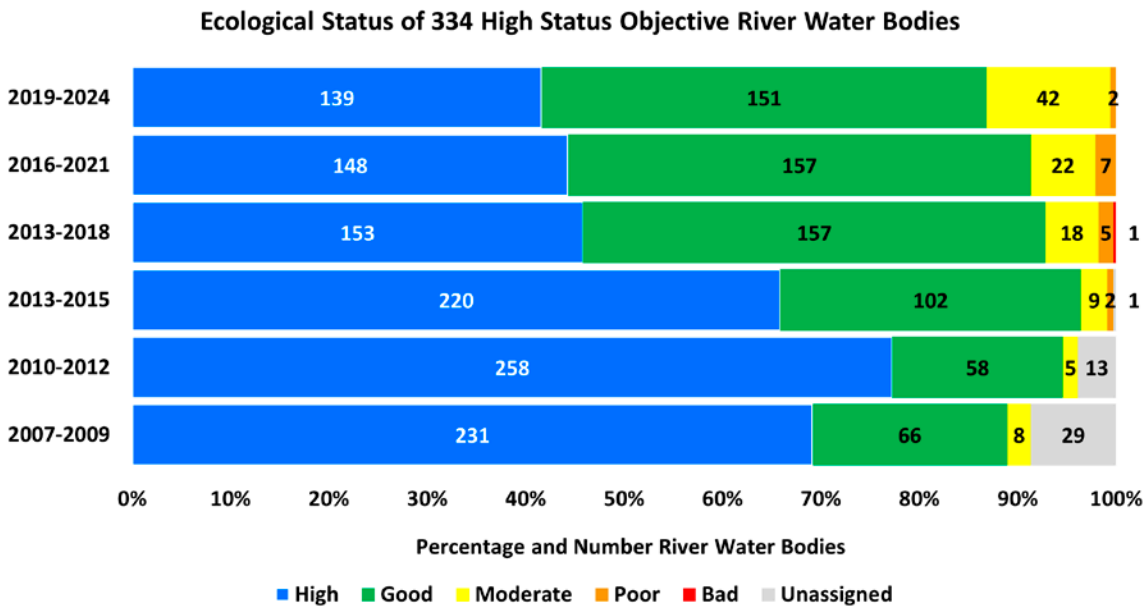


2.7 High Status Objective Water Bodies

The protection and restoration of high status objective or blue dot water bodies is a requirement of the Water Framework Directive. In Ireland, in Cycle 2, 319 river water bodies were identified as having a high status objective. This number was increased to 334 in Cycle 3.

Of the 334 high status objective river water bodies in cycle 3, 139 (39%) are at high status in the 2019-2024 period while 195 were classified as below high status with the majority (151) at good status (Figure 2.7). Forty four of the water bodies are at less than good status. Of the total high status objective water bodies monitored, 260 water bodies did not change ecological status since the last assessment, 44 declined in status while 30 improved in status. This represents an overall net decline of fourteen water bodies or 4.2% of the high status objective river water bodies over this period.

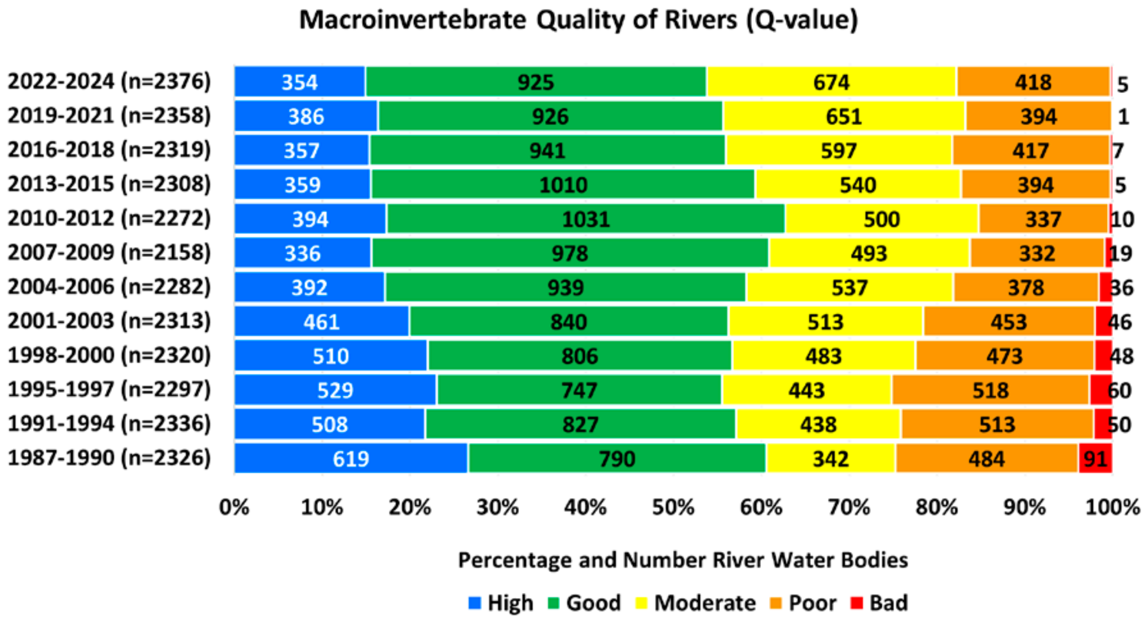
Figure 2.7 Change in ecological status for 334 high status objective river water bodies since 2007 (number of water bodies indicated)



2.8 Long-term Trends in Macroinvertebrate Q-value quality

The macroinvertebrate based Quality Rating system (Q-value) has been employed to assess river water quality in Ireland since the 1970s. This long term series provides a valuable record of environmental change in Irish rivers. The latest figures show a continuing decline with the lowest percentage of monitored river water bodies at satisfactory quality for macroinvertebrates recorded at just under 54% (1279) of monitored river water bodies while 46% had less than satisfactory quality (i.e. moderate, poor or bad) in the latest period (Figure 2.8). It should be noted that all available Q value data is used in this section. Some of these sites are not considered in the assessment of ecological status but are included here.

Figure 2.8 Macroinvertebrate quality of rivers (Q-value) from 1987 to 2024 (number of water bodies indicated). Totals reflect updates to the database since the previous assessments and may differ between reports.



2.9 Nutrients

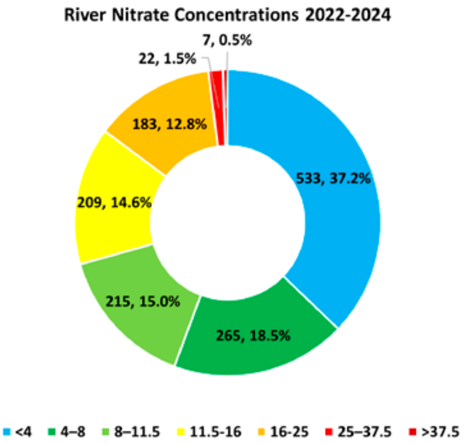
Nitrate

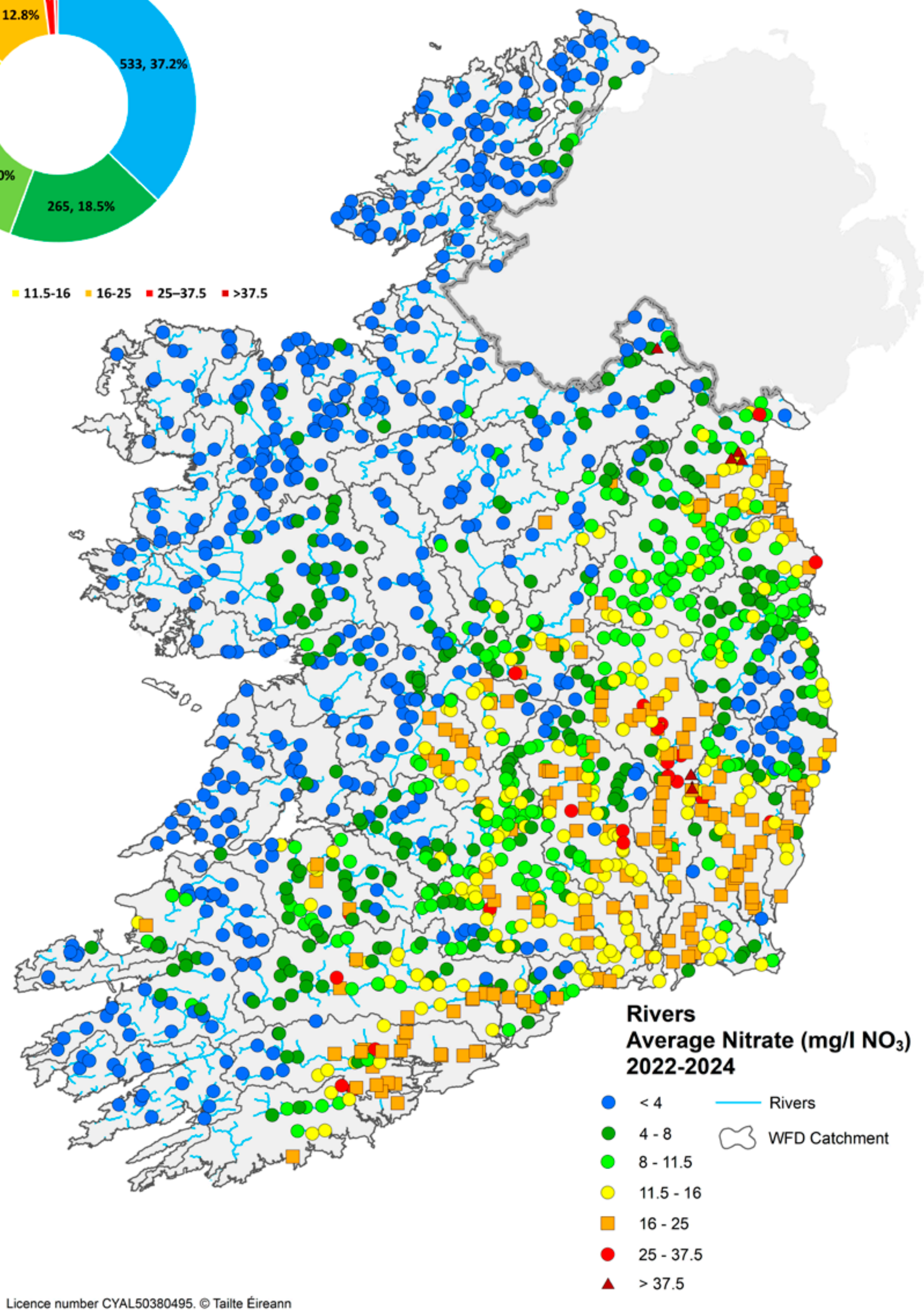
The concentration of nitrate (NO_3) in rivers is an indicator of nutrient enrichment and a potential human health indicator in drinking water. There are no environmental quality standards for nitrate in rivers but average nitrate concentrations higher than 8 mg/l NO_3 which is the level at which impacts to the ecological health of these rivers and associated downstream marine waters occurs. The maximum concentration allowable in drinking water to protect human health is much higher at 50 mg/l NO_3. Taking account of variability in concentrations throughout the year, the annual average concentrations should remain below 75% of the threshold, i.e. 37.5 mg/l NO_3, to ensure the maximum concentration is not exceeded.

Just under half (44%) of monitored sites had average concentrations above 8 mg/l NO_3 (Figure 2.9). This is slightly more than the 2019- 2021 period (43%). Seven river sites had average concentrations above 37.5 mg/l NO_3. The worst performing sites are located on the rivers Aghalona, Roscat, Shambles, Mapastown, Whitecross and the Bawn.

River sites with higher nitrate concentrations are mostly located in the south-east and south of the country however three of the rivers with levels greater than 37.5 mg/l NO_3 are in the Newry, Fane, Glyde and Dee catchment (Mapastown, Whitecross and the Bawn) (Map 2.4).

Figure 2.9 River nitrate quality





Map 2.4 Average nitrate concentration at river sites for 2022-2024

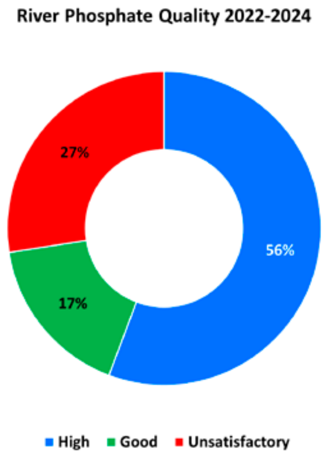
Phosphate

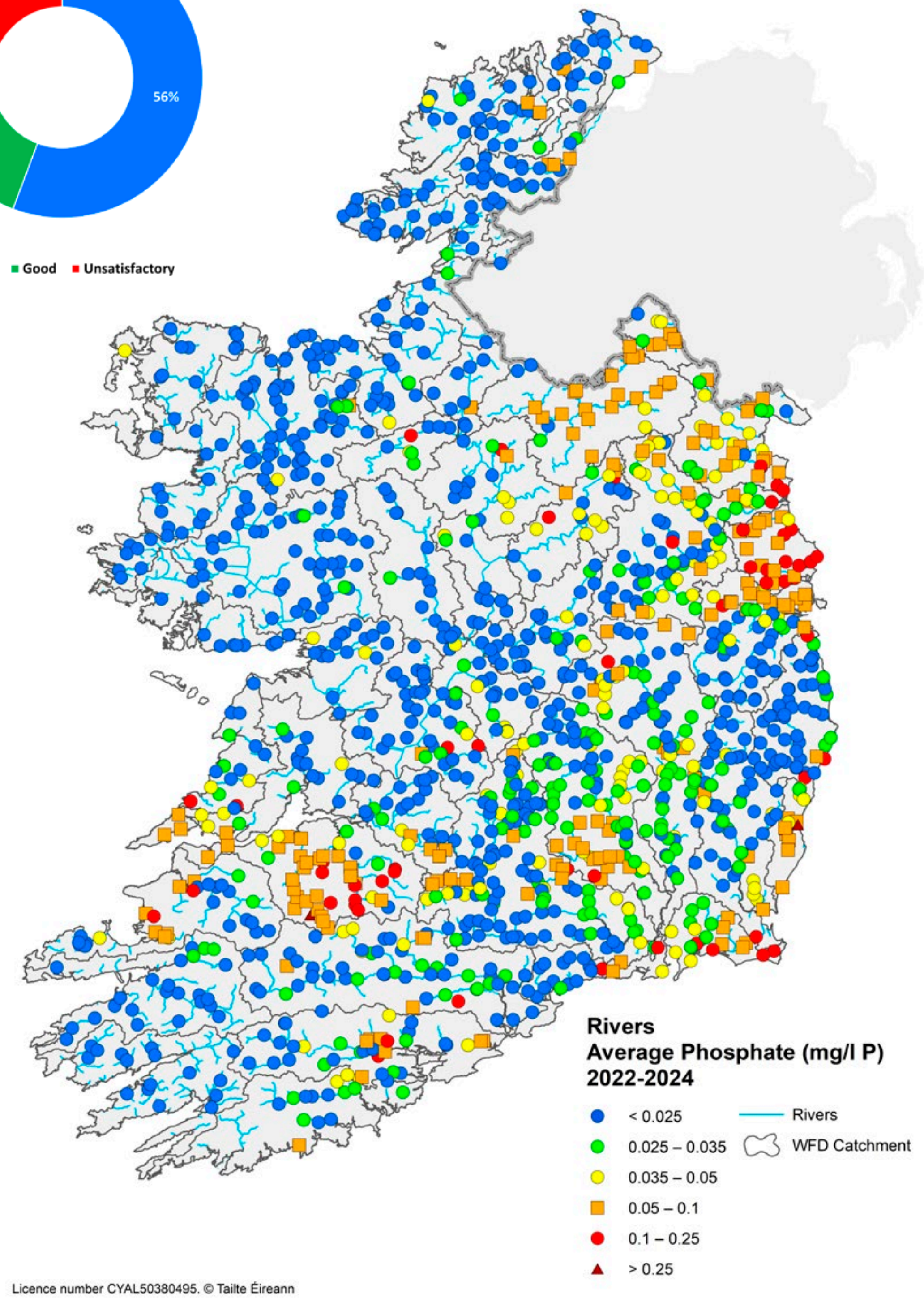
Average phosphate concentrations of less than 0.025 mg/l P and less than 0.035 mg/l P are legally binding environmental quality standards (EQS) to support the achievement of high and good ecological status respectively.

The 2022-2024 data for phosphate concentrations show that 72.5% of monitored river sites are classed as either high or good quality (less than 0.035 mg/l) for phosphorus nutrient condition (Figure 2.10). This is an improvement of almost 2.5% over the 2019-2021 period and almost 10% since the 2016-2018 period.

Sites with higher average phosphate concentrations are evident in the catchments of Liffey and Dublin Bay and Nanny-Devlin in the east, in the Erne catchment in the northeast and in the Shannon Estuary south catchment in the southwest of the country (Map 2.5).

Figure 2.10 River phosphate quality





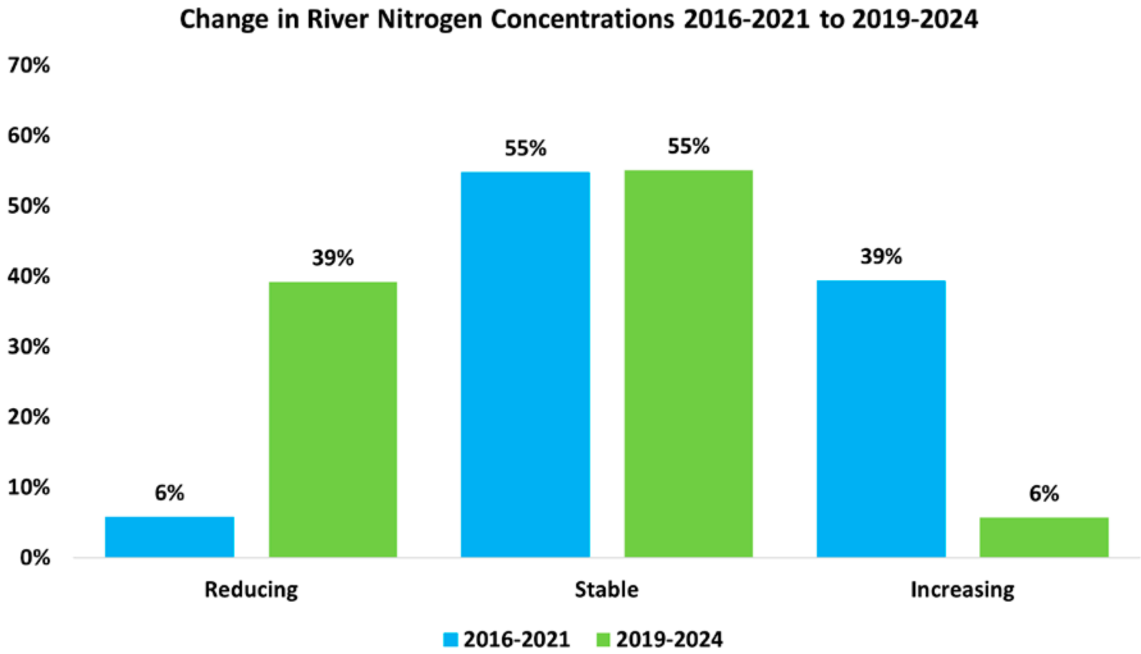
Map 2.5 Average phosphate concentration at river sites for 2022-2024

2.10 Nutrient Trends

River nitrogen trends have shown that 55% of sites are stable comparing 2016-2021 to 2019-2024 (Figure 2.11 and 2.12). Encouragingly, 39% of sites in 2019-2024 period showed reductions in nitrogen concentrations while 6% showed an increase, a reverse of trends in the previous period, 2016 to 2021.

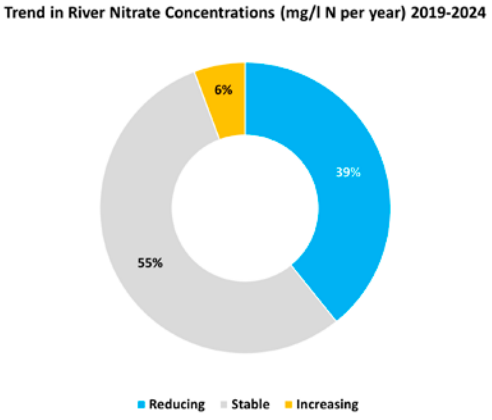
The areas of the country showing reductions in nitrogen concentration are mostly located in the south, south east and east of the country (Map 2.6).

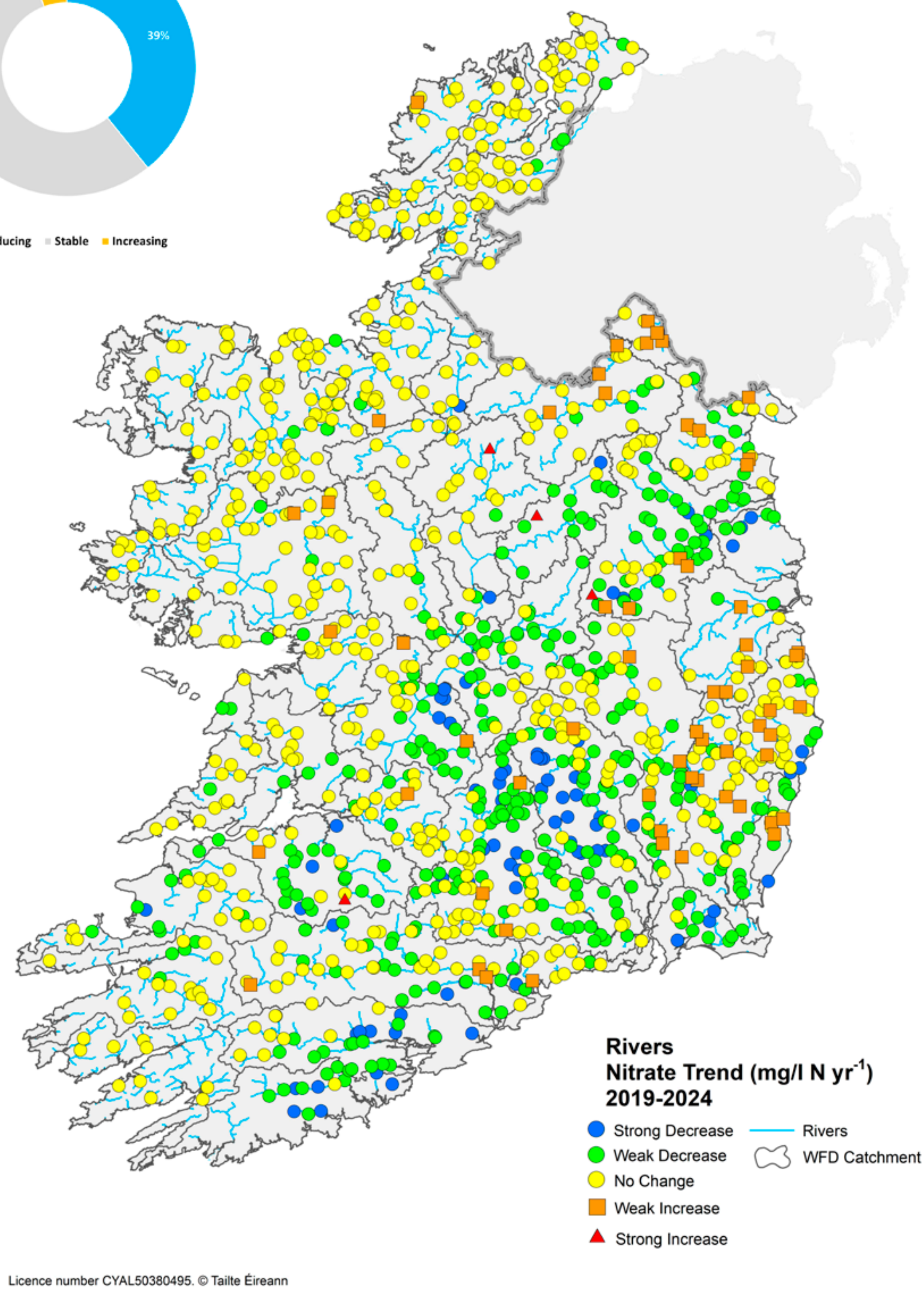
Figure 2.11 Change in river nitrogen concentration between 2016-2021 and 2019-2024[6]. Nitrogen measured as total oxidised nitrogen.



6 Trend for nitrogen is indicated by a reduction/increase of 0.05mg/l N per annum. Using Mann-Kendall and Sen's slope statistical methodology.

Figure 2.12 River nitrogen trend 2019-2024



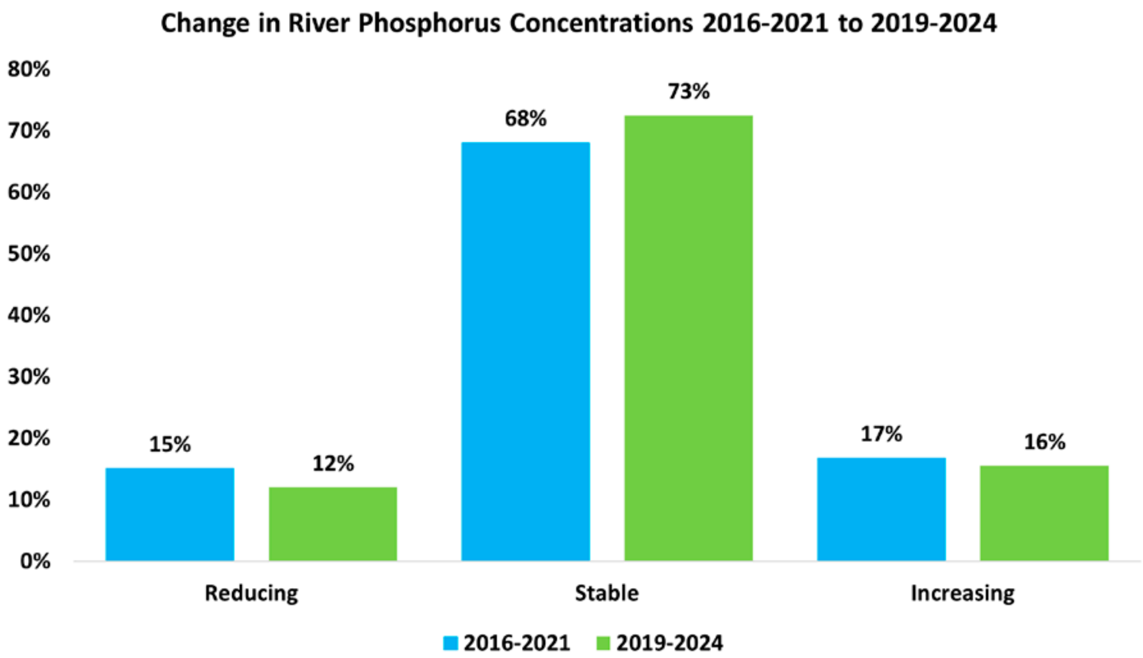


Map 2.6 Trends in average nitrate concentration at river sites from 2019 to 2024

The proportion of sites with increasing phosphate[7] concentrations has decreased slightly from 16.8% to 15.5% comparing 2016-2021 to 2019-2024, (Figure 2.13 and Figure 2.15). 73% of sites were stable with 12% showing reduction in concentrations in 2019-2024.

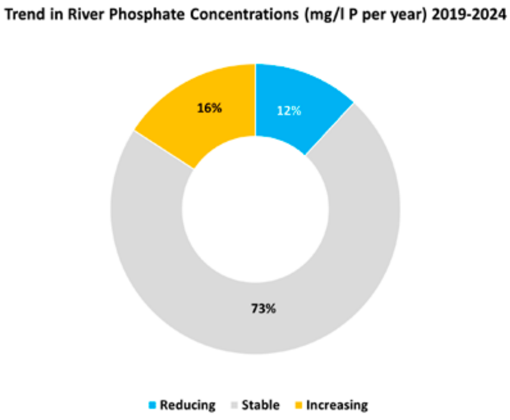
Geographically, the east and south east showed the largest number of sites with increasing concentrations (Map 2.7). The south had the largest number of sites showing reductions in concentrations in 2019-2024.

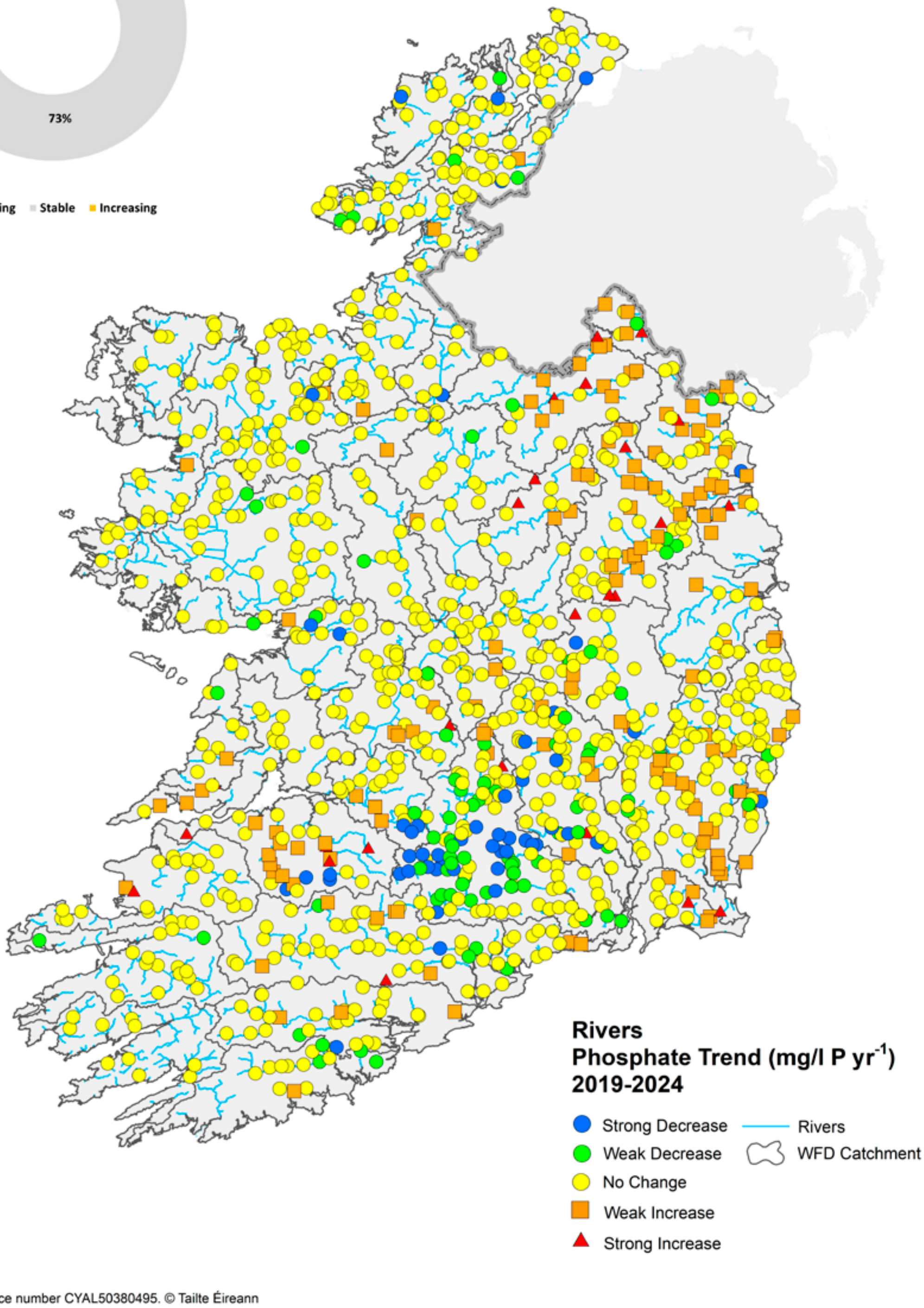
Figure 2.13 Change in river phosphorus concentration between 2016-2021 and 2019-2024. Phosphorus measured as molybdate reactive phosphorus.



7 Trend for phosphorus is indicated by a reduction/increase of 0.002mg/l P per annum. Using Mann-Kendall and Sen's slope statistical methodology.

Figure 2.14 River phosphate trend 2019-2024





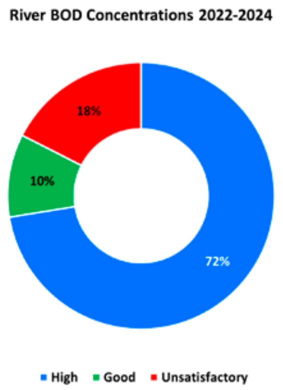
Map 2.7 Average phosphate concentration at river sites from 2019 to 2024

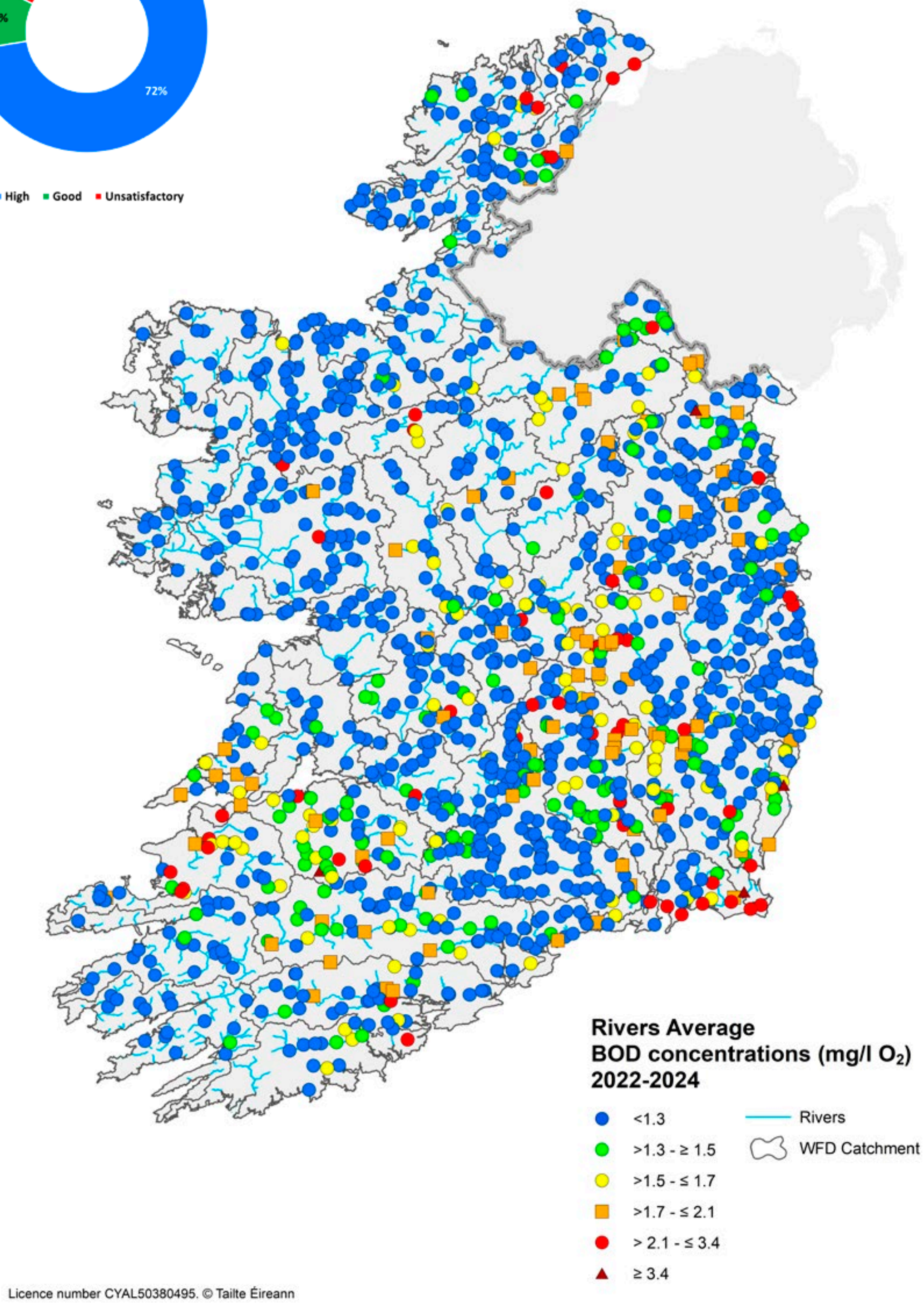
2.11 Oxygen Demand

When biodegradable organic matter (including organic waste) is present in a river, it provides nutrients for the growth of bacteria and other microorganisms – this will cause the microorganisms to multiply, and they may deplete the dissolved oxygen in the water impacting macroinvertebrates and fish. The Biochemical Oxygen Demand (BOD) test is a measure of the amount of oxygen consumed by microorganisms in breaking down the organic matter. Average BOD values of ≤1.3 mg/l O_2 and ≤1.5 mg/l O_2 have been established as the national standards to support achieving high and good ecological status respectively. BOD values in rivers often increase during periods of heavy rain and high river flows – as organic matter is washed in from the land.

In the period 2022-2024, 82% of Irish river sites were meeting the good status threshold of 1.5 mg/l O_2, a drop of over 4% compared with the period 2019-2021 (Figure 2.15 and Map 2.8). 18% of river sites have unsatisfactory BOD levels in 2022-2024.

Figure 2.15 River BOD quality





Map 2.8 Average BOD concentration at river sites for 2022-2024

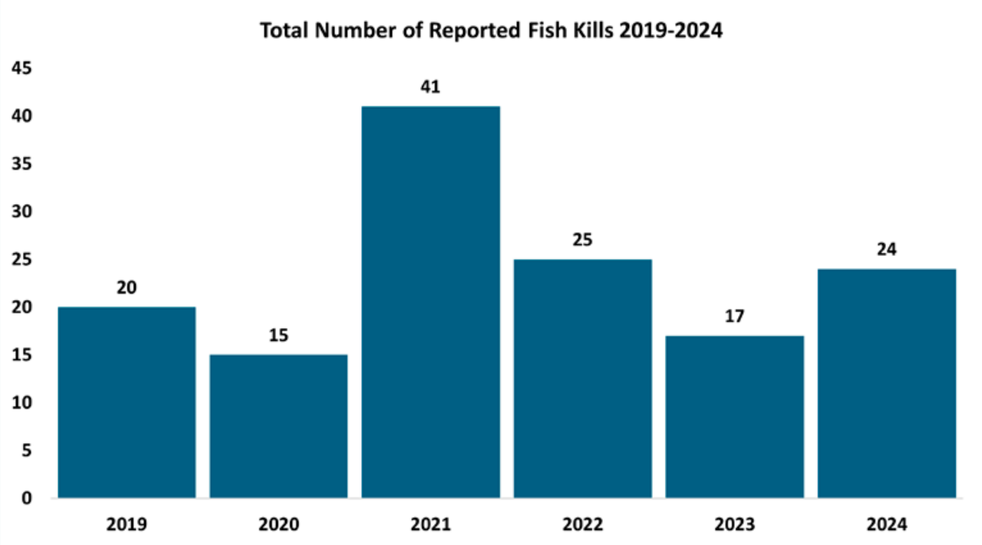
2.12 Conclusion

In 2019-2024 52% of our river water bodies were in unsatisfactory ecological status. This reflects a 2% decline (79 water bodies) since 2016-2021. The Bandon-Ilen (19), Suir (18), Erne (18), Corrib (17) and Boyne (16) catchments had the most water body declines in status. The north west, west, and south west of the country had the highest percentage of rivers in satisfactory ecological status. Similar to 2016-2021, only 42% of our 334 high status objective river water bodies are achieving their target status.

Nitrogen concentrations in the east and southeast have shown reductions in the most recent period, 2019-2024; however, many of our rivers still have concentrations that are too high. High phosphate concentrations continue in many rivers in parts of the east, northeast, southwest and southeast of the country. Despite the recent improvements in nitrate, these excess concentrations of nutrients, coupled with physical habitat damage, are harming the ecology of our rivers.

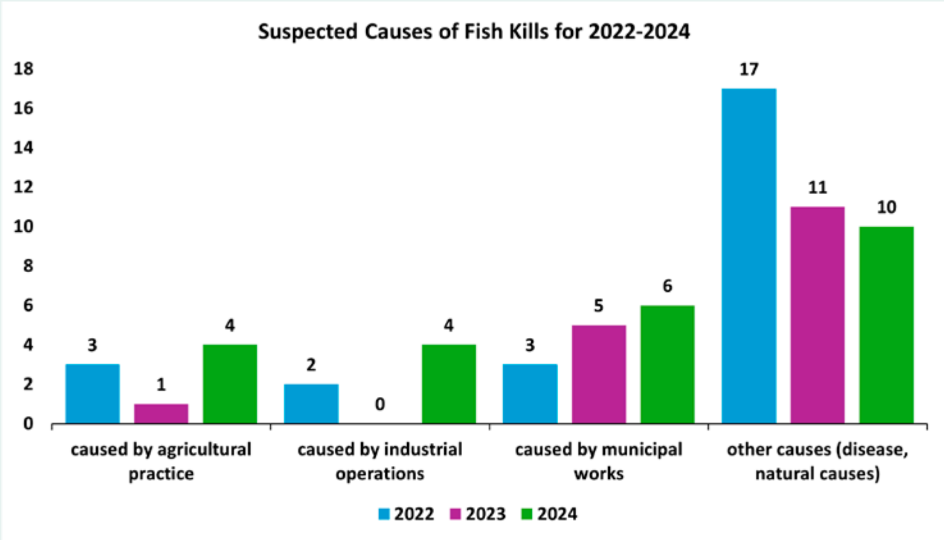
Box 2.1 Fish Kills

The presence of healthy fish stocks, such as salmon and trout, is an indicator of good water quality. The occurrence of a fish kill is typically an indicator of serious pollution. Fish kills can occur within a localised stretch or over a long distance in a water body. Data on fish kills in Ireland are compiled annually by Inland Fisheries Ireland (IFI).



The graph above indicates the number of fish kills in our surface waters from 2019 to 2024[8]. The number of fish kills was highest for the reporting period in 2021 (41) when compared to the average (24) in recent years. There are many possible causes, but low flow conditions experienced in the summer of 2021 may have contributed to theses higher numbers by increasing the vulnerability of fish to pollution events through increased water temperature and depleted oxygen concentrations. Oxygen depletion can occur following the break-down by bacteria of organic pollutants which can come from agricultural, municipal or industrial sources. As the bacteria decompose the organic matter, they use up oxygen and concentrations fall to levels that can cause harm to other organisms such as fish.

8 The significant fish kill on the River Blackwater in August 2025 is not reported here. This data covers the period 2019-2024. For more information on the River Blackwater fish kill in 2025 please visit https://www.fisheriesireland.ie/news/media-releases/summary-report-of-the-investigation-into-fish-mortalities-in-the-blackwater



Where possible, IFI categorise fish kill causes. Generally, the exact cause is unknown, and multiple factors may have led to conditions which resulted in the fish kills. The causes attributed to the fish kills based on investigations carried out by IFI in 2022, 2023 and 2024 are outlined above.

More information on fish kills in Ireland is available at [Fish Kills in Ireland 1969 to Recent | IFI Open Data Portal]

3. Lakes

3. Lakes

3.1 Introduction

Our lakes have an uneven geographic distribution nationally with most occurring along the west and northeast of the country. The national water quality monitoring programme assessed 224 lakes (84% of total lake area in Ireland) during 2019-2024. These represent the majority of large lakes including lakes used for drinking water abstractions and those that are of regional, local or scientific interest in relation to protected habitats and species.

Status is applied to the unmonitored lakes based on information gathered from monitored lakes that have similar characteristics and pressures. This results in the ecological status of 812 lakes being assessed which gives an overall national picture.

3.2 Summary for Lakes

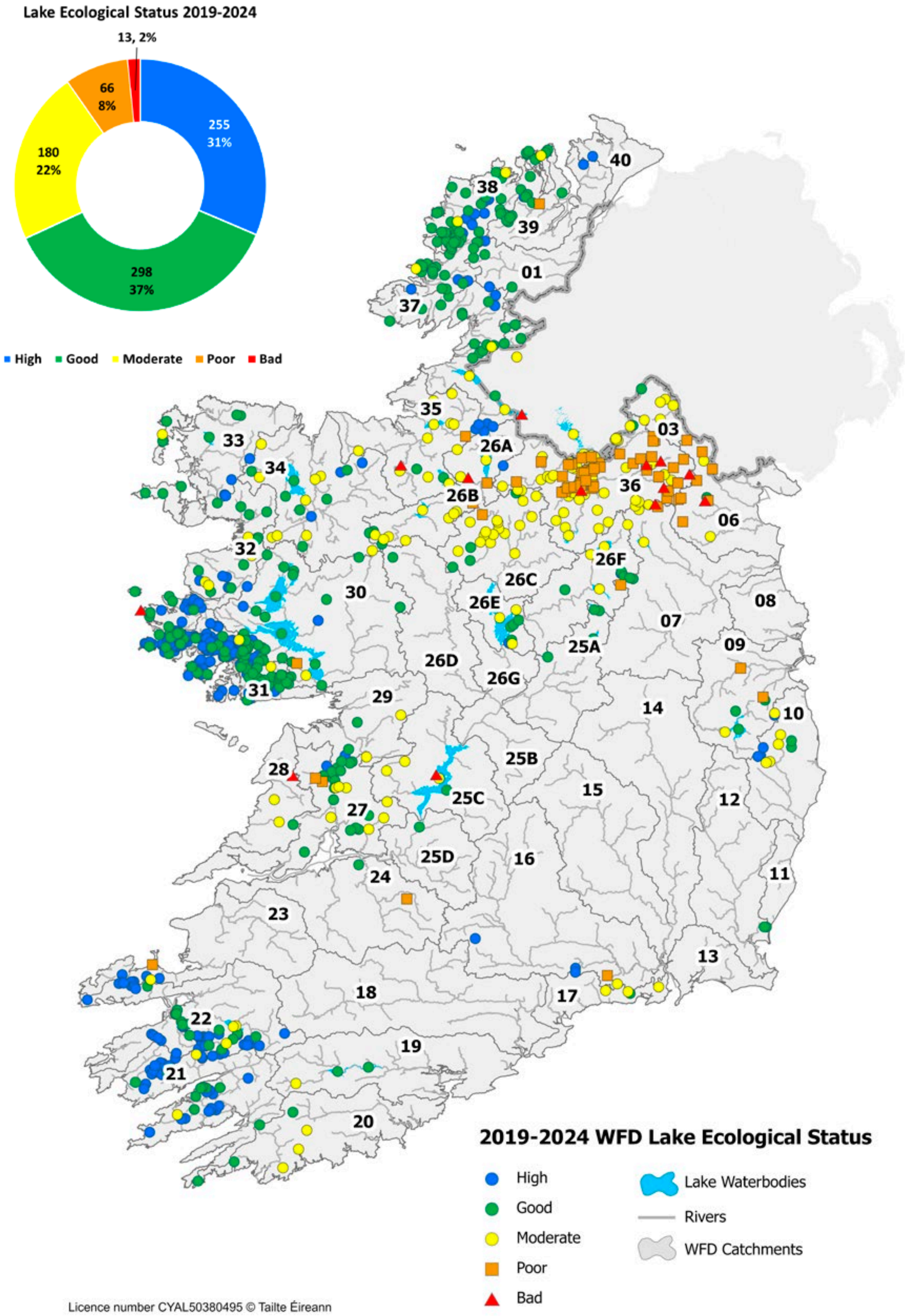
- Nationally, 553 lakes (68%) are in high or good ecological status and 259 lakes (32%) are in moderate, poor or bad ecological status.
- There has been a 0.5% decline in the number of monitored lakes in satisfactory ecological status (high or good) since 2016-2021.
- Most lakes assessed (85%) are showing a stable total phosphorus trend since 2016. However, despite this, a third (32%) of lakes failed the environmental quality standard (0.025 mg/l P).

3.3 National Ecological Status

Nationally, 553 lakes (68%) in the period 2019-2024 are in good or high ecological status, and 259 lakes (32%) are in moderate or worse ecological status (Figure 3.1). This includes both monitored and unmonitored lakes.

The majority of high and good ecological status lakes are found in the southwest, west and northwest of the country while the majority of moderate or worse ecological status lakes are located in the northeast of the country (Map 3.1). This distribution tends to reflect the difference in the level of human activity, hydrogeology and soil conditions in these regions.

Figure 3.1 Lake ecological status 2019-2024

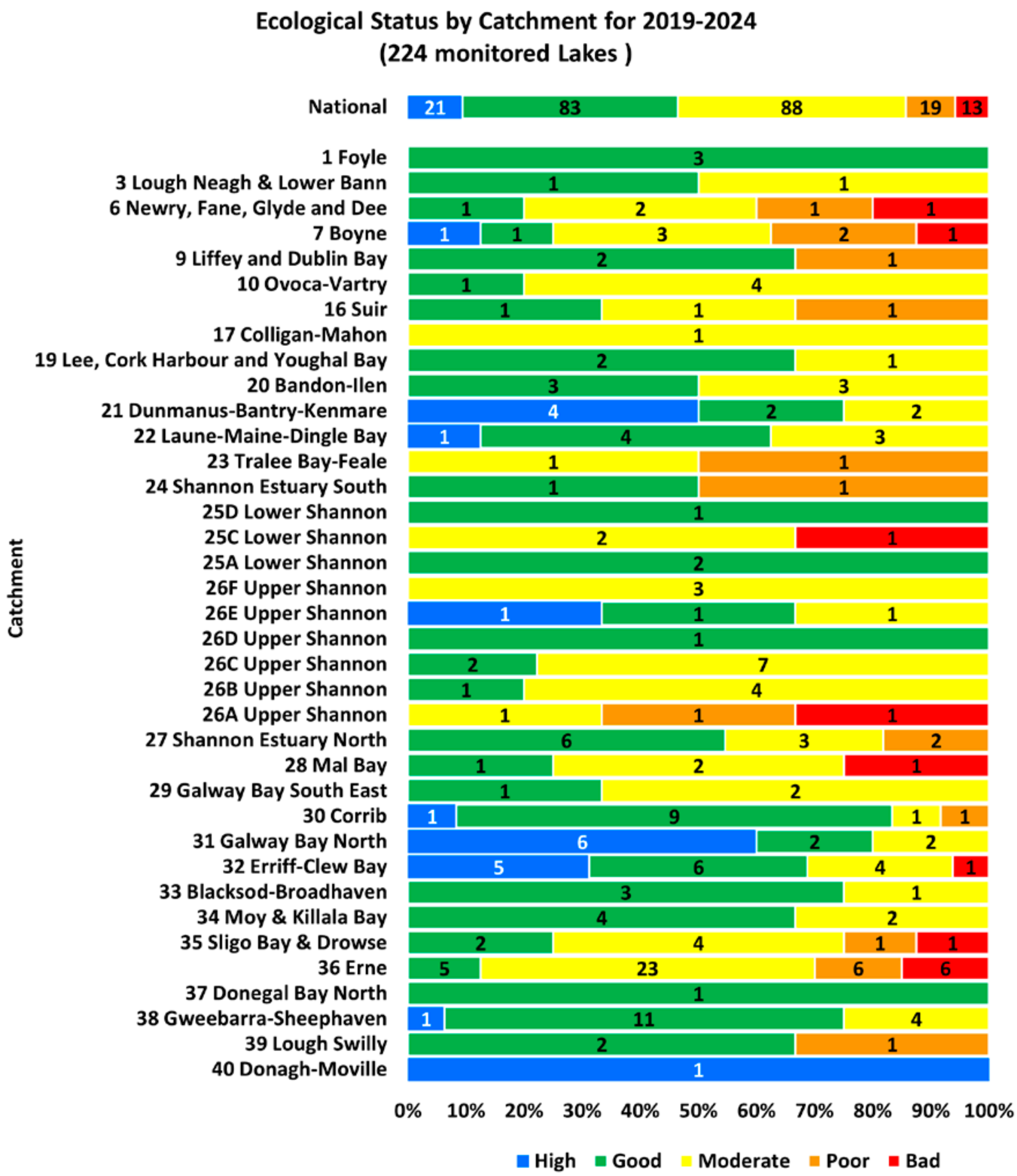


Map 3.1 Ecological status of all lake water bodies 2019-2024

3.4 Catchment Level Ecological Status

Lake ecological status for each of the 37 catchments with monitored lakes is shown in Figure 3.2. Catchments with the highest number of lakes are the Erne (40 lakes), Erriff-Clew Bay (16 lakes), Gweebarra-Sheephaven (16 lakes), Corrib (12 lakes), Shannon Estuary North (11 lakes) and Galway Bay North (10 lakes).

Figure 3.2 Ecological status of monitored lake water bodies at catchment level 2019-2024 (numbers of lakes indicated)



3.5 Elements Determining Ecological Status

The biological, physico-chemical and hydromorphological elements used to assess lake ecological status are shown in Figure 3.3.

Macrophytes was the main biological element to influence overall ecological status followed by fish and phytoplankton. The biological communities were highly impacted in thirteen lakes that were assigned bad status:

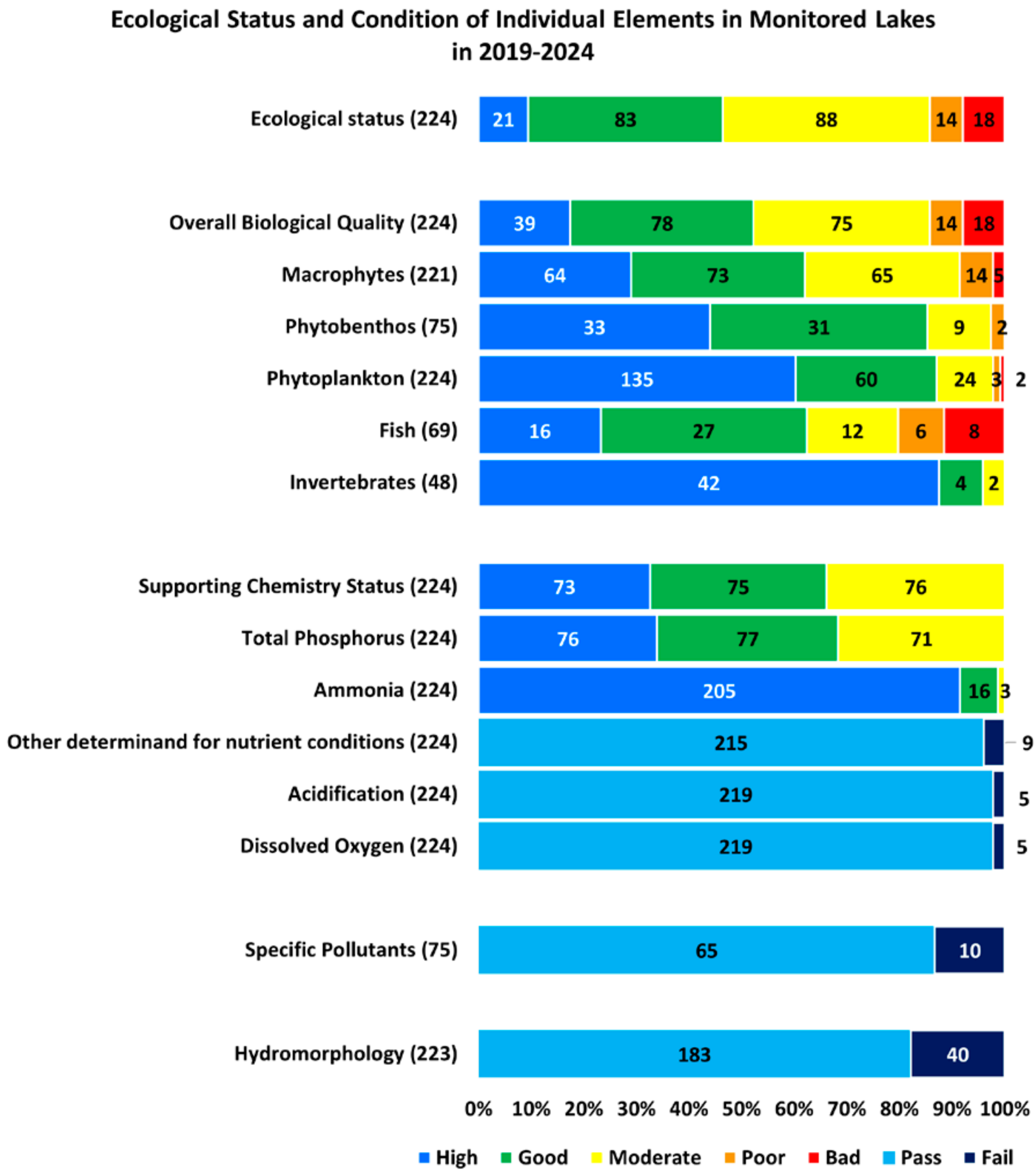
- Alewnaghta (Co. Clare) – fish
- Aughrusbeg (Co. Galway) – fish
- Egish (Co. Monaghan) – macrophyte and fish
- Inner Lough (Co. Monaghan) – phytoplankton
- Lickeen (Co. Clare) – fish
- Macnean Lower (Cavan) – fish
- Naglack (Co. Monaghan) – phytoplankton
- Meelagh Lough (Co. Roscommon) – fish
- Oughter South (Co. Cavan) – macrophyte
- Tacker (Co. Cavan) – macrophyte and fish
- Templehouse (Co. Sligo) – macrophyte
- Skeagh Upper (Co. Cavan) – fish
- White Rockcorry (Co. Monaghan) – macrophyte and fish

Total phosphorus status was moderate for all but three of these lakes; Aughrusbeg (Co. Galway), Lickeen (Co. Clare), and Meelagh Lough (Co. Roscommon). This suggests that other factors and not nutrients are at play impacting the fish population.

The overall driving factor in the physico-chemical status of the lakes was total phosphorus. Hydromorphology is only considered when assigning status to high status lakes and resulted in eight lakes being classified as good status instead of high (compared to four lakes for the previous assessment). These lakes were:

- Bleach Lough (Co. Limerick)
- Bofin Lough (Co. Galway)
- Cullaun Lough (Co. Clare)
- Guitane (Co. Kerry)
- Loughaunore (Co. Galway)
- Mask Upper (Co. Galway)
- Lough Veagh (Co. Donegal)
- Washpool Lough (Co. Mayo)

Figure 3.3 Ecological status and condition of individual elements in monitored lakes in 2019-2024 (number of lakes indicated)



3.6 Changes and Trends

The number of monitored lakes in satisfactory ecological status (good or high) declined from 107 lakes in 2016-2021 to 104 in the current assessment, 2019-2024 (Figure 3.4). When compared to the first baseline assessment in 2007-2009, the number of lakes currently in satisfactory ecological health is broadly similar.

In terms of general changes across all status categories 38 monitored lakes improved in ecological status, 34 declined and 152 remained unchanged, representing a net deterioration of 4 lakes since 2019-2021. Most improving or declining lakes changed by a single ecological class (Figure 3.5). A lake may improve but still not achieve its environmental objectives, e.g. a lake may improve from poor ecological status to moderate.

17 of 41 (41%) high status objective lakes are achieving their objective in 2019-2024.

Figure 3.4 Change in ecological status for lakes monitored in each survey period since 2007 (number of lakes is indicated)

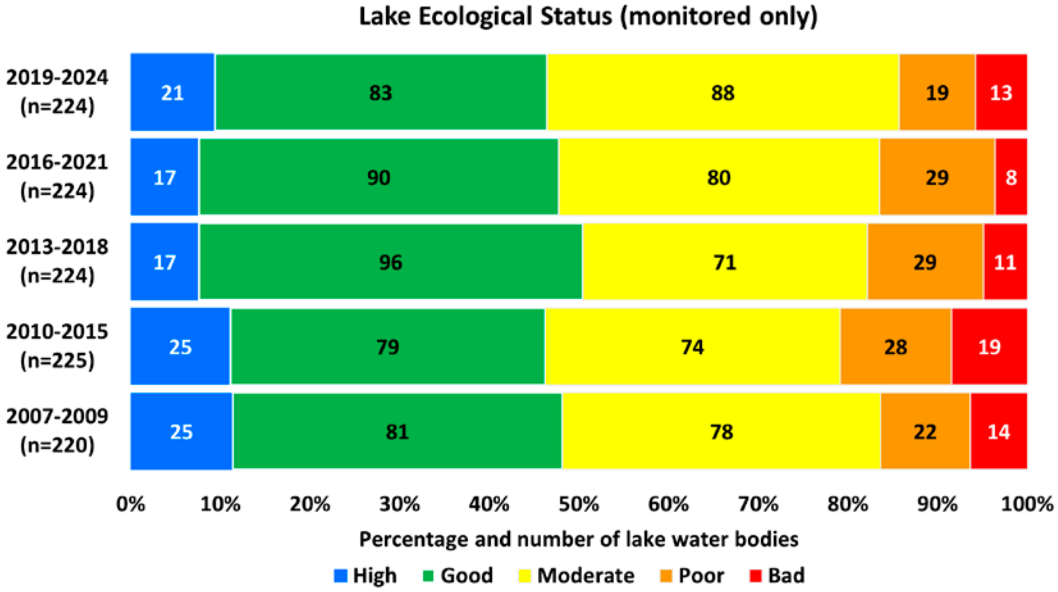
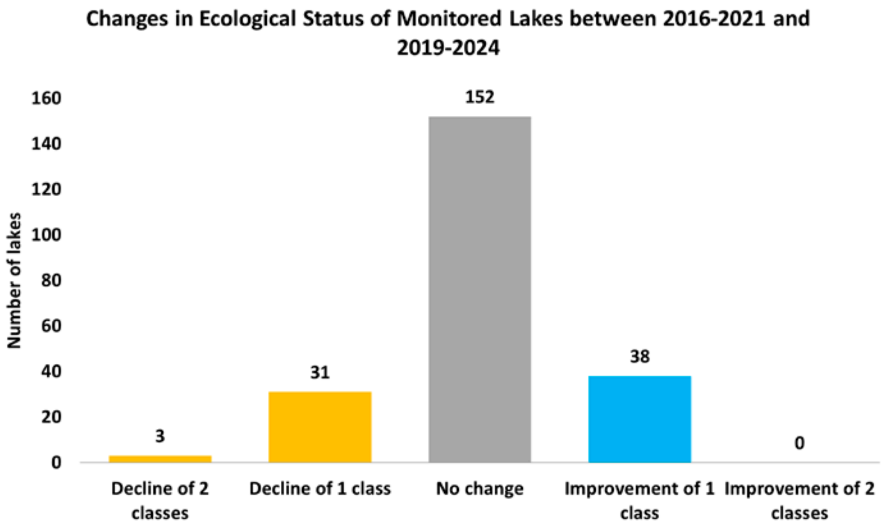


Figure 3.5 Changes in ecological status of monitored lake water bodies between 2016-2021 and 2022-2024



3.7 Nutrients

Concentrations

The concentration of total phosphorus (mg/l P) in lakes is a key quality indicator because of its impact on biological quality in freshwater. Nutrients such as phosphorus are essential for plant growth, but if present in excess amounts can lead to significant declines in water quality due to the proliferation of plants and algal blooms.

Average total phosphorus concentrations in lakes of less than 0.01 mg/l P and less than 0.025 mg/l P have been established in Ireland as legally binding environmental quality standards (EQS) to support the achievement of high and good ecological status. Concentrations of total phosphorus consistently greater than 0.025 mg/l P are likely to result in the lake not achieving good ecological status.

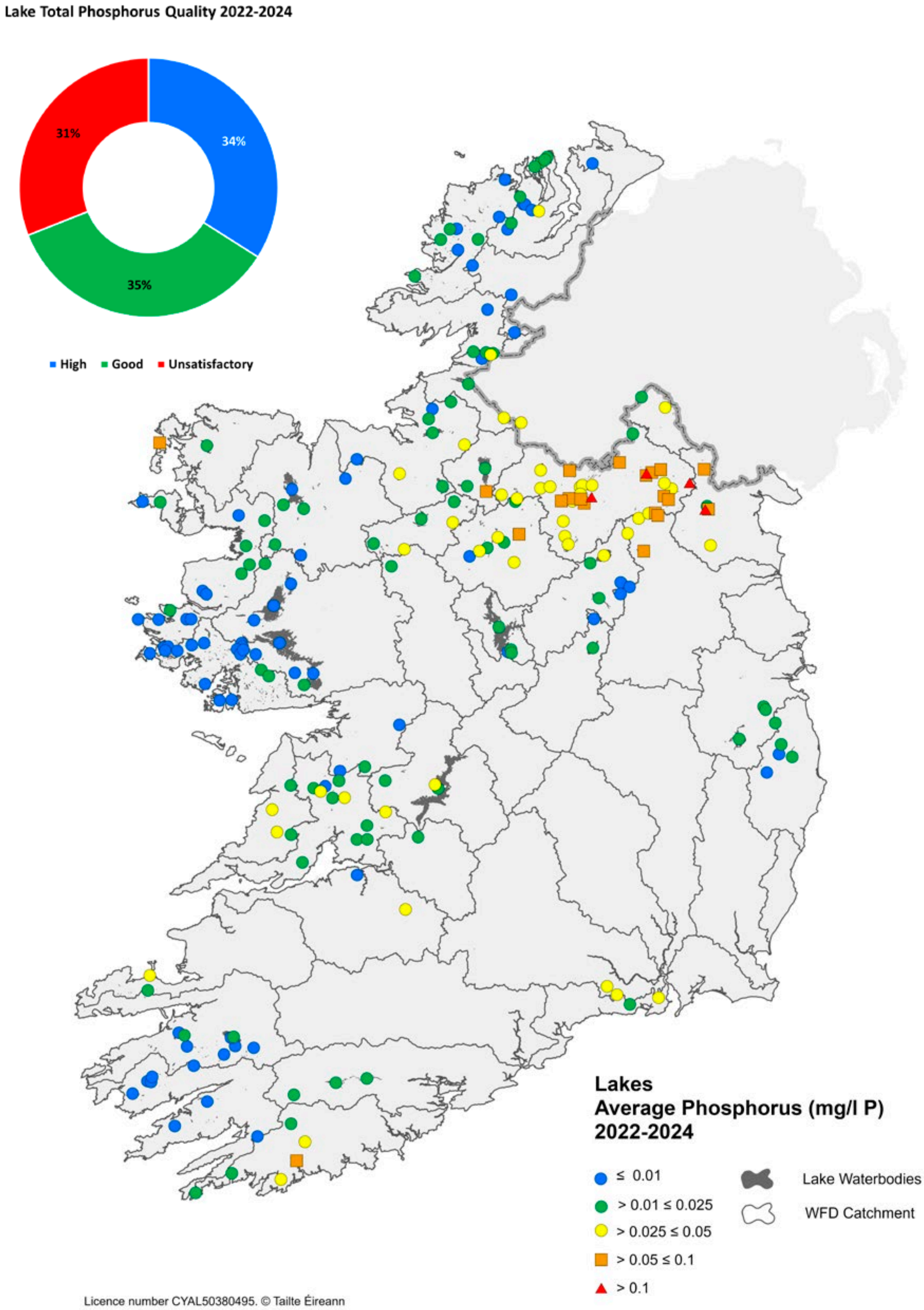
Two-thirds (68%) of monitored lakes are classed as either high or good quality for total phosphorus for 2022-2024. The remaining one third (32%) have unsatisfactory phosphorus concentrations. (Figure 3.6).

Map 3.2 represents the average total phosphorus concentrations in Ireland's monitored lakes from 2022-2024. Five monitored lakes had very high average total phosphorus concentrations (greater than 0.1 mg/l P) in 2022-2024, all in the northeast of the country:

- Naglack (Co. Monaghan) – 3 year average 0.25 mg/l P
- Farnham Lough (Co. Cavan) – 3 year average 0.16 mg/l P
- Inner Lough (Co. Monaghan) – 3 year average 0.17 mg/l P
- Lough Egish (Co. Monaghan) – 3 year average 0.16 mg/l P
- White Rockcorry (Co. Monaghan) – 3 year average 0.10 mg/l P

Four lakes had values as high or higher compared to the previous assessment, with the exception of White Rockcorry, which has shown an improving trend, despite still having high phosphate concentrations.

Figure 3.6 Lake total phosphorus quality 2022-2024



Map 3.2 Average total phosphorus concentrations in Ireland's monitored lakes 2022-2024

3.8 Nutrient Trends

A trend assessment of 223[9] lakes was carried out using annual average total phosphorus data from 2016 to 2024. Most of the lakes analysed (215) had a stable trend where total phosphorus was relatively unchanged (Figure 3.7)[10].

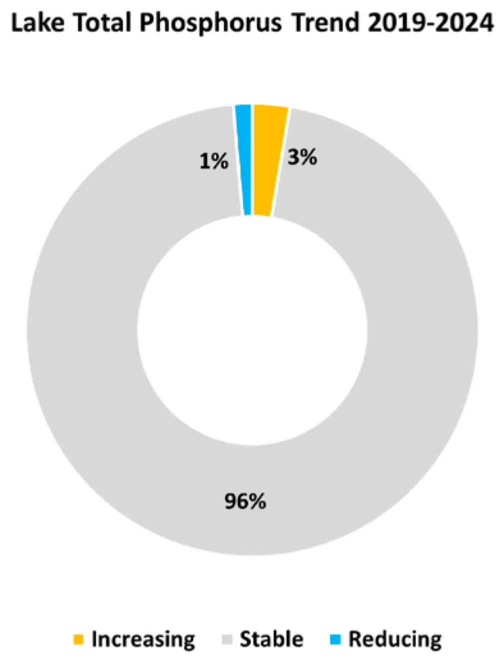
Four lakes had a strong increasing trend in total phosphorus concentrations:

- Corconnelly (Co. Monaghan)
- Inner (Co. Monaghan)
- Naglack (Co. Monaghan)
- White Rockcorry (Co. Cavan)

One lake had a strong decreasing trend in total phosphorus concentrations:

- Farnham Lough (Co. Cavan)

Figure 3.7 Lake total phosphorus trend 2019-2024



9 Number of lakes that met the criteria to undergo a trend assessment.

10 Trend for phosphorus is indicated by a reduction/increase of 0.002mg/l P per annum. Using Mann-Kendall and Sen's slope statistical methodology.

3.9 Conclusion

Compared to the other water categories the distribution of lakes in the country is uneven, with very few in the midlands and southeast. The majority of high and good ecological status lakes are found in the southwest, west and northwest of the country while the majority of moderate or worse ecological status lakes are located in the northeast of the country. This distribution tends to reflect the difference in the level of human activity, hydrogeology and soil conditions in these regions. The analysis presented here show that there has been a 0.5% decline (4 water bodies) in the percentage of lakes in satisfactory ecological status since the last assessment. The majority of declines in lake status are being driven by increasing total phosphorus concentrations that are in turn causing excessive macrophyte and phytoplankton growth which is upsetting the ecological balance of these lakes.

Lakes in the northeast of the country have the highest total phosphorus concentrations that are also rising. Restoring these lakes to at least good status represents a significant challenge as they often contain a historical legacy store of phosphorus in their sediments that is slowly being released over time.

4. Transitional and Coastal Waters

4. Transitional and Coastal Waters

4.1 Introduction

In Ireland, transitional and coastal waters cover an area of over 14,000 km^2 (transitional 844 km^2; coastal 13,325 km^2) and represent a wide variety of types such as lagoons, estuaries, large coastal bays and exposed coastal stretches (Map 4.1). Transitional water is the term used to describe estuaries and lagoons. The ecological status of these waters has been assessed using data from 2019 to 2024, as many of the biological assessments are undertaken over a six-year period. The saline waters of Ireland are comprised of 307 water bodies (110 coastal and 197 transitional) and approximately 40% of these are monitored in the national water quality monitoring programme.

4.2 Summary for Transitional and Coastal Waters

- 48 transitional water bodies (30%) are in high or good ecological status and 112 (70%) are in moderate, poor or bad ecological status.
- 80 coastal water bodies (82%) are in high or good ecological status. 14 coastal water bodies (15%) are in moderate ecological status, 2 are poor and 1 is in bad status. In terms of surface area, 98% of coastal waters are in high or good ecological status.
- 20% of transitional and coastal water bodies have nitrogen concentrations that are too high.
- Loadings of phosphorus and nitrogen to the marine environment have shown a reduction in 2024 after a period of increases since 2013. The largest inputs are in the south east of the country and in many areas are still too high, despite the recent reductions.

4.3 National Ecological Status

Figure 4.1 shows that 48 (30%) transitional water bodies are in high or good ecological status and 112 (70%) are in moderate or worse ecological status. Six of these water bodies are in bad ecological status (the worst status class) and 19 are in poor ecological status (these are listed in Table 4.1).

Figure 4.1 Ecological status of transitional waters during 2019-2024, by number and by area (km^2)

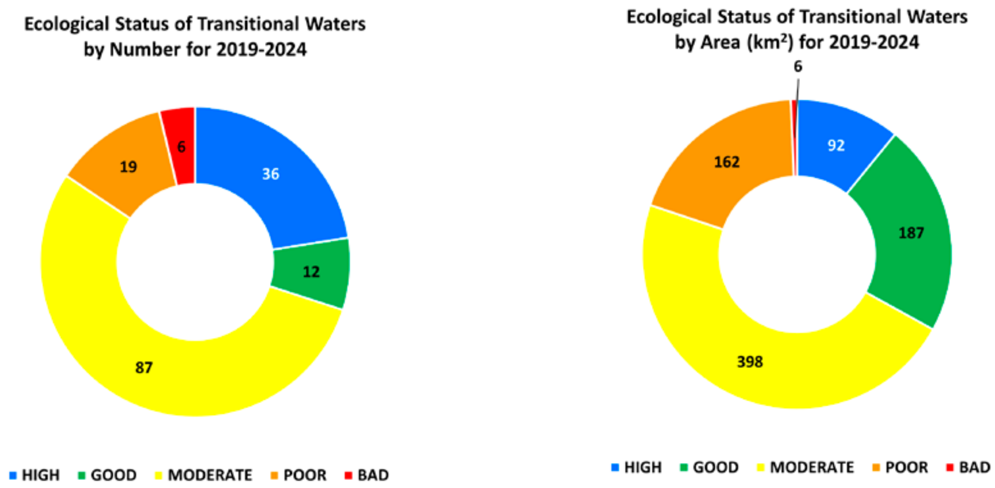


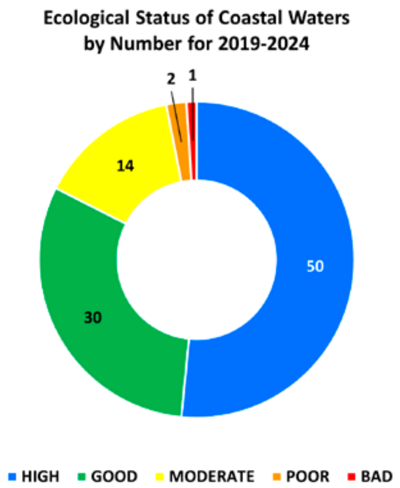
Table 4.1 Transitional water bodies at poor and bad status, and the main biological element responsible for determining status

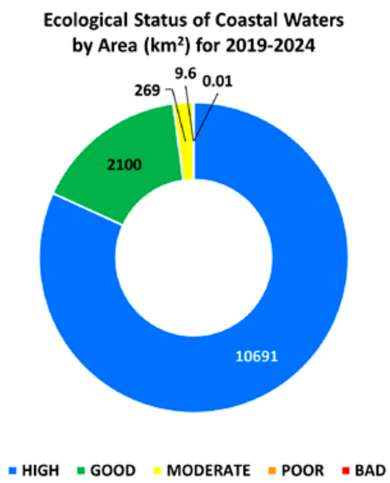
Water Body	Status	Main biological element responsible
Ballyteige	Poor	Lagoonal communities
Boyne Estuary	Poor	Fish
Durnesh	Poor	Lagoonal communities
Garavoge Estuary	Poor	Phytoplankton
Ilen Estuary	Poor	Phytoplankton
Inner Dundalk Bay	Poor	Phytoplankton
L. Donnell	Poor	Lagoonal communities
Lady's Island Lake	Poor	Lagoonal communities
Lee (Cork) Estuary Lower	Poor	Phytoplankton
Limerick Dock	Poor	Fish
Loch an tSaile, North of Camus Bay	Poor	Fish
Lower Bandon Estuary	Poor	Phytoplankton
Lower Slaney Estuary	Poor	Phytoplankton
Rogerstown Estuary	Poor	Macroalgae
Shannon	Poor	Lagoonal communities
Swilly Estuary	Poor	Phytoplankton
Tolka Estuary	Poor	Macroalgae
Upper Shannon Estuary	Poor	Angiosperms
Upper Suir Estuary	Poor	Phytoplankton

Water Body	Status	Main biological element responsible
Cuskinny	Bad	Lagoonal communities
Kilkerran	Bad	Lagoonal communities
Cashen	Bad	Phytoplankton
Castletown Estuary	Bad	Phytoplankton
Upper Bandon Estuary	Bad	Phytoplankton
Upper Feale Estuary	Bad	Phytoplankton

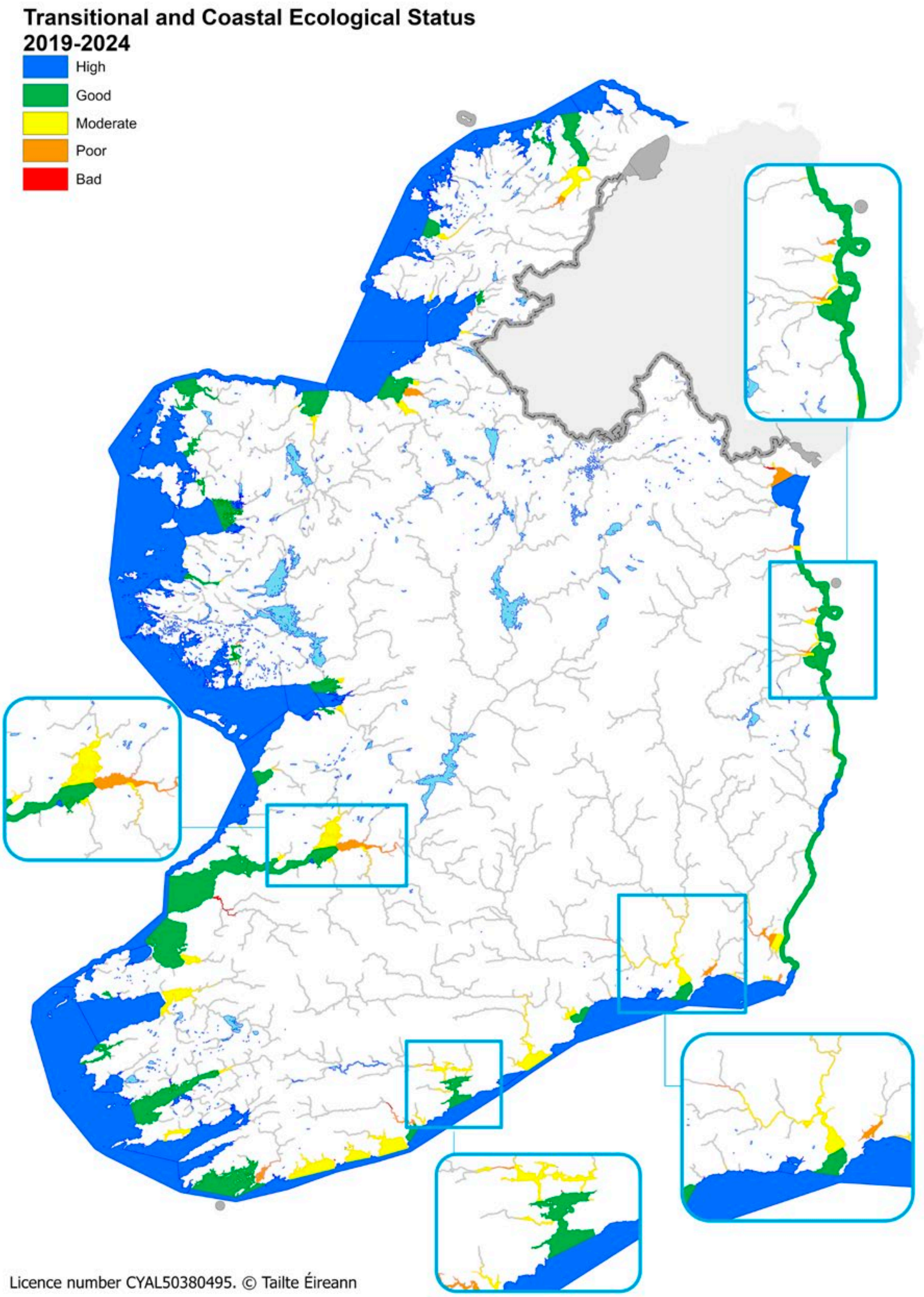
Figure 4.2 shows that for coastal waters, 80 water bodies (82%) are in high or good ecological status, with 17 (18%) at less than good status. The majority (98%) of the surface area of coastal waters are in high or good ecological status. Two small coastal lagoons Rincarna Pool and Scattery Island lagoon north were bad and poor status. Bannow Bay was at poor status due to elevated growths of opportunistic macroalgae.

Figure 4.2 Ecological status of coastal waters during 2019-2024, by number and by area (km²)





Map 4.1 Ecological status of transitional and coastal water bodies during 2019-2024



4.4 Factors Determining Ecological Status

Transitional waters

The biological, physico-chemical and hydromorphological elements used to determine transitional water status are shown in Figure 4.3. As can be seen the biological quality elements which have determined overall status varies across water bodies.

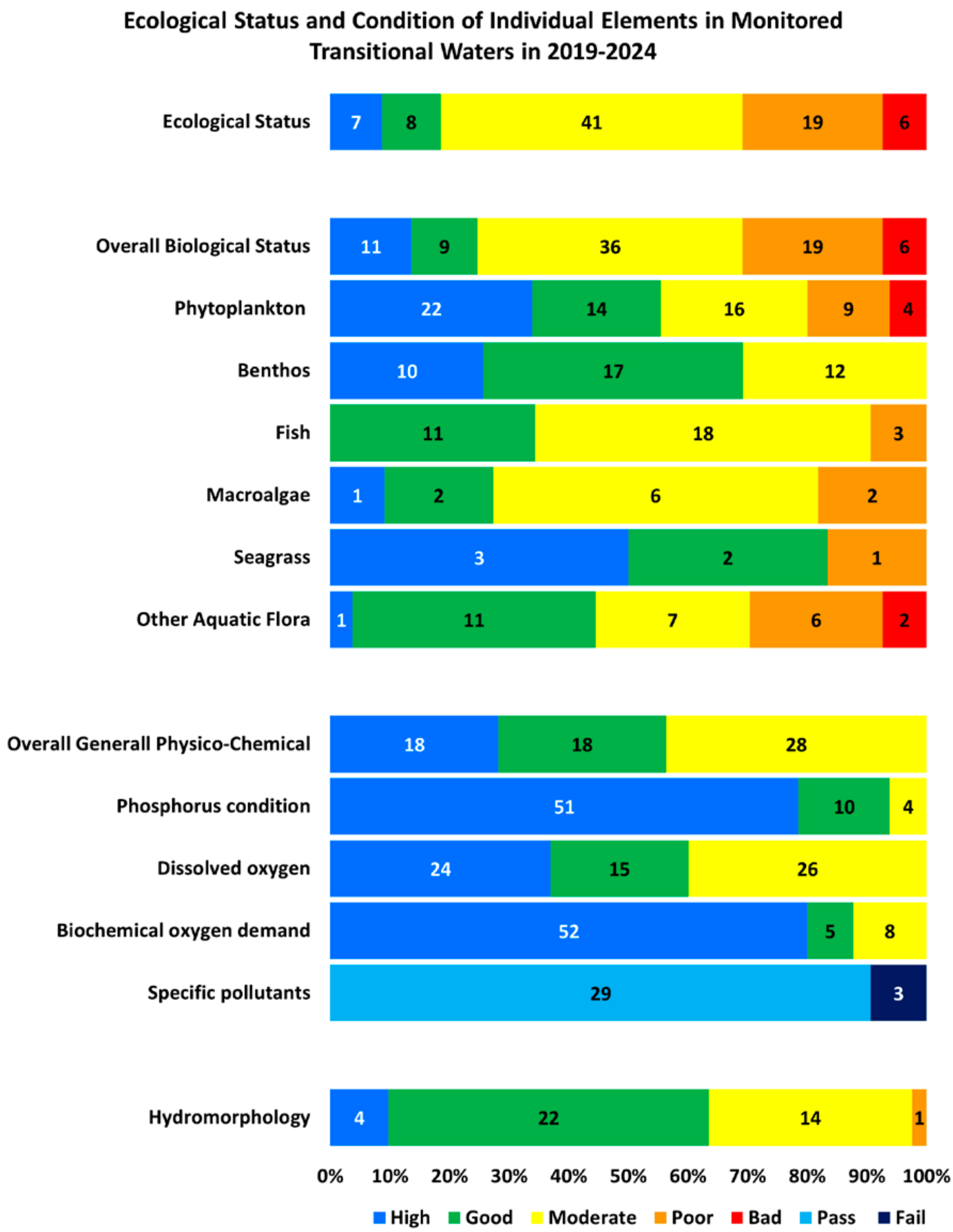
Phytoplankton is assessed in most transitional water bodies, and 45% of the water bodies assessed are in moderate or worse status based on the condition of this biological element. Fish status is also a key element for the classification of transitional water bodies, with 43% of water bodies assessed for fish in unsatisfactory status. The remaining water bodies assessed for fish were in good ecological status, none reached high status.

Macroalgae monitoring looks at rocky shore seaweeds and opportunistic algae (large accumulations of green, commonly known as sea lettuce blooms, or brown seaweeds such as in Dublin Bay or Dundalk Bay). Eight water bodies were at moderate or poor status. Intertidal seagrass communities are a sensitive and protected habitat and have been used as an element since 2007; while most areas assessed were high or good, one water body, Rogerstown Estuary was assessed as poor status.

For the supporting physico-chemical elements, oxygenation conditions are the main driver of status. Water bodies are assessed against two standards for dissolved oxygen concentrations, one to look at reduced oxygen concentration because of oxygen consumption of polluting organic matter and the second to look at elevated concentration which can indicate excessive algal growth. The lowest oxygen concentrations were found in the Lee estuary, Cork (43%), the Lee Estuary in Tralee, Co. Kerry (55%) and the Feale estuary Co. Limerick (59%). The highest concentrations were found in the Deel Estuary (185%), the Castletown estuary and Inner Dundalk Bay, Co. Louth (155%) and Lough Mahon, Co. Cork (138%).

Four water bodies, out of the 103 assessed, breached the salinity-related environmental quality standard for phosphorus (as molybdate reactive phosphorus (MRP)). These include the Maigue and Deel estuaries that flow into the Shannon estuary, the Broadmeadow, Co, Dublin and the Cashen estuary, Co. Limerick.

Figure 4.3 Ecological status and condition of individual biological quality elements, physico-chemical elements and hydromorphological quality elements in transitional waters in 2019-2024. Phosphorus condition is based on the assessment of molybdate reactive phosphorus (MRP).



Coastal waters

In coastal waters the primary biological quality elements used for assessment of ecological status are phytoplankton and benthic invertebrates.

Fish are not used as a biological element in coastal waters for the WFD.

An overview of the relative impacts of individual biological elements on ecological status of coastal waters is shown in Figure 4.4. Based on the assessment of phytoplankton, most areas were in high or good ecological status except for Wexford harbour which was moderate.

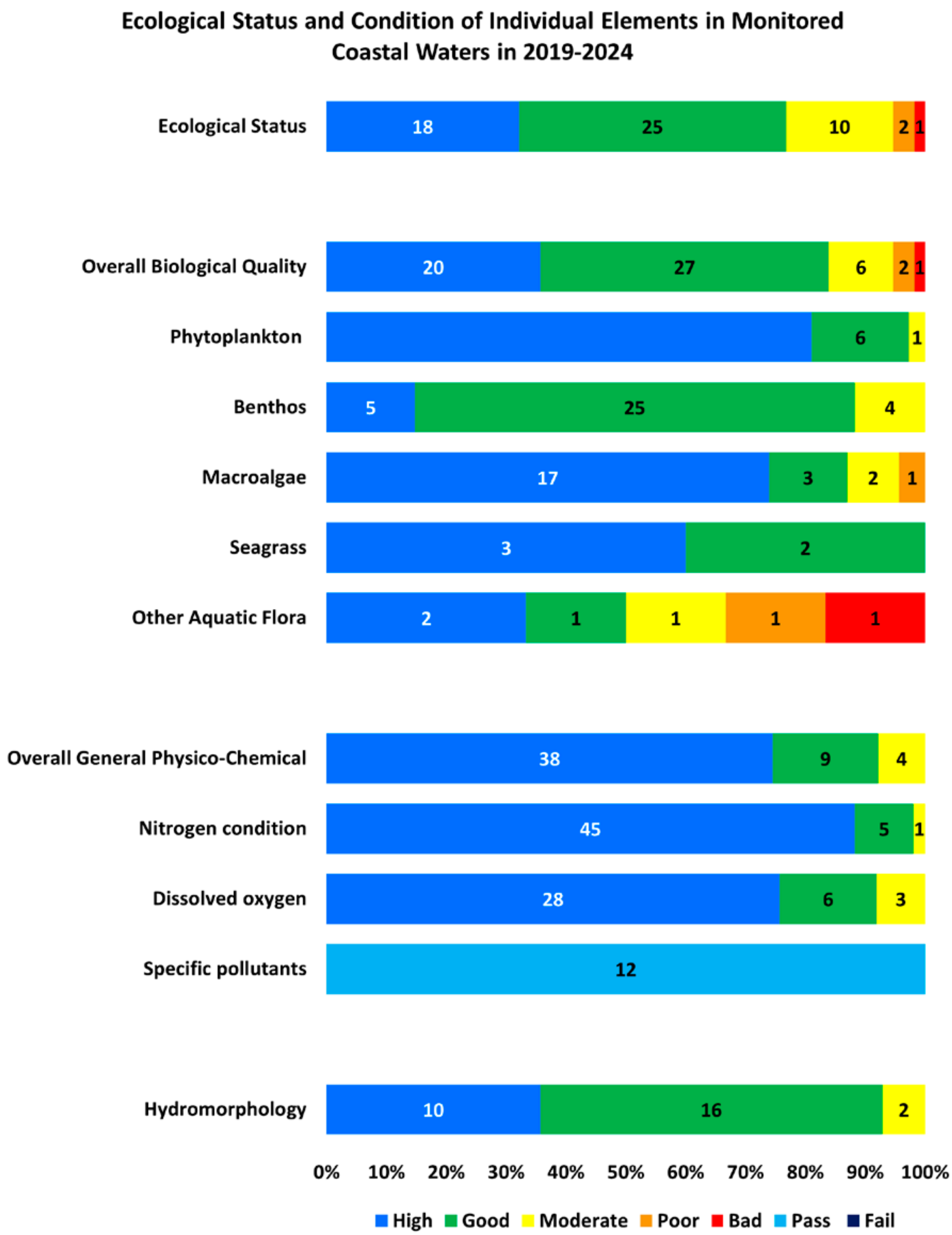
Four coastal water bodies, including one small lagoon, Portavaud east, were in moderate ecological status based on the condition of the benthic invertebrate quality element: Inner Tralee Bay, Co. Kerry, Berehaven, Co. Cork and Wexford Harbour. Some areas previous classified as moderate for this element in the 2016-2021 period, such as Clew Bay and Sligo Bay, have returned to good or high status.

The macroalgal quality element is assessed in coastal waters primarily by looking at seaweed diversity on rocky shores, but also by looking at green algal growths in a limited number of coastal areas with suitable intertidal habitat. Based on the diversity of seaweeds found on rocky shores all water bodies assessed were in good or high ecological status. Malahide Bay and Youghal Bay were moderate and Bannow bay was poor due to excessive growths of opportunistic seaweeds.

A single coastal water body, Rincarna Pools lagoon was in bad ecological status. This was due to the effects of eutrophication on the plant communities.

In coastal waters the main physico-chemical elements assessed are dissolved oxygen (DO) and nitrogen (as dissolved inorganic nitrogen (DIN)) which is generally considered to be the limiting nutrient in marine waters. When there is too much nitrogen present this can cause excessive growth of algae which in turn can harm other plants and animals. All but one, the Boyne Estuary Plume zone, of the coastal water bodies assessed passed the environmental quality standard for DIN although 5 were in the good category. For dissolved oxygen, three water bodies failed the environmental quality standard. These were: Clonakilty Bay and Courtmacsherry Bay, Co. Cork (both >125%) and Killybegs Harbour, Co. Donegal (<77%).

Figure 4.4 Ecological status and condition of individual biological, physico-chemical and hydromorphological quality elements in coastal waters in 2019-2024. Nitrogen condition is based on the assessment of dissolved inorganic nitrogen (DIN).



4.5 Hydromorphology in Transitional and Coastal Waters

Hydromorphology was assessed in 41 transitional and 28 coastal waters using the Hydromorphological Quality Index developed by the EPA. For transitional waters 26 water bodies (63%) were in high or good hydromorphological condition and 15 (37%) were in moderate or worse condition.

In coastal waters 26 (93%) water bodies were high or good ecological status and 2 (7%) were unsatisfactory at moderate ecological status.

Changes between this assessment and the previous period are largely due to improved assessment data rather than any change in environmental conditions.

4.6 Changes and Trends

Figure 4.5 and Figure 4.6 show the ecological status of transitional and coastal water bodies, respectively, over five assessment periods. The comparisons are done on a subset of 70 monitored water bodies to allow for a consistent assessment between different monitoring periods.

In transitional waters, the overall proportion of high and good status water bodies has declined further when compared to earlier periods (Figure 4.5). High and good categories have dropped by two water bodies and there has been an increase in poor and bad status.

In coastal waters, the proportion of water bodies in good ecological status increased up to the 2013-2018 period but declined in the 2016-2021 assessment (Figure 4.6). In 2019-2024, the number of moderate or worse status water bodies has reduced by 1. There has been a decline in high status from 10 to 8 water bodies.

Figure 4.7 shows the number of changes in both transitional and coastal waters between 2016-2021 and 2019-2024. Most coastal waters improved or declined by a single ecological class. In contrast, 4 transitional waters declined by 2 classes; Berehaven, Gweebarra Estuary, Loch an tSaile, North of Camus Bay, and Upper Feale Estuary.

Five of 11 (45%) transitional waters and 6 of 16 (38%) coastal waters with a high status objective are achieving high status in 2019-2024.

Figure 4.5 Changes in transitional water status since 2007 [11] (numbers of water bodies indicated)[12]

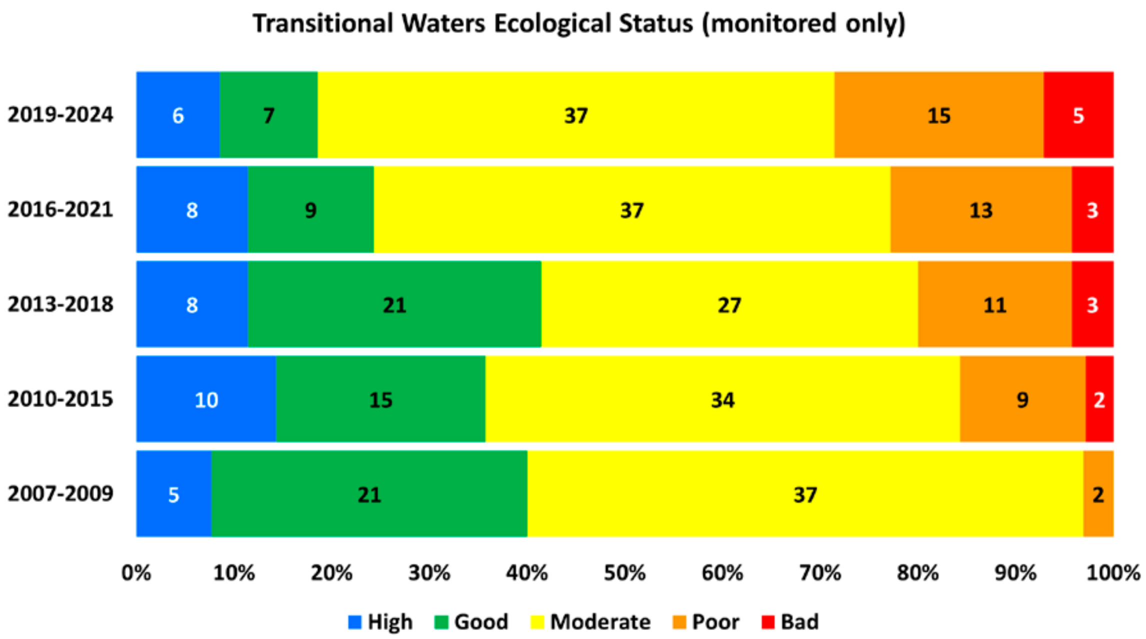
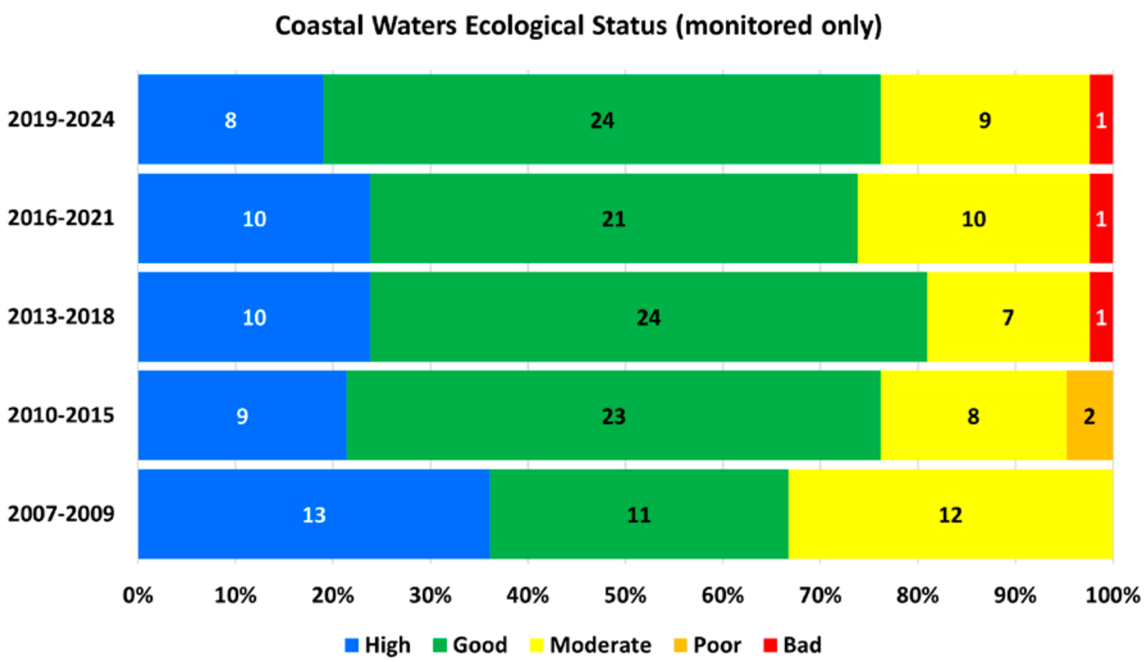


Figure 4.6 Comparison of coastal water status since 2007 (numbers of water bodies indicated)[13]

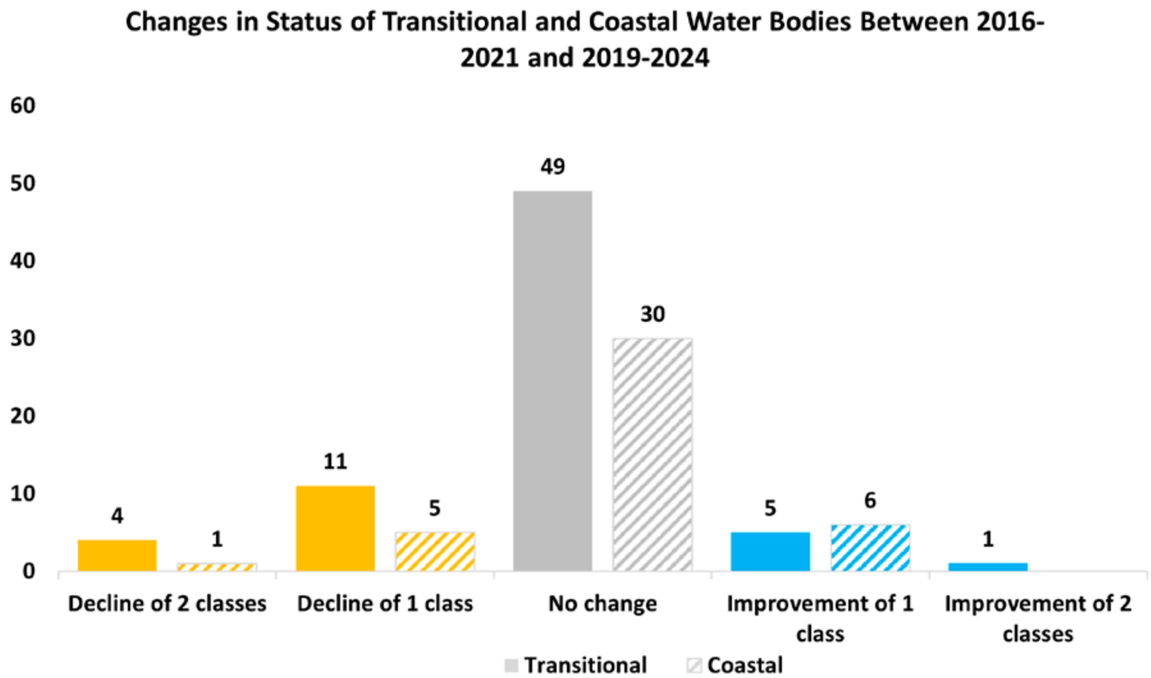


11 The monitoring programme in 2007-2012 was not fully operational, so some water bodies do not have comparable data.

12 NOTE: owning to an administrative error the previous report showed 10 Transitional water bodies in good status for the 2016-2021 bar

13 The numbers from the 2016-2021 period have been updated since the last published report.

Figure 4.7 Changes in status of monitored transitional and coastal water bodies between 2016-2021 and 2019-2024



4.7 Nutrients in Transitional and Coastal Waters

Nitrogen is considered the primary limiting nutrient in coastal systems while phosphorus or nitrogen can control the growth of phytoplankton and macroalgae in estuarine systems. In winter, the concentrations of both nutrients are expected to be at their highest due to the absence of any signification plant or algal growth. Salinity related thresholds have been defined for nitrogen and phosphorus and median nutrient concentrations above the thresholds indicates the presence of increased levels from pollution sources.

Nitrogen Winter Exceedances

Twenty-three (19%) of the 119 estuarine and coastal water bodies assessed were above the salinity-related nutrient criteria (Map 4.2) which ranges between 2.6 mg/l of N at the freshwater end of the spectrum to 0.25 mg/l of N at the fully saline end of the spectrum. All exceedances in this period were in transitional waters.

The water bodies with the highest dissolved inorganic nitrogen concentration were:

- Glashaboy Estuary, Co. Cork (5.8 mg N/l),
- Upper Barrow Estuary, Co. Kilkenny (4.8 mg N/l)
- Barrow Nore Estuary Upper, Co. Kilkenny (4.2 mg/l)
- Upper Slaney Estuary, Co. Wexford (4.1 mg/l)
- Corock Estuary, Co. Wexford (4.0 mg N/l)
- Upper Blackwater Estuary (3.8 mg N/l)
- Nore Estuary, Co. Wexford (3.5 mg/l)

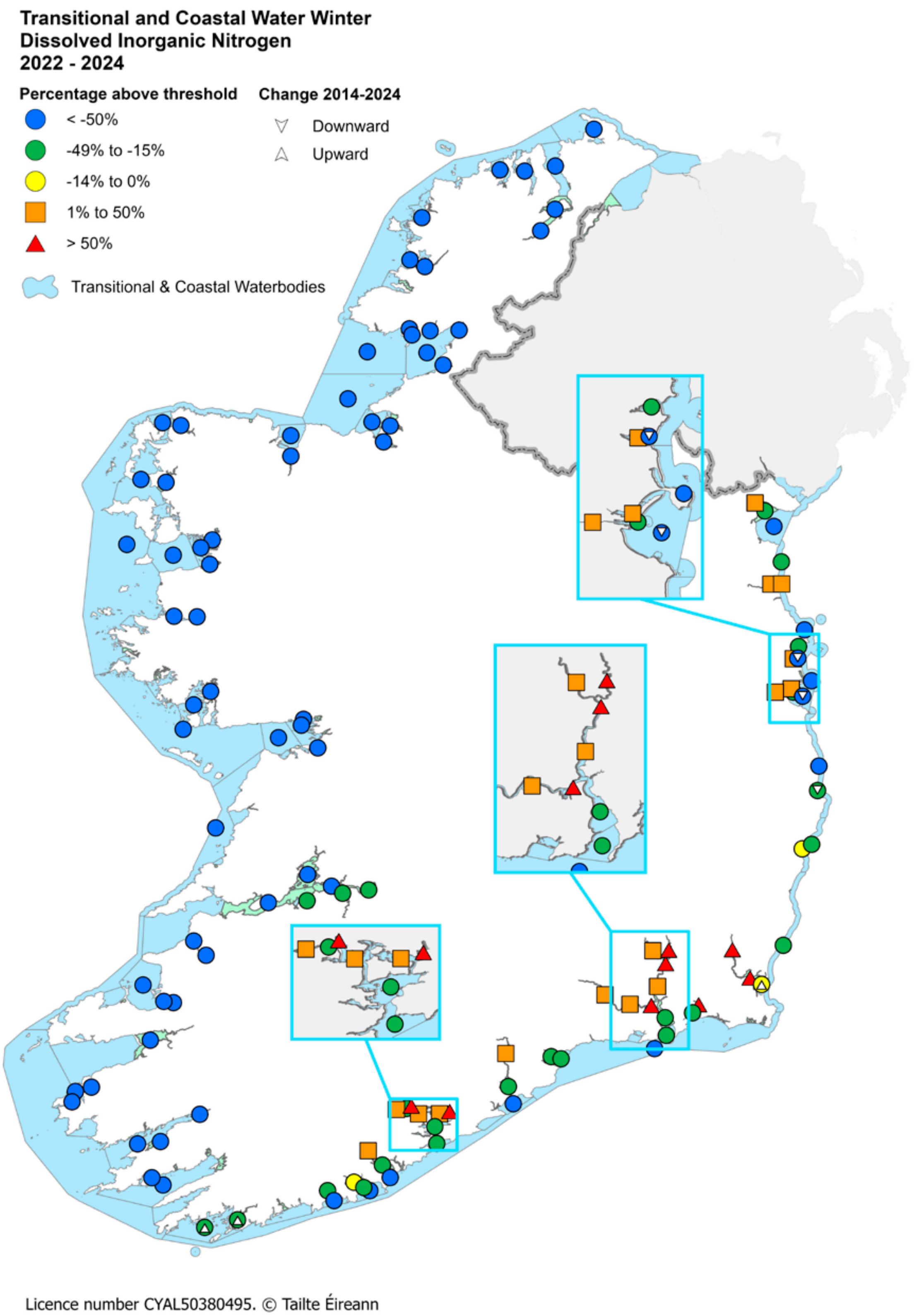
Nitrogen Trends

A trend analysis was undertaken of winter median nitrogen concentrations (as dissolved inorganic nitrogen) in estuarine and coastal water bodies from 2014 to 2024. Five water bodies showed a significant upward trend and three showed a significant downward trend; the remaining water bodies showed no trend. The water bodies with a significant trend up or down are listed in Table 4.2.

Table 4.2 Water bodies with a significant trend in winter median nitrogen concentrations

Water Body	Trend	County
Broad Lough	Down	Wicklow
Dublin Bay	Down	Dublin
Malahide Bay	Down	Dublin
Ilen Estuary	Up	Cork
Liffey Estuary	Up	Dublin
Lower Slaney Estuary	Up	Wexford
Roaring Water Bay	Up	Cork
Wexford Harbour	Up	Wexford

Map 4.2 Nitrogen winter exceedances above the salinity related assessment thresholds



Phosphorus Winter Exceedances

Only three of the 119 water bodies assessed, the Maigue estuary and the Deel estuary in Co. Limerick and the Cashen Estuary, Co. Kerry exceeded the relevant salinity-related winter phosphorus thresholds (Map 4.3). The majority of estuaries and coastal waters (96%) had median winter phosphorus concentrations less than 0.04 mg/l (the environmental quality standard for transitional waters), over 60% of these having levels less than 0.02 mg/l P.

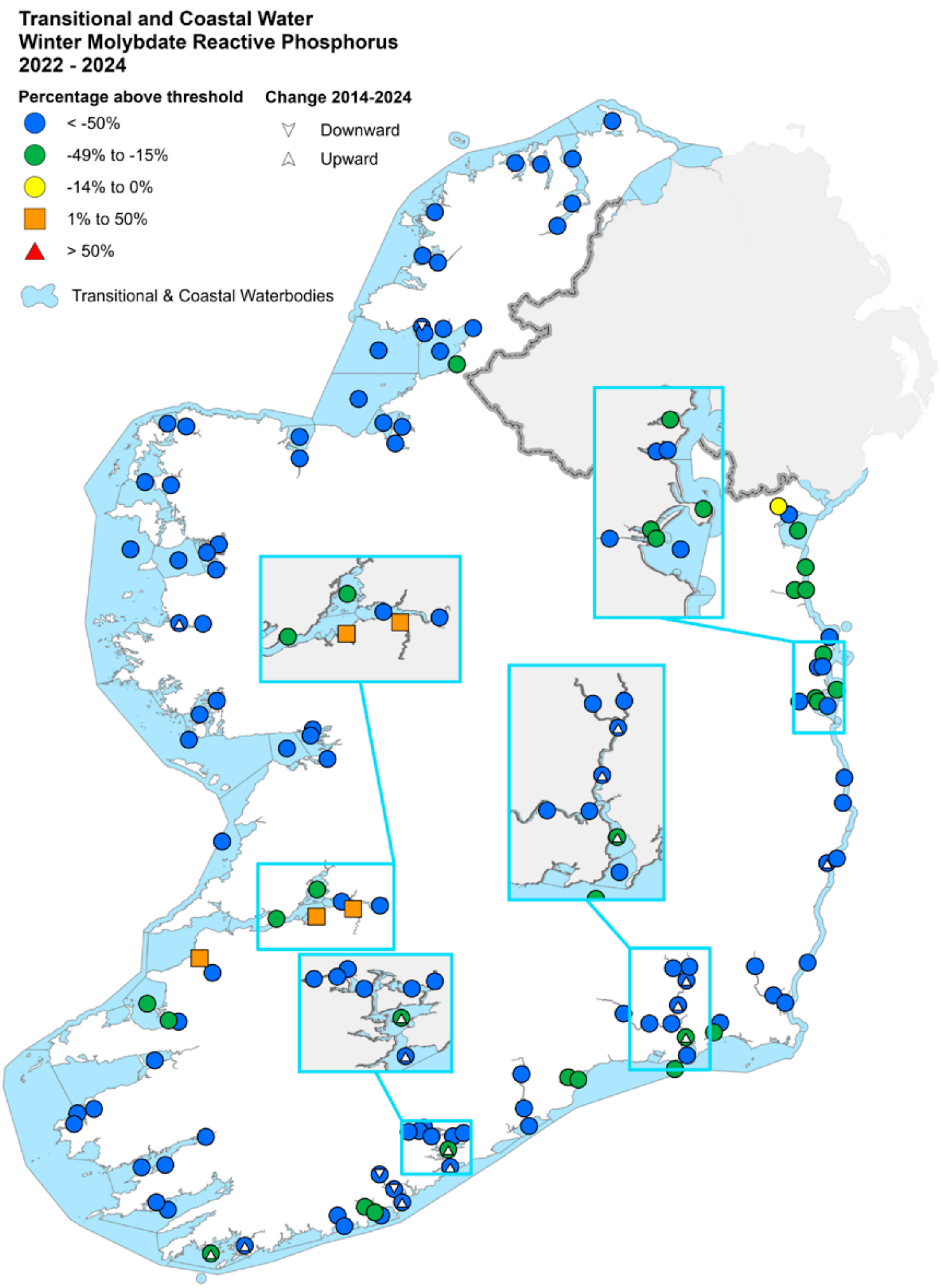
Phosphorus Trends

Trend analysis was also carried out for winter median phosphorus concentrations (as molybdate reactive phosphorus). Of the water bodies included in the analysis, ten water bodies showed an upward trend, 3 showed a significant downward trend and the rest showed no trend. The water bodies with a significant trends up and down are listed in Table 4.3.

Table 4.3 Water bodies with a significant trend in winter median nitrogen concentrations

Water Body	Trend	County
Killybegs Harbour	Down	Donegal
Lower Bandon Estuary	Down	Cork
Upper Bandon Estuary	Down	Cork
Avoca Estuary	Up	Wicklow
Barrow Nore Estuary Upper	Up	Kilkenny
Cork Harbour	Up	Cork
Ilen Estuary	Up	Cork
Killary Harbour	Up	Galway
New Ross Port	Up	Kilkenny
Outer Cork Harbour	Up	Cork
Roaring Water Bay	Up	Cork
Barrow Suir Nore Estuary	Up	Kilkenny/Waterford
Kinsale Harbour	Up	Cork

Map 4.3 Phosphorus winter exceedances above the salinity related assessment thresholds

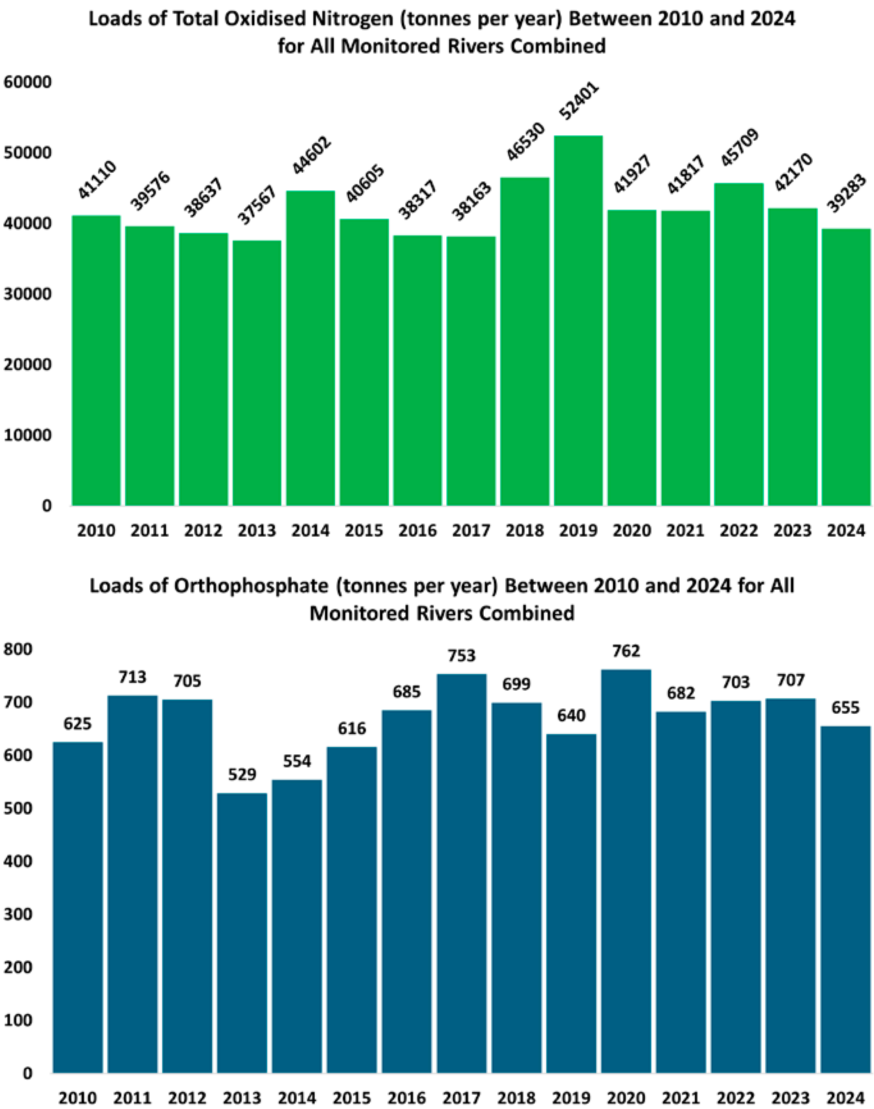


4.8 Nutrient Inputs to the Marine Environment

Nutrient Inputs to the Marine Environment

As part of the Oslo Paris Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR), monitoring of nutrient inputs from 19 major Irish rivers to estuarine and coastal waters has been ongoing since 1990. Measuring these inputs provides a useful indicator of trends in the transfer of nutrients from land-based sources. The inputs are calculated based on nutrient concentrations, which are measured 12-times a year, and river flow, which is measured continuously. Loads can fluctuate between years depending on the weather, particularly rainfall. To remove the influence of inter-annual changes in river flow, the inputs are normalised by a factor which represents the long-term average flow rate for each river.

Figure 4.8 Loads of total oxidised nitrogen and Orthophosphate (tonnes per year) between 2010 and 2024 for all monitored rivers combined

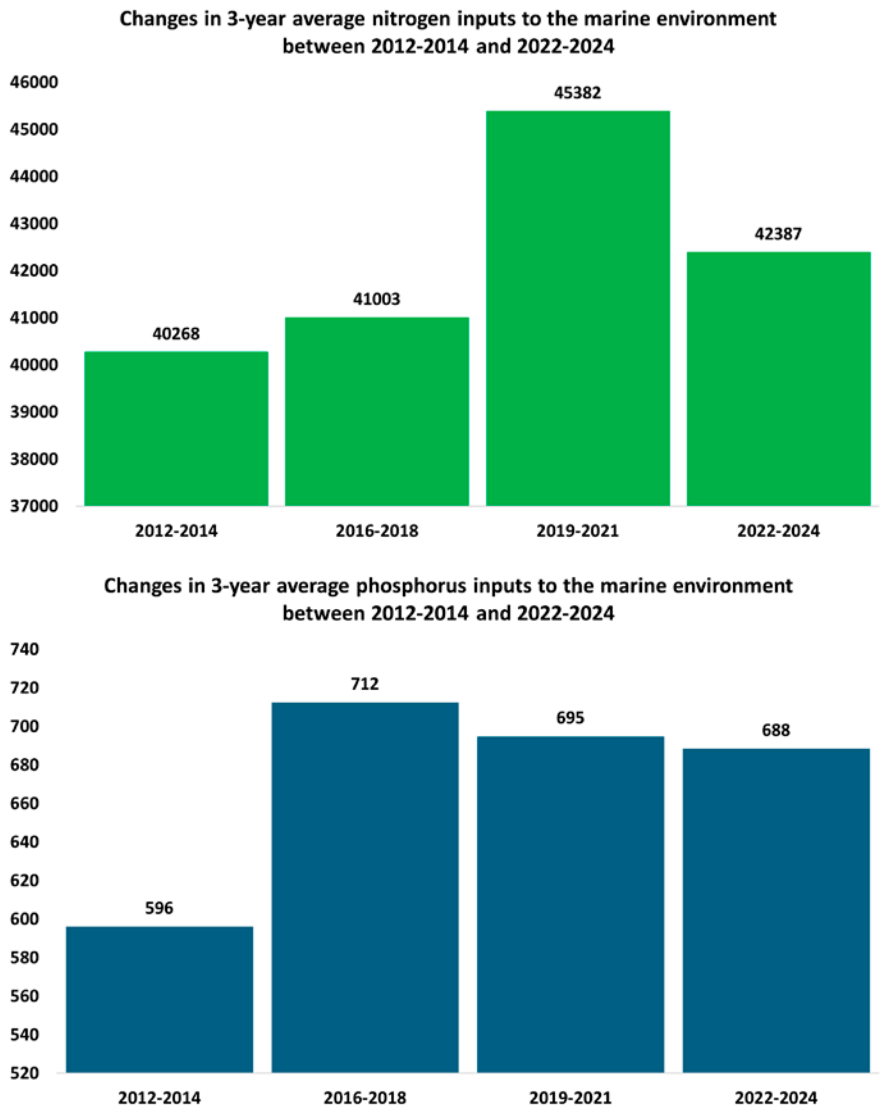


Nitrogen is expressed as loadings of Total Oxidised Nitrogen (TON). TON loads in 2023 showed a small reduction and this has continued into 2024 (Figure 4.8). The catchments with the largest contributions of nitrogen are in the south and southeast of the country.

Inputs of phosphorus are expressed as loadings of orthophosphate (PO_4). Loads of orthophosphate had shown an increase since 2019 to 2023 but have reduced in 2024 (Figure 4.8).

The previous Water Quality in Ireland report for 2016 to 2021 showed that loads of nutrients entering the marine environment were increasing, however the data for the last few years suggest that this trend is starting to reverse. The average loads for 2022-2024 for TON are 7% lower than the 2019-2021 average, though still higher than 2016-2018. Phosphorus loads have reduced by 1% for 2022-2024 compared to 2019-2021 (Figure 4.9).

Figure 4.9 Changes in 3-year average nitrogen and 3-year average phosphorus inputs to the marine environment between 2012-2014, 2016-2018, 2019-2021 and 2022-2024



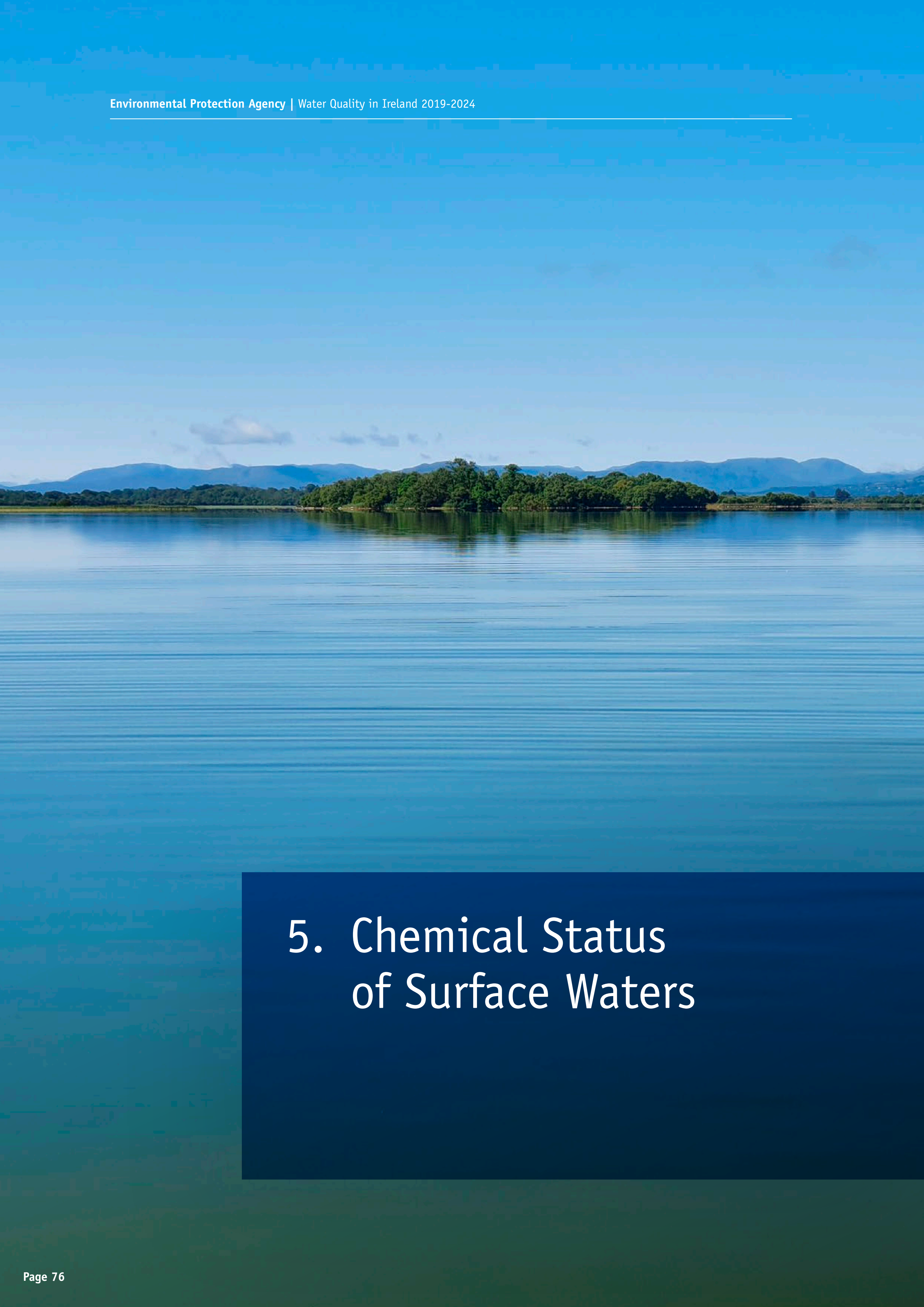
4.9 Conclusion

Transitional and coastal waters have seen a further decline in status in this assessment. While there have been reductions in nutrient inputs to the marine environment in many areas these are still too high and remain a strong driver of ecological status.

Many of the declines are in the southwest, although changes have been seen across the country. While in the south west nutrient pressures appear to be the primary driver, around the country changes have been seen across different assessment elements. This suggests that multiple pressures are driving status in our estuaries and coasts.

Some improvements have been seen in areas that had previously declined, Waterford harbour for example has returned to good status, although the water bodies upstream all remain at moderate or worse. Clew Bay and Sligo Bay, previously moderate due to benthic invertebrate status, have also returned to good status in this assessment.

Transitional waters continue to be the worst performing surface water category with only 30% reaching high or good status, down from 35% in the last assessment. This continued decline reflects their position as the ultimate receptors of pressures from the upstream catchments. Catchment measures must consider the estuarine environment to ensure that reductions in pressures, primarily nutrients, are sufficient to drive improvements in these water bodies.



5. Chemical Status of Surface Waters

5. Chemical Status of Surface Waters

5.1 Introduction

The Chemical Status of a river, lake, transitional, or coastal water is an indication of how polluted the water body is by hazardous chemicals, such as pesticides and heavy metals. Chemical status is assessed against compliance with the Environmental Quality Standards (EQS) Directive[14]. This directive sets out EQSs (or concentration limits) for approximately 48 chemical substances. The EQS Directive aims to protect the most sensitive species from direct toxicity as well as predators and humans that may be exposed to chemical pollution. An EQS may apply to either water or biota (e.g. fish tissue), depending on which is the most appropriate matrix for assessing the impact of that substance. Where concentrations in excess of the EQS are found for one or more substance the water body is deemed to fail to achieve good chemical status. Chemical substances that persist in the environment many years after their use has ceased (e.g. mercury and Poly Brominated Diphenyl Ethers (PBDEs) in fish tissue) are known as ubiquitous substances. Chemical status is reported with and without ubiquitous substances.

5.2 Summary for Chemical Status of Surface Waters

- All surface water bodies fail to achieve good chemical status due to the presence of Poly Brominated Diphenyl Ethers (PBDEs) and mercury in fish at concentrations above environmental standards.
- When ubiquitous substances (PBDEs and mercury in fish) are excluded, the assessment shows that 18% of Irish Surface bodies failed to achieve good chemical status.
- Mercury and other metals in water, pesticides, and per- and poly-fluoroalkyl (PFAS) chemicals in water, are the main causes of non-ubiquitous failures.

5.3 Monitoring Programme Overview

The monitoring programme for hazardous substances in rivers, lakes, estuaries and coastal waters is based on risk assessments of 48 priority substances identified under the EQS Directive and some other substances that may pose a risk to water quality in Ireland. The monitoring programme uses the surveillance network of the national water quality monitoring programme (a representative sub-set of all Irish surface waters) to provide a comprehensive and long-term picture of the concentrations of these substances in waters. The programme is run on a six-year cycle with most water bodies monitored intensively for one year during the cycle. The programme also includes targeted monitoring in areas where there are known or suspected sources of hazardous substances, for example monitoring for cadmium, nickel and lead close to historic mining sites, for per- and poly-fluoroalkyl (PFAS) chemicals close to known PFAS contaminated sites, and for certain insecticides (e.g. cypermethrin) at river sites where hazardous substance impact on aquatic insect populations is suspected. The scope, frequency, and duration of targeted monitoring varies depending on the evidence requirement and is reviewed annually. In surveillance water bodies, monitoring is conducted for a large number of substances at a high frequency. At targeted water bodies, monitoring is only undertaken for the targeted substance at a frequency sufficient to allow compliance checking against the relevant EQS.

14 As listed in the Environmental Quality Standards Directive (2008/105/EC) as amended by the Priority Substances Directive (2013/39/EU)

Where monitoring data is available for a water body, chemical status is assigned by assessing the compliance of the monitoring data with the relevant EQS. Data from monitoring of 255 surveillance sites and 189 targeted sites during the period 2019-2024 was used to assess chemical status.

5.4 Chemical Status Failures

Poly Brominated Diphenyl Ethers (PBDEs) and Mercury in Biota

In 49 of the 50 water bodies where fish (lakes and rivers) and in 21 of the 24 water bodies where shellfish (estuaries and coastal waters) was tested for poly brominated diphenyl ethers (PBDEs), concentrations in excess of the environmental quality standards (EQS) were found. In 45 of the 51 water bodies where fish was tested and 5 of the 25 water bodies where shellfish was tested for mercury, concentrations in excess of the EQS were found. The concentrations of PBDEs and mercury in shellfish are typically lower than the concentrations in fish because shellfish are at a lower trophic level (further down the food chain) and so do not bioaccumulate as much PBDEs or mercury as a fish would. The EQSs for PBDEs and mercury are set for fish.

PBDEs are man-made flame retardants that were used as coatings on many products. Their use has been banned in Europe since 2010, but some contaminated products remain in circulation. The disposal of these can result in the release of PBDEs to air and water. In wastewater treatment PBDEs can end up in sewage sludge, the land spreading of which can result in PBDEs being lost to water.

Mercury is released into the environment from sources such as burning of fossil fuels, industrial emissions, historic mining activities, and wastewater treatment plants and enters water bodies via atmospheric deposition or discharges. Restrictions on the uses of mercury have reduced emissions.

PBDE and mercury in biota EQS exceedances were widely distributed, and failures were detected in areas free from any known direct sources. This suggests the sources are many and diffuse. The results are in line with the OSPAR assessments of marine contaminants[15]. The high exceedance rates are consistent with rates reported for the UK[16 17] and in Europe, where most or all water bodies monitored have exceedances for mercury and PBDEs in biota. It should be noted that although most fish in Irish waters contain concentrations of mercury above the EQS, they are well below the food regulatory standard and do not represent a risk to the human consumer providing advice from the food safety authority is followed[18]. Likewise, most fish contain concentrations of PBDE above the EQS. No food regulatory limit has been set for PBDEs, but the issue is under review by the European Food Safety Authority[19]. The OSPAR assessments indicate PBDE and mercury concentrations in biota are reducing over time.

Given the high level of exceedances in the 2019-2024 monitoring dataset it is very likely that more widespread testing would result in all Irish surface water bodies failing to achieve good chemical status due to EQS exceedances for PBDEs and mercury in biota.

15 https://oap.ospar.org/en/ospar-assessments/committee-assessments/hazardous-substances-and-eutrophication/mime/cemp-levels-and-trends-marine-contaminants/cemp-2025/

16 polybrominated-diphenyl-ethers-pressure-rbmp-2021.pdf

17 Mercury: challenges for the water environment – GOV.UK

18 https://www.fsai.ie/consumer-advice/food-safety-and-hygiene/chemicals-in-food/mercury-and-fish-consumption

19 https://www.efsa.europa.eu/en/efsajournal/pub/8497

5.5 Chemical Status Failures – Other Substances

When PBDE and mercury in biota failures were excluded, 96 of the 444 monitored water bodies failed to achieve good chemical status due to EQS exceedances for one or more priority substance. These EQS exceedances were for PAHs, mercury in water, cadmium, nickel, lead, cypermethrin, and perfluoro-octanyl sulphonic acid (PFOS) in water and Heptachlor in biota. In total 124 EQS exceedances were found in the 96 water bodies.

Figure 5.1 Number of monitored water bodies with EQS exceedances excluding PBDE and mercury (Hg) in biota 2019-2024

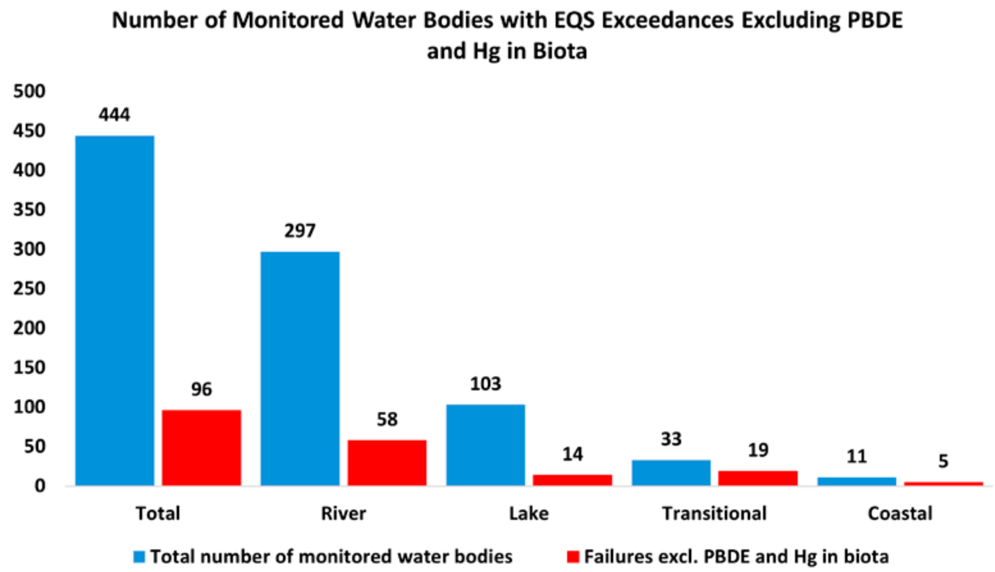
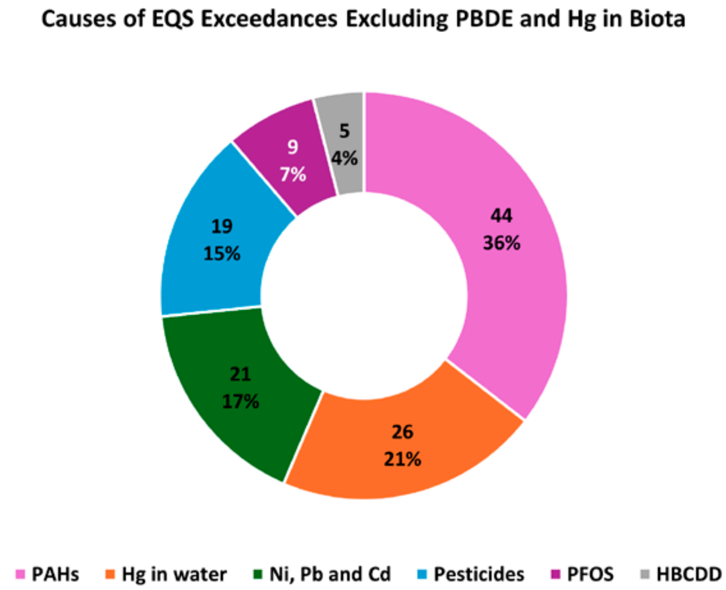


Figure 5.2 Causes of EQS exceedances in monitored water bodies excluding PBDE and mercury (Hg) in biota 2019-2024. PAHs = Polycyclic Aromatic Hydrocarbon substances, Ni, Pb and Cd = nickel, lead and cadmium, PFOS = Perfluoro-octanyl Sulphonic Acid, and HBCDD = Hexa-Bromo-Cyclo-DoDecane.



Polycyclic Aromatic Hydrocarbon substances (PAHs)

Forty four of the 124 EQS exceedances (36%) were due to detections of benzo(a)pyrene and other PAH substances in water. PAHs are generated from the incomplete combustion of fuels, such as coal, wood, oil, petrol and diesel in both industrial and domestic settings. Other industrial sources include waste incineration, the production of bitumen and asphalt, and the production, use and disposal of rubber tyres. PAHs enter water bodies via atmospheric deposition (rainfall), road run-off, and discharges from wastewater treatment plants. Similar to PBDE and mercury in biota, the PAH EQS exceedances were widely distributed, suggesting the sources are many and diffuse. PAH EQS exceedances in water are common in European waters[20].

In this assessment only PBDEs and mercury in biota and PAHs in water are considered widespread and ubiquitous. All other substances causing EQS exceedances have local sources.

Mercury in water

26 EQS exceedances (21%) were due to mercury in water. The causes of these mercury exceedances are likely to be direct emissions of mercury to water from local historical mining and industrial sites, wastewater treatment plants or leaching from historic landfill sites or farmland following application of contaminated sewage sludges.

Other metals in water

Twenty one EQS exceedances (17%) were due to cadmium, nickel, and lead, in water. Like mercury in water, these exceedances are likely to be mainly as a result of historical local mines and industries with leaching of metals from historic landfills and sewage sludges also likely sources.

Pesticides in water and biota

Nineteen EQS exceedances (15%) were due to detection of pesticides, mainly cypermethrin in water (13) and heptachlor in shellfish (5) above EQSs. Cypermethrin is an insecticide that enters the water environment through the use and disposal of plant protection products, veterinary medicines (sheep dip), landfill leachate, and wastewater treatment plants. It is not very persistent in the environment nor is it likely to bioaccumulate in aquatic organisms, but it is highly toxic to some species of aquatic life, particularly insects and crustaceans. The use of cypermethrin in veterinary medicines and forestry management has been phased out in recent years. However, cypermethrin EQS failures have been on-going in some rivers and lakes in the northwest and estuaries in the southeast since monitoring began in 2019. Heptachlor is an insecticide that is no longer in use but continues to cause some EQS failures in fish due to its persistence.

Perfluoro-octanyl Sulphonic Acid (PFOS) in water

Nine of the EQS exceedances (7%) were due to perfluoro-octanyl sulphonic acid (PFOS). PFOS is one of a large number of per- and poly-fluoroalkyl (PFAS) substances that are widely used in the manufacture of stain resistant clothes and household products as well as in industrial processes and fire-fighting foams. PFAS substances, often referred to as forever chemicals, are contaminants of emerging concern. Monitoring for PFAS began in Ireland in 2019. Rivers close to sites known to have PFAS contamination issues (Dublin and Cork airports) have PFOS concentrations in water above the EQS. The Nore and Suir estuaries also have PFOS concentrations in water above the EQS. Other PFAS substances, such as Perfluorooctanoic Acid (PFOA), have been detected regularly at elevated concentrations in rivers and estuaries. No EQS currently exists for PFOA. PFOS has not been detected in fish or shellfish at concentrations above the EQS.

20 Polycyclic aromatic hydrocarbons (PAHs): challenges for the water environment – GOV.UK

Hexa-Bromo-Cyclo-DoDecane (HBCDD) in water

Five EQS exceedances (4%) were due to detections of Hexa-Bromo-Cyclo-DoDecane (HBCDD**)** in water samples from a small number of estuaries (mostly in northwest) at concentrations above the EQS. HCCDD is a synthetic industrial chemical substance that was used to fireproof construction materials like polystyrene foams to manufacture thermal insulation boards for buildings. It was also used to coat textiles and fabrics in furniture and car interiors to meet fire safety requirements. It has been banned in Europe since 2016. Release of HBCCD into the environment is likely to be due to poor management of waste plastics, textiles and fabrics (e.g. in construction and demolition wastes). Similar to PBDEs, in wastewater treatment works, much of the HBCDDs end up in sewage sludge. Land spreading of sewage sludges can result in HBCDDs being lost to water during wet weather. Unlike PBDEs, HBCDD has not been detected in fish or shellfish above the EQS.

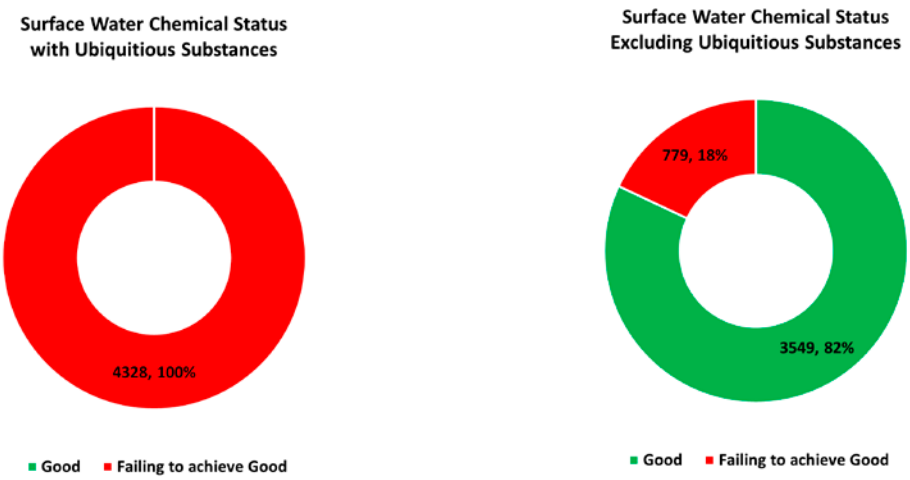
5.6 Chemical Status Assessment

Chemical status is assigned based on risk assessments and monitoring results for individual substances in Irish water bodies. Risk assessments consist of an initial screening for all substances and subsequent detailed assessments of substances where insufficient evidence exists to assign them as low risk of causing an EQS exceedance (and chemical status failure) in a surface water body.

All water bodies were assessed to have failed chemical status when ubiquitous (PBDE and mercury in biota and PAHs in waters) are included (Figure 5.3). When these ubiquitous substances are excluded, 47 of the 255 monitored surveillance water bodies (18%) failed to achieve good chemical status (Figure 5.3). Based on this representative subset of all water bodies, 18% fail chemical status when ubiquitous substances are excluded.

Targeted monitoring at a further 189 water bodies resulted the detections of an additional 27 chemical status failures due to non-ubiquitous substances. In total 74 water bodies were found to have failed chemical status due to non-ubiquitous substances.

Figure 5.3 Chemical status of 4,328 surface water bodies 2019-2024, with and without ubiquitous substances



5.7 Management of Priority Substances in Irish Waters

A failure to achieve good chemical status requires relevant measures to be introduced for the substance driving the failure.

For PBDEs, mercury, and PAHs controls have been introduced. The PBDEs listed under the WFD are banned and regulated as persistent organic pollutants which involves controls to remove them from waste recycling streams. Ireland is a signatory of the Minamata Convention which is focussed on protecting human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. This has resulted in many mercury containing materials being phased out. The Industrial Emissions Directive (2010/75/EU)[21] and Ambient Air Quality and Clean Air for Europe Directive (2008/50/EC)[22] restrict the emissions of PAHs. A focussed monitoring programme designed to assess trends in environmental levels of PBDEs, mercury and PAHs will be maintained to assess the effectiveness of these measures.

Banned/restricted substances which are not considered persistent and for which historic monitoring data has identified no exceedances are unlikely to drive a failure to achieve good chemical status. Based on this type of assessment, many of the 48 priority substances are no longer routinely monitored in surface waters. The risk assessments and monitoring programme are reviewed regularly as more monitoring data and other evidence becomes available or new regulations come into force.

The third category of substances which drive failures due to historic activity or current activity include the non-ubiquitous substances identified as causing the failure of chemical status above. In these cases, further development of the risk-based approach at a substance level is required to identify where local (or potentially national) measures may need to be implemented, such as the management of spent sheep dip to address cypermethrin EQS exceedances.

5.8 Conclusion

In the period 2019-2024, the assessment shows that all surface water bodies failed to achieve good chemical status due to biota EQS exceedances for PBDEs and mercury in biota. When PBDEs and mercury in biota EQS and PAH EQS in water failures are excluded 18% of surface water bodies failed to achieve good chemical status based on the representative subset of water bodies in the monitoring programme.

The risk assessments and monitoring programme will continue to be developed to improve the evidence base on hazardous chemicals in Irish waters and to identify other water bodies that fail chemical status.

21 2010/75/EU – https://eur-lex.europa.eu/eli/dir/2010/75/oj/eng

22 2008/50/EC – https://eur-lex.europa.eu/eli/dir/2008/50/oj/eng

6. Groundwater

6. Groundwater

6.1 Introduction

Groundwater originates as rainfall that soaks through the soil to the underlying subsoil and bedrock. Groundwater flows from the upper reaches of catchments through interconnected spaces or fractures in the subsoil or bedrock to the streams, rivers, lakes or estuaries. During periods when there is little or no rain, almost all the water flowing in streams and rivers originates from groundwater.

For management purposes, groundwater in Ireland is assigned, assessed and managed within 514 groundwater bodies, which range in size from less than 1 km^2 to 1,887 km^2.

6.2 Summary for Groundwater

- 93% (477) of groundwater bodies met their good chemical status objective and 99% (508) of groundwater bodies met their good quantitative status objective. 92% of bodies met both objectives, accounting for 95% of the country (68,012 km^2) by area.
- The average nitrate concentration in groundwater was below the threshold value of 37.5 mg/l NO_3 at 94% of monitoring locations during 2019-2024.
- The south east, and midlands and eastern regions of the country continue to have the greatest proportion of monitoring locations with elevated nitrate concentrations. The midlands and eastern region is where nitrate concentrations increased the most since 2019. This is attributed largely to the impact of nutrient losses from agricultural sources.
- The average phosphate concentration in groundwater was below the threshold value of 0.035 mg/l P at 91% of monitoring locations, with little change since the 2016-2021 assessment period.

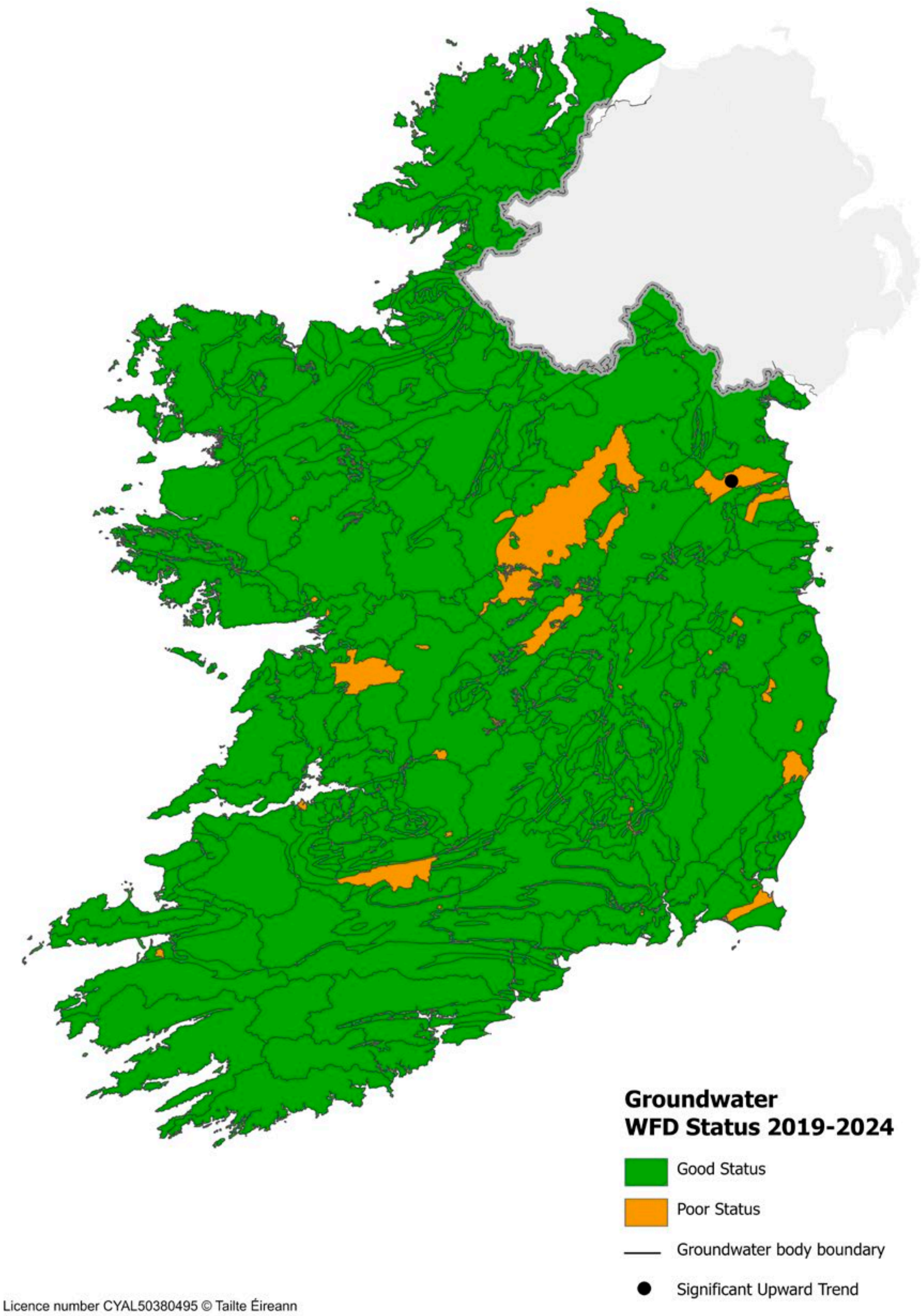
6.3 National Status

Of the 514 groundwater bodies, 471 (92%) met their good chemical and good quantitative status objectives in 2019-2024 (Map 6.1). Of the 43 poor status water bodies, 37 failed to meet the chemical status objective and six failed to meet the quantitative status objective.

29 of the 37 poor chemical status groundwater bodies are small groundwater bodies (0.4 to 16.1 km^2) and the significant pressures at these locations relate to largely historical contamination from point sources including mines, landfills and industry.

The Bettystown, and Fardystown groundwater bodies failed the water balance test and are at poor status due to abstraction pressures. Additionally, five of the poor quantitative status groundwater bodies (Fardystown, Tullamore, Inny, Charleville, and Inch) are associated with an impact of groundwater abstractions on surface water bodies.

Map 6.1 Groundwater status 2019-2024



6.4 Elements Determining Status

Groundwater status is determined using five chemical and four quantitative tests[23]. Each test is applied independently and the results are combined to give an overall assessment of groundwater body chemical and quantitative status. The worst-case from the relevant chemical status tests is reported as the overall chemical status, and the worst-case of the quantitative tests is reported as the overall quantitative status for the groundwater body. The worst result of the chemical and quantitative assessments is reported as the overall groundwater body status. The tests are as follows:

Chemical Status Classification Tests

- saline (or other) intrusions
- impact of groundwater on surface water ecological/chemical status
- groundwater dependent ecosystems (GWDTE) – chemical assessment
- drinking water protected area
- general chemical assessment

Quantitative Status Classification Tests

- saline (or other) intrusions
- impact of groundwater on surface water ecological/quantitative status
- groundwater dependent ecosystems (GWDTE) – quantitative assessment
- water balance

Table 6.1 provides a summary of the main elements that resulted in groundwater bodies failing to meet their chemical or quantitative status objective.

23 Details of the groundwater status tests are available in the EPA report Methodology for Establishing Groundwater Threshold Values, the Assessment of Chemical and Quantitative Status for Groundwater and Groundwater Trends https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/methodology-for-establishing-groundwater-threshold-values-the-assessment-of-chemical-and-quantitative-status-for-groundwater-and-groundwater-trends.php

Table 6.1 Summary of groundwater status

Groundwater assessment	2019-2024 Summary		2016-2021 Summary	
	Good status	Poor status	Good status	Poor status
General Chemical	484	30	482	32
Drinking Water	510	4	507	7
Surface Water Quality	510	4	510	4
GWDTE Chemical	512	2	512	2
Intrusions	514	0	514	0
Overall Chemical Status	**477**	**37**	**472**	**42**
Water Balance	512	2	513	1
GWDTE Quantity	514	0	513	1
Surface Water Quantity	509	5	514	0
Intrusions	514	0	514	0
Overall Quantitative Status	**508**	**6**	**512**	**2**
Overall Status	**471**	**43**	**470**	**44**

6.5 Changes and Trends

Overall, there has been little change in groundwater status since the 2016-2021 assessment period, with eight groundwater bodies declining to poor status and nine groundwater bodies improving to good status. Of the 43 poor status groundwater bodies, 37 are at poor chemical status and six are at poor quantitative status.

Since the last assessment period, there has been a reduction, from 32 to 29, in the number of poor status groundwater bodies associated with historical mining, industrial and waste sites.

One cross-border groundwater body (Crom Castle) is at poor status due to elevated Ammonium concentrations resulting in a failure of the general chemistry assessment.

Three of the four poor status groundwater bodies associated with the Surface Water Quality Test are due to groundwater contributing metals to rivers which are at less than good status in the historic mining areas of Avoca, Tynagh and Silvermines. The fourth is a cross-border groundwater body (Cooneen Water) where phosphate was identified by the Northern Ireland Environment Agency (NIEA) as the failing parameter.

In relation to groundwater bodies which supply drinking water, four were assigned poor chemical status, one of which is one cross-border groundwater body (Claudy). Overall, when compared to the previous assessment, this is a reduction from seven to four at poor status arising from the drinking water assessment. One (Cloughjordan-Moneygall Gravels) had previously been assigned good status, while the other three have remained at poor status. The assignment of poor status was due to exceedances of the standards for nitrate in three groundwater bodies and ammonium in the Claudy groundwater body (which is a cross-border groundwater body with elevated concentrations observed in Northern Ireland).

The ecological and water quality assessments of two turloughs (Caherglassaun and Skealoughan) indicated that these groundwater dependent terrestrial ecosystems (GWTDE) are not meeting their conservation objectives due to excessive phosphorus concentrations in groundwater. Therefore, the groundwater bodies relating to both turloughs are at poor status for the 2019-2024 assessment. The Skealoughan turlough groundwater body was at good status in the previous assessment period, while the Caherglassaun turlough groundwater body was previously at poor status. The Tullynafrankagh turlough groundwater body was assigned poor status in the previous assessment but has improved to good status in the 2019-2024 assessment period.

The impact of groundwater (and associated surface water) abstractions takes account of the new abstraction legislation and associated licensing regime[24]. One groundwater body (Bettystown) remains at poor status due to a failure of the water balance test and an additional groundwater body (Fardystown) has now failed this test. For the surface water quantity test, five groundwater bodies, including Fardystown, are identified as poor status due to the impact of groundwater abstractions on surface water bodies. A new methodology has been developed and therefore no groundwater bodies had previously failed this test.

A significant and sustained upward trend in nitrate concentration was identified in the Wilkinstown groundwater body. Within this groundwater body, one of the monitoring points, IE_EA_G_01021000008, already has average nitrate concentrations above 50 mg/l NO_3. This groundwater body is identified with a black dot on Map 6.1, in accordance with Groundwater Regulations[25].

6.6 Nutrients

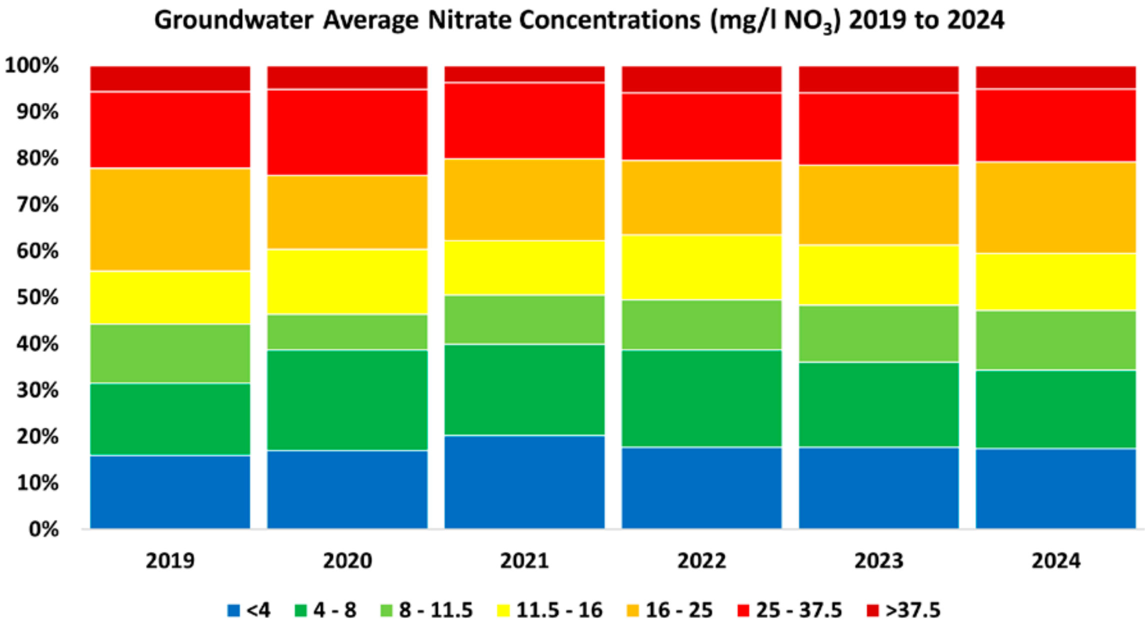
Overall, the average annual nitrate concentration was below the groundwater threshold value of 37.5 mg/l NO_3 at 94% of the monitoring locations over the assessment period 2019-2024.

Figure 6.1 shows that nitrate concentrations in our groundwaters are broadly stable over this assessment period. The percentage of monitoring stations with nitrate concentrations less than 8 mg/l NO_3 decreased by 4% when compared to the 2016-2021 period, whereas the percentage of monitoring points with concentrations less than 25 mg/l NO_3 increased by 1%. The percentage of monitoring sites greater than 25 mg/l NO_3 increased by a corresponding 3% over the period 2019-2024, when compared with the previous assessment period.

24 https://www.irishstatutebook.ie/eli/2024/si/419/made/en/print

25 https://www.irishstatutebook.ie/eli/2010/si/9/made/en/print

Figure 6.1 Annual average nitrate concentration in groundwater from 2019 to 2024

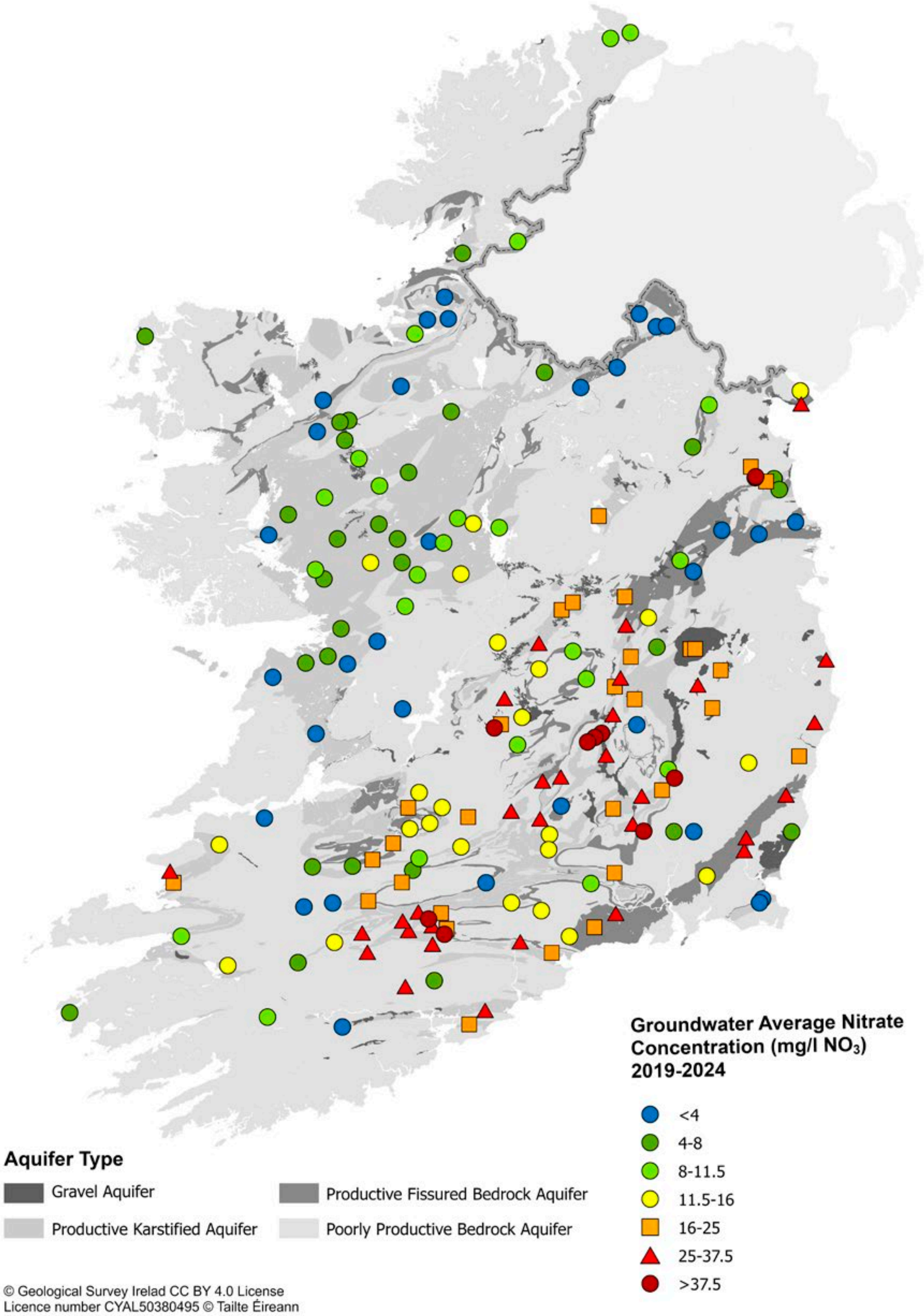


The most recent data from 2024 indicates that there are nine monitoring locations with an average nitrate concentration greater than 37.5 mg/l NO_3, all of which are drinking water supplies. As mentioned in Section 6.5, one of these locations (IE_EA_G_01021000008 in the Wilkinstown groundwater body) had average concentrations above 50 mg/l NO_3, which is the drinking water standard, and therefore requires additional treatment to ensure that the water supplied does not breach the drinking water standards at the tap.

The Wilkinstown, Stoneyford Gravels and Cloughjordan-Moneygall Gravels groundwater bodies had monitoring locations with statistically significant upward trends in nitrate concentration, which are projected to be greater than the drinking water standard in the next WFD planning cycle, therefore, these groundwater bodies are assigned poor status under the drinking water protected area test. Measures need to be taken in the current WFD planning cycle, in the areas of the catchment that are supplying water to the abstraction to prevent a future breach of the drinking water standard.

Although groundwater has a nitrate threshold value (37.5 mg/l NO_3) associated with protecting drinking water resources, it is known that lower concentrations may be impacting on the quality of surface water, particularly those rivers, lakes or estuaries where the ecology is sensitive to inputs of nitrogen. The south east region and midlands and eastern region of the country continue to have the greatest proportion of monitoring locations with elevated nitrate concentrations (Map 6.2). The midlands and eastern region is where nitrate concentrations increased the most since 2019. This is attributed largely to the impact of nutrient losses from agricultural sources.

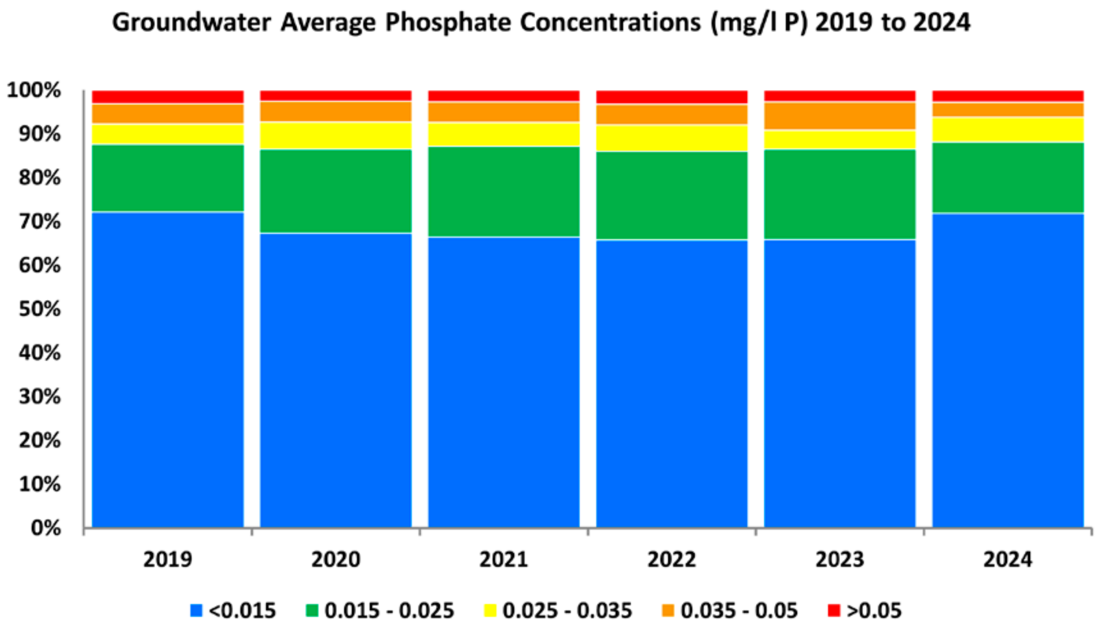
Map 6.2 Average nitrate concentrations in groundwater 2019-2024



The average phosphate concentration in groundwater was below the threshold value (0.035 mg/l P) at 91% of the monitoring locations during 2019-2024, with little change since the previous assessment period.

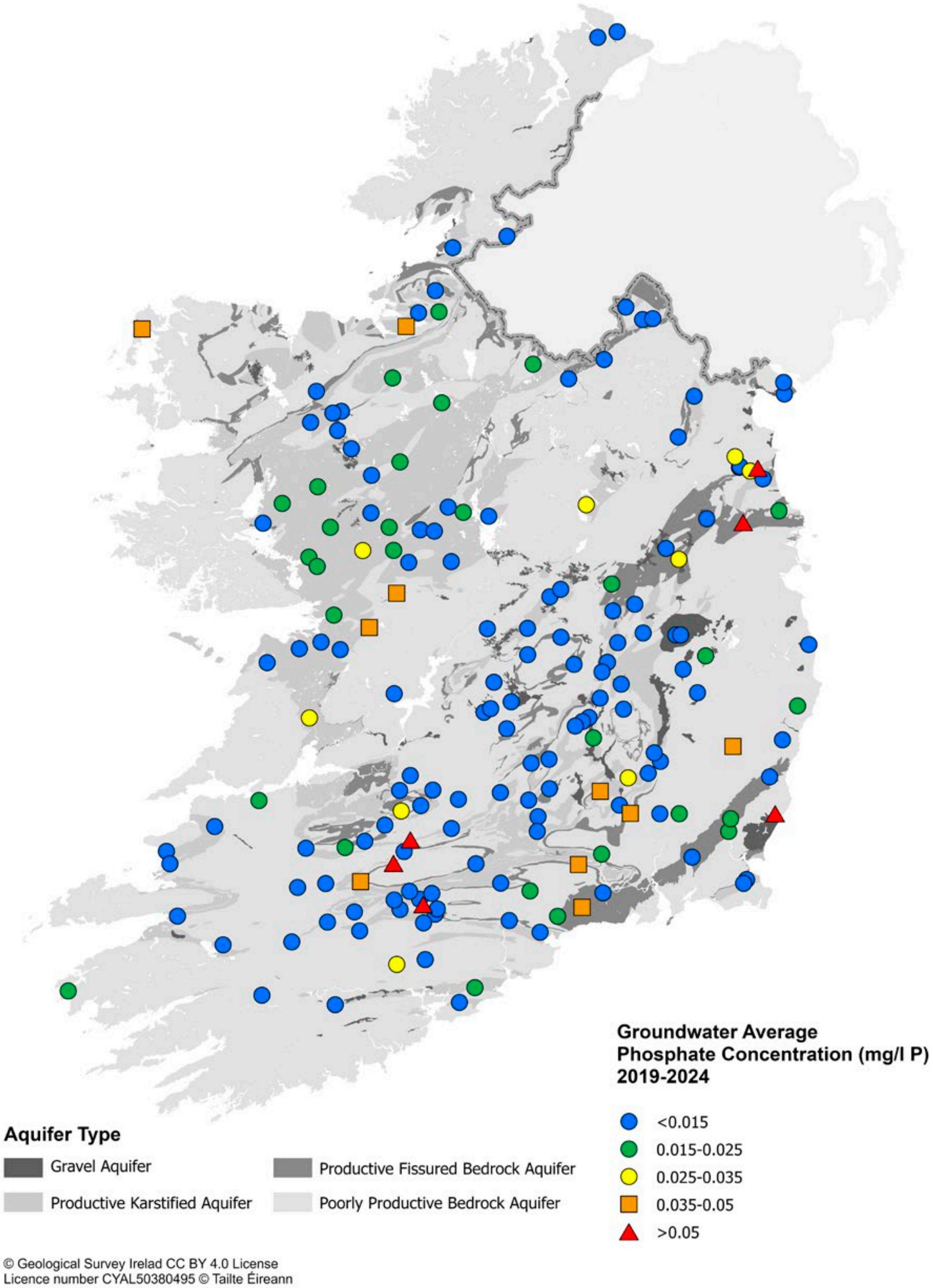
Figure 6.2 indicates that phosphate concentrations in groundwater have remained broadly consistent from 2019-2024. While there has been a 1% increase in the percentage of monitoring points with concentrations less than 0.015 mg/l P (the lowest concentration category), there has been a 2% increase in monitoring points with concentrations above 0.035 mg/l P, compared with the previous assessment period.

Figure 6.2 Average phosphate concentrations in groundwater from 2019 to 2024



Of the 16 monitoring locations with average 2019-2024 concentrations above the phosphorus threshold value (0.035 mg/l P), six had concentrations greater than 0.05 mg/l P (Map 6.3). These groundwaters could be a possible pressure on the rivers in the associated catchments. Therefore, management measures should also consider the groundwater pathway in these catchments.

Map 6.3 Average phosphate concentrations in groundwater 2019-2024



6.7 Hazardous Substances and Pesticides

A screening analysis for a wide suite of hazardous substances (volatile and semi-volatile organic chemicals, pharmaceuticals and PFAS type compounds) and pesticides in groundwater was undertaken in 2020 at 197 groundwater monitoring stations across the groundwater monitoring network. This screening, along with the screening undertaken from 2007-2009 and 2014 has shown that very few of these substances are found in groundwater in Ireland, and where they are found, they are typically at low concentrations.

Targeted monitoring was carried out in 2023, when a total of 369 substances (pesticides, organic compounds, pharmaceuticals and PFAS type compounds) were sampled and analysed across 55 sites. The standards in the relevant legislation[26][27] were exceeded for five substances at five monitoring points. Exceedances were detected for the pesticides, 2,6-dichlorobenzamide (BAM) (two sites) and glyphosate (one site). The standard for the organic substance Benzo(a)pyrene was exceeded at one site while Total Petroleum Hydrocarbons was exceeded at one site. The parameter "Sum of PFAS" was exceeded at one site.

Table 6.2 Individual sample exceedances of hazardous substances in groundwater in 2023

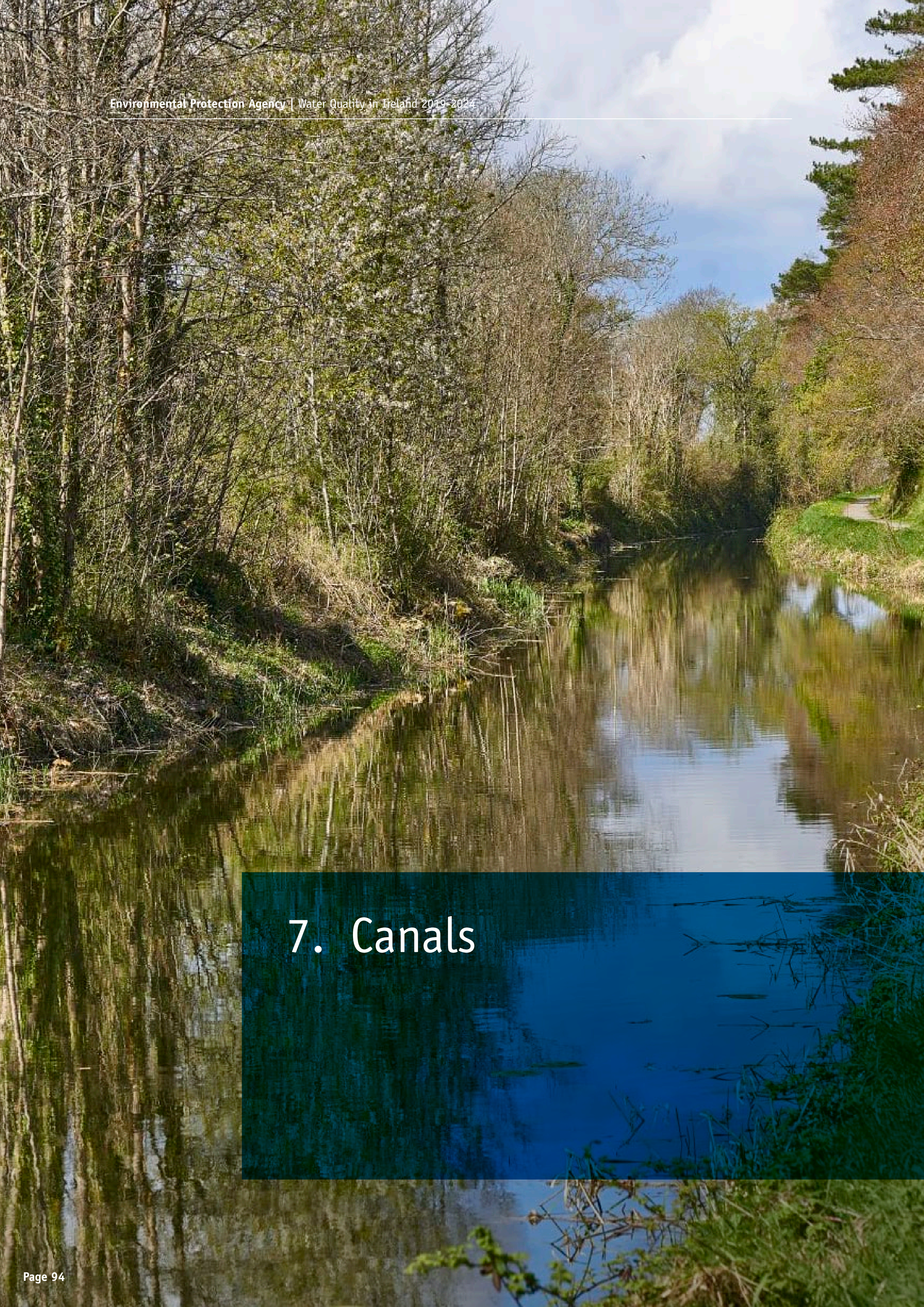
Monitoring Location	Substance	Sample concentration (µg/l)	Groundwater threshold value (µg/l)	Drinking water (max allowable concentration µg/l)
IE_SE_G_13314000005	2,6-dichlorobenzamide (BAM)	0.15	0.075	0.1
IE_SE_G_13314000006	2,6-dichlorobenzamide (BAM)	0.08	0.075	0.1
IE_SE_G_17314000008	Glyphosate	0.157	0.075	0.1
IE_SW_G_00505000006	Benzo(a)pyrene	0.026	0.0075	0.01
IE_WE_G_000812000006	Total Petroleum Hydrocarbons	14	7.5	–
IE_SE_G_13314000005	Sum of PFAS	0.145	–	0.1

As part of monitoring undertaken under licence conditions, some of these substances have been detected at significant concentrations in groundwater associated with a small number of historical mining, waste and industrial activities, resulting in localised groundwater pollution. Where the contamination from these activities is significant, groundwater bodies have been identified and classified as being at poor chemical status, with measures to manage the contamination forming part of the conditions of the licence. As summarised in Section 6.5, there has been a reduction, from 32 to 29, in the number of poor status groundwater bodies associated with historical mining, industrial and waste sites.

6.8 Conclusion

The majority (92%) of our groundwaters are in a satisfactory condition, which is a positive outcome. Groundwater quality in the country has been stable generally with nine groundwater bodies improving to good status and eight groundwater bodies declining to poor status. as with our rivers and marine environment, groundwaters in the south east region and midlands and eastern region of the country have elevated nitrate concentrations, with an increase in nitrate concentration most notable in the Midlands and Eastern region.

26 https://www.irishstatutebook.ie/eli/2016/si/366/made/en/print
27 https://www.irishstatutebook.ie/eli/2023/si/99/made/en/print



7. Canals

7. Canals

7.1 Introduction

Canals are categorised as artificial water bodies (AWBs). AWBs are water bodies created entirely by human activity where a water body did not naturally exist. Canals in Ireland are used primarily for navigation and recreation. They are important, biodiverse habitats and act as wildlife corridors. They are part of a wider network that includes feeder streams that supply the canals with water.

Waterways Ireland is responsible for the monitoring and assessment of the water quality of our canals. This includes the Grand Canal (including the Barrow Line), the Royal Canal and the canalised section of the Shannon-Erne Waterway. The canals traverse eight catchments across Ireland, from the Upper Shannon catchment in the west to the Liffey and Dublin Bay catchment in the east and are divided into 16 water bodies for the canal monitoring programme.

In total, 45 surveillance sites were monitored in the 2019-2024 period. Forty-one of these sites were assessed for biological, physico-chemical, microbiological and hydromorphological quality elements and four were assessed for physico-chemical and microbiological elements only. The combination of the assessment of these quality elements is used to determine the overall ecological quality of our canals.

7.2 Summary for Canals

- 14 of the 16 (87.5%) canal water bodies assessed achieved good ecological potential.
- Grand Canal Naas and Corbally Branch failed to achieve its environmental objectives, due to an impacted macroinvertebrate community.
- Grand Canal Basin also failed to achieve good ecological potential. It was classified as being at moderate ecological potential due to increased faecal coliforms.
- Water quality in the canals has slightly declined since the last reported period of 2016-2021 with one fewer water body achieving good ecological potential.

7.3 Ecological Potential of Canals

The objective for canals is good ecological potential rather than good ecological status, because they are categorised as AWBs. This is the best ecological condition they can achieve due to their modified nature. Ecological potential is classified according to five categories; maximum, good, moderate, poor or bad.

When all the quality elements were combined, all water bodies in the Royal Canal achieved good ecological potential, and in the Grand Canal, 6 out of 8 water bodies achieved good ecological potential (Table 7.1; Map 7.1). The two water bodies failing to meet their environmental objectives were the Grand Canal Basin, due to elevated faecal coliforms, and the Grand Canal Naas and Corbally Branch where the macroinvertebrate element was classified as moderate.

Despite having achieved good ecological potential in this assessment, there are significant issues with sporadic elevated faecal coliform levels in the Shannon-Erne Waterway.

Table 7.1 Ecological Potential of monitored canal water bodies 2019-2024

Canal Water Body (Catchment)	Ecological Potential
Grand Canal	
Grand Canal Basin	Moderate
Grand Canal Main Line (Liffey and Dublin Bay)	Good
Grand Canal Naas and Corbally Branch	Moderate
Grand Canal Milltown Feeder (Barrow)	Good
Grand Canal Barrow Line (Barrow)	Good
Grand Canal Main Line (Barrow) East	Good
Grand Canal Main Line (Barrow) West	Good
Grand Canal Main Line (Boyne)	Good
Grand Canal Main Line (Lower Shannon)	Good
Royal Canal	
Royal Canal Main Line (Liffey and Dublin Bay)	Good
Royal Canal Main Line (Boyne)	Good
Royal Canal Main Line (Lower Shannon)	Good
Royal Canal Main Line (Upper Shannon F)	Good
Royal Canal Main Line (Upper Shannon E)	Good
Royal Canal Main Line (Upper Shannon C)	Good
Shannon Erne	
Shannon Erne (Upper Shannon A)	Good

Map 7.1 Ecological potential of monitored canal water bodies 2019-2024

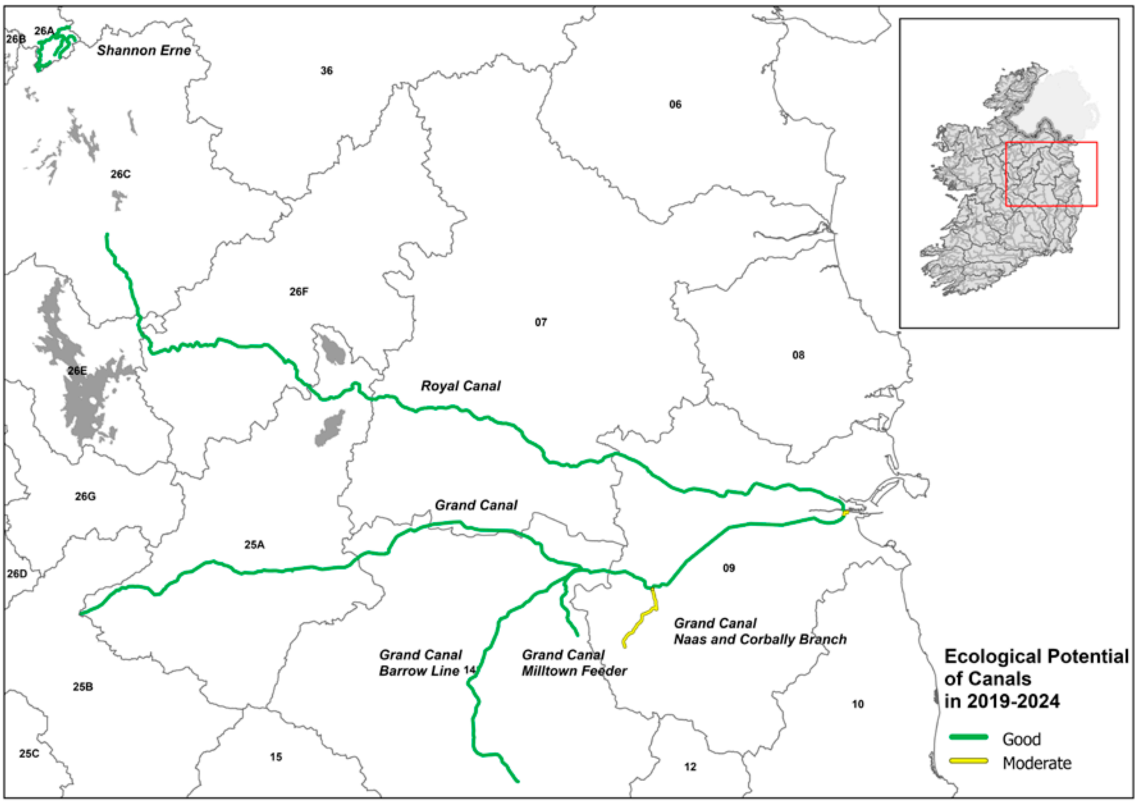
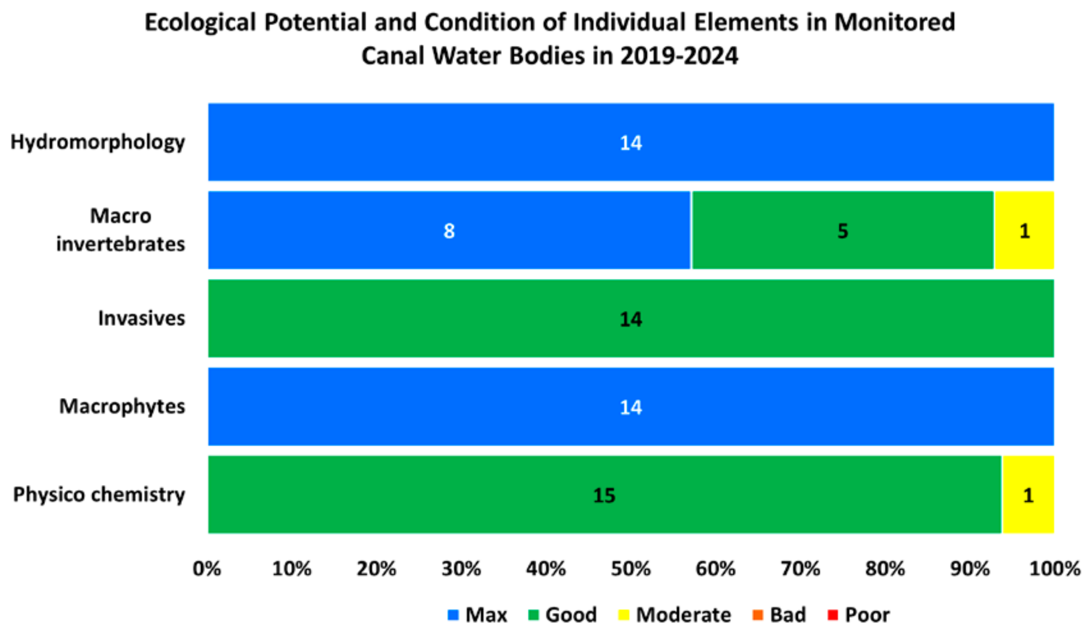


Figure 7.1 illustrates the condition of the individual elements used to classify the ecological potential of the canals for the 2019-2024 period.

Figure 7.1 Ecological potential and condition of individual quality elements in canal water bodies in 2019-2024 (numbers of water bodies indicated)



7.4 Feeder Streams

The canal surveillance monitoring programme also involves the routine sampling of physico-chemical and microbiological elements in five feeder streams that discharge into the canals. These feeder streams can be a source of nutrient and organic enrichment to the main canal channels and, depending on their location, can be subjected to point source pollution from municipal wastewater infrastructure or diffuse pollution from agricultural runoff.

Conditions indicative of moderate ecological potential based on elevated faecal coliforms, BOD, ammonia and nutrients (one or a combination of these) were recorded in four of the five feeder streams: the Monread, Ballymullen, and Ballylennon feeders on the Grand Canal, as well as the Athy Drain that feeds the Grand Canal Barrow Line.

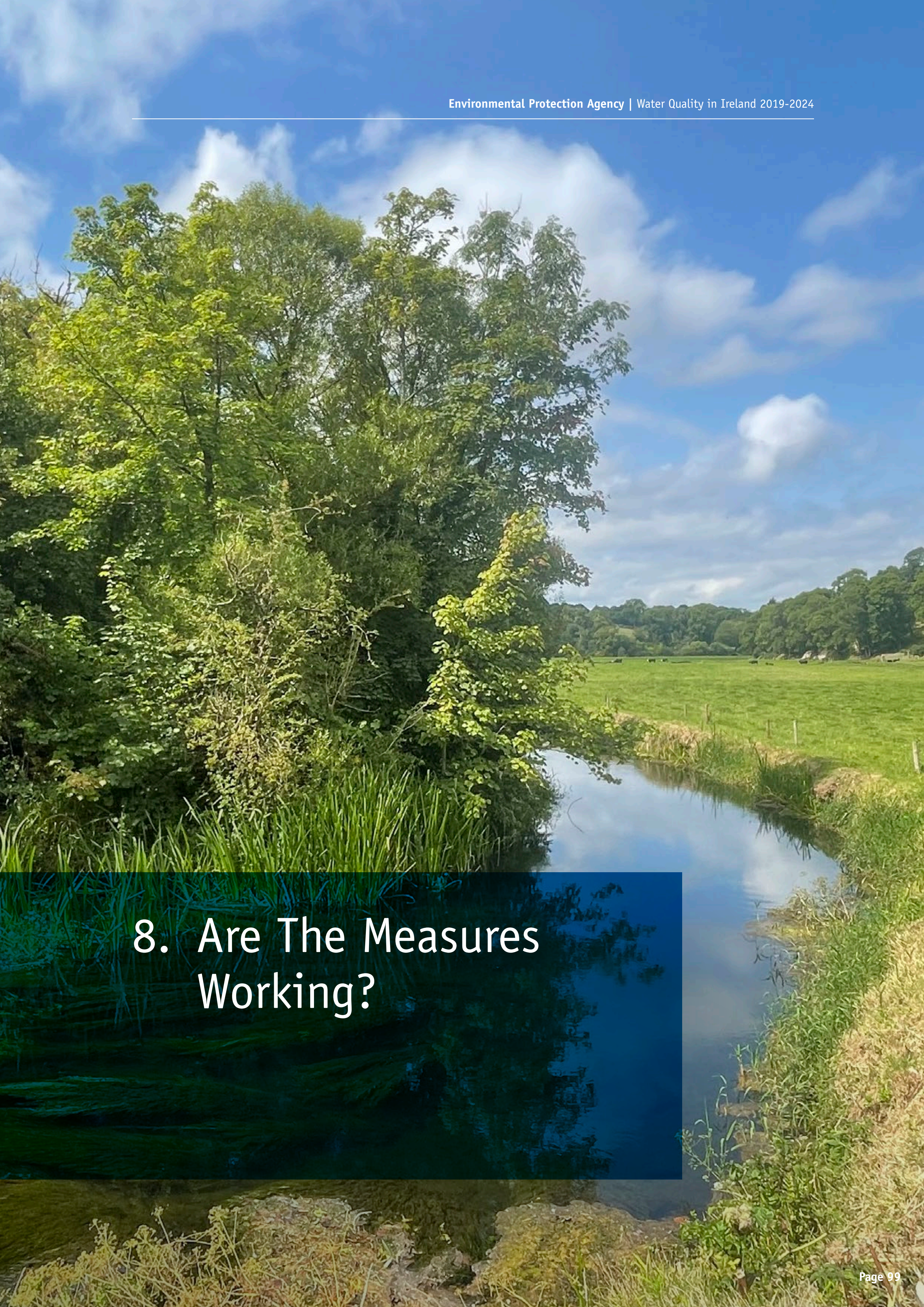
This highlights the need to protect the canals through the management of the feeder streams and engagement with local authorities.

7.5 Conclusion

Overall, the water quality of the canals assessed has declined slightly since the last assessment. The majority of canal water bodies assessed achieved good ecological potential overall, and all of those assessed for the macrophyte element achieved maximum ecological potential.

The overall good ecological potential of our canals shows the value of these habitats; this emphasises the importance of the canals in Ireland as clean and diverse aquatic systems.

There remain issues, however, with a number of feeder streams that feed the canals, these feeders are acting as point sources of elevated faecal coliforms and nutrients to the receiving waters, so it is important that the causes of the pollution in the feeders and surrounding catchments are addressed. Recent work in identifying and addressing the issues in these feeders highlights the value of ongoing monitoring along with a partnership approach between statutory agencies to resolve water quality issues on a local level.



8. Are The Measures Working?

8. Are The Measures Working?

8.1 Introduction

Our surface waters and groundwaters remain under pressure from human activities. Given that the number of surface water bodies achieving their ecological objective has dropped between reporting periods, it is reasonable to state that the programme of measures is not yet working to protect or restore water quality on a national scale. The main pressures impacting water quality are excess nutrients coming mainly from agriculture and waste water discharge, damage that various activities such as land drainage and urban development do to the physical condition of our water habitat and forestry related activities. The second and third cycle river basin management plans have each set out a programme of measures to improve and protect water quality. The current ecological status data can be used to assess progress against the environmental objectives that those measures were designed to achieve.

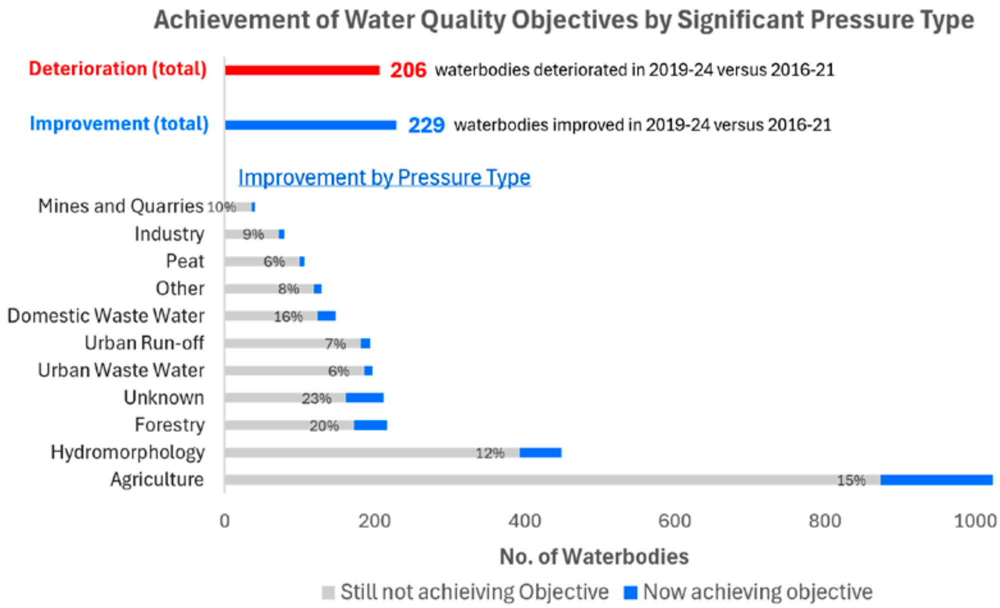
8.2 Ecological status change within significant pressure categories

The third cycle River Basin Management Plan (RBMP) highlighted that 1,649 monitored water bodies were 'At risk' of not meeting their WFD objectives and had significant pressures assigned [28]. The dominant significant pressures impacting these water bodies are agriculture, hydromorphology, forestry and urban waste water. A breakdown of ecological status change by significant pressure type is shown in Figure 8.1. A comparison is made between two reporting periods (2016-21 vs. 2019-24). Results from 2019-24 show that of the 1,649 'At risk' water bodies, 229 have now achieved their WFD objectives. Improvements in these water bodies have been largely offset by declines elsewhere, with 206 water bodies, previously categorised as 'Not at risk', deteriorating between the assessment periods.

Water quality improvements in the 'At risk' water bodies are welcomed, however evidence of substantial progress is not clear in any of the pressure groups. The scale of deterioration in water bodies which had previously achieved their objectives highlights the urgent need for increasing the scale and pace of water quality protection actions. While water bodies with multiple significant pressures complicate the assessment of effectiveness, gaps remain in the identification and implementation of the right measure in the right place. Given the level of investment and effort, the low level of proportional improvement across all pressure groups is disappointing. The focus of work ahead of the 4th cycle RBMP is to critically evaluate the effectiveness of measures, characterise the pressures impacting water bodies that had previously been considered 'Not at risk' and to update the assessment of significant pressures in 'At risk' water bodies, using the best available data. Additional evidence needs to be collated and assessed in 1,230 water bodies that are in 'Review'.

28 Significant Pressures – Catchments.ie – Catchments.ie

Figure 8.1 Ecological status change in 'At risk' water bodies, classified by significant pressure type. % improvement refers to the proportion of water bodies in each pressure category that improved.

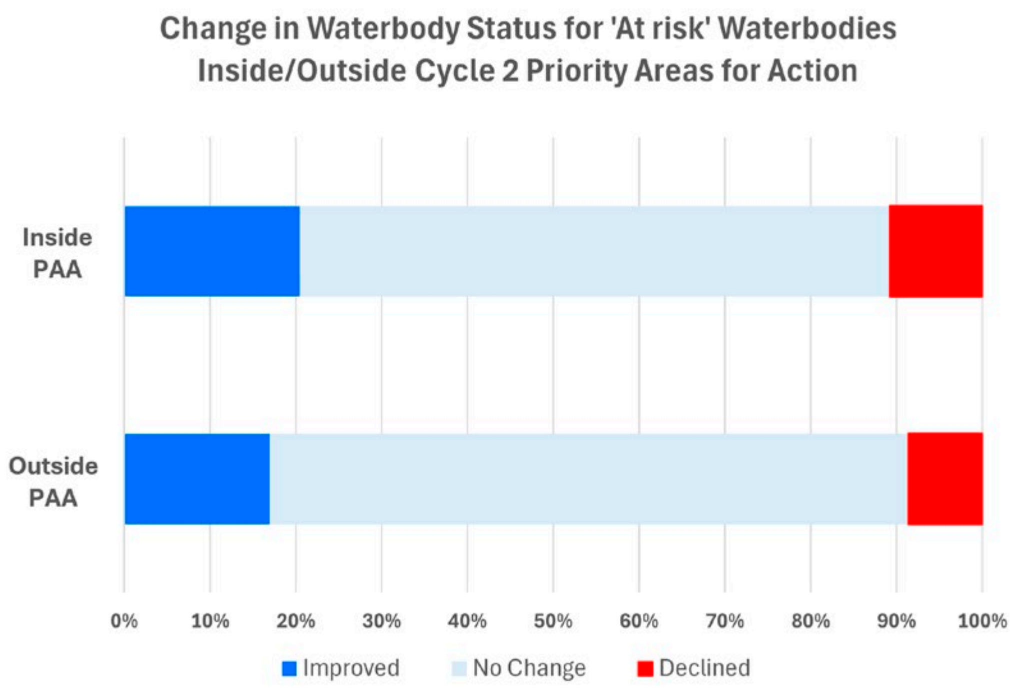


8.3 Priority Areas for Action

A key measure under the second and third cycle RBMP's was the creation of Priority Areas for Action (PAAs), where public sector bodies and stakeholders are working together to implement actions to restore water quality, led by the Local Authority Waters Programme (LAWPRO). Where agriculture is a significant pressure LAWPRO provide the dedicated Agricultural Sustainability Support and Advisory Programme (ASSAP) with local science so they can work with farmers in the key areas to target actions to improve water quality.

A breakdown of ecological status change in 'At risk' water bodies, both inside and outside of PAAs is shown in Figure 8.2. A comparison is made between two reporting periods (2016-2021 vs. 2019-2024). While improvements have been made in 21% of PAA water bodies, this has been offset by declines elsewhere. Little difference is evident between 'At risk' water bodies within and outside PAAs, with both groups largely following the national pattern of improvements offset by declines.

Figure 8.2 Change in ecological status inside versus outside Priority Areas for Action (2016-2021 versus 2019-2024)



8.3.1 Priority Areas for Action – Phosphorus

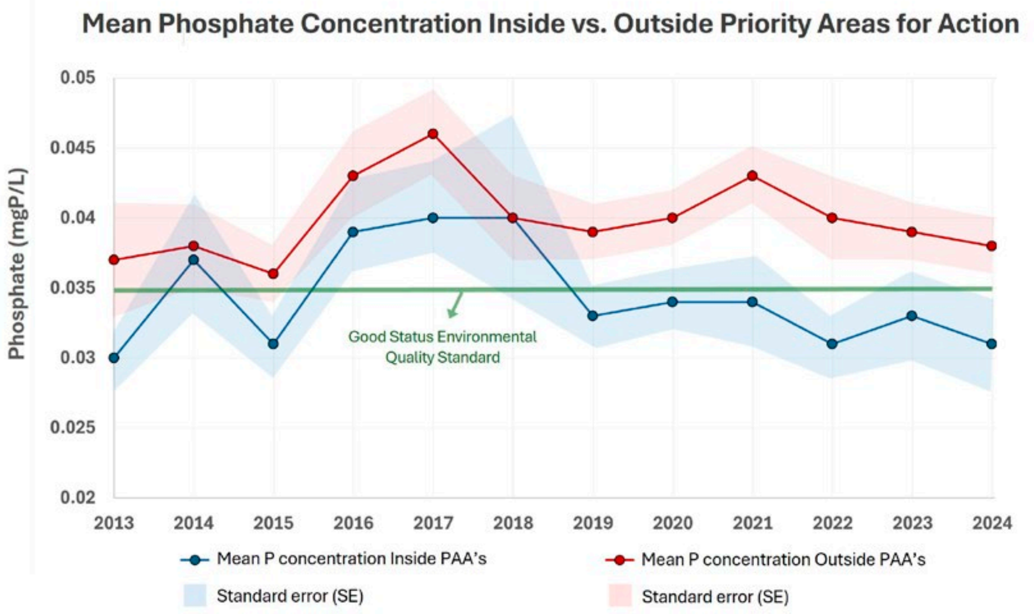
Despite the lack of progress in improvement in ecological status in PAAs, there is evidence that there is an improvement in phosphorus concentrations in these areas which is very welcome.

Annual mean phosphate concentrations in 'At risk' water bodies where agriculture is a significant pressure are shown in Figure 8.3. A comparison is made between water bodies, both inside and outside of PAAs. While phosphate levels were typically lower inside PAAs before the establishment the LAWPRO and ASSAP in 2018, the gap has since widened with concentrations on average 22% lower inside PAAs (2019-2024).

It is noteworthy that from 2019 onwards, mean phosphate levels inside PAAs were consistently below the good status environmental quality standard of 0.035 mg P/L, which was an improvement compared to the period leading up to their establishment.

The information in Figure 8.3 represents a subset of water bodies where phosphate concentration information is available and urban wastewater is not a significant pressure. Within these PAA water bodies, LAWPRO have made 153 referrals to the ASSAP. The number of farms included in each referral ranged from one to 167, with a median of nine farms per referral area. Phosphate trends inside the PAAs indicate a positive effect from targeted scientific assessment and resultant agricultural actions. Phosphate reductions have not yet translated into net improvements in ecological status. This may be due to a combined impact of other water body scale issues affecting ecological status in the PAAs and/or the time it takes for ecological recovery to occur once nutrient concentrations have been reduced.

Figure 8.3 Annual mean phosphate concentrations in 'At risk' water bodies where agriculture is a significant pressure. Water bodies where urban waste water is also a significant pressure are not included. Standard error is a statistical metric used to describe the degree of variation about the mean concentration each year.



While the trends in phosphate concentrations are welcome, there is currently no evidence available that can be used to directly relate actions on farms, to catchment water quality outcomes. In the broadest sense, it is clear that there is a lot of positive action being taken by many farmers in PAAs. However, without transparent insight into the type, scale and location of measures implemented, it is difficult to assess the effectiveness of actions or to understand which actions are driving success. It is essential that this information is shared to foster opportunities for learning, improvement, and replication of effective strategies in other catchments, and in doing so, progress towards broader ecological recovery goals.

8.4 Ecological Recovery in Nitrogen Impacted Estuaries

Reductions in nitrate loads can result in an improvement in ecological status when the levels reduce sufficiently to support good ecological conditions. The Blackwater catchment in Co. Cork is an example of an intensively farmed catchment where ecological recovery has occurred in the recent past. Nutrient losses from the catchment reduced substantially in the period up to 2012, from relatively high levels in the 1990s and 2000s when animal numbers and fertiliser use were at their highest. This resulted in a significant improvement in the ecology of the downstream estuary, which achieved its objectives in the mid-2010s (Ni Longphuirt, *et al.*, 2015)[29]. Unfortunately, nitrate levels are once again too high due to subsequent increases in nutrient losses that occurred up until the late 2010s, which resulted in unsatisfactory ecological conditions returning in the early 2020s. This highlights two points, firstly, that Ireland's shallow geological systems with relatively high rainfall can flush nutrients quickly enabling ecological recovery within a decade. Secondly, the experience in the Blackwater catchment is a reminder of the importance of maintaining improvements once they are achieved.

29 https://doi.org/10.1016/j.scitotenv.2015.03.076

The EPA recently published an assessment of 35 years of nitrate concentrations and the scale of reductions needed to achieve ecological outcomes[30]. The report highlighted the significant variability over time which is influenced by multiple factors, including source loading, agricultural land management and weather patterns. During this period, the highest total nitrogen loads from 20 representative catchments occurred in the year 1996. The nitrogen loads were closest to the levels needed to achieve ecological standards in the estuaries in 2008 and 2011. In more recent years, there has been a welcome reduction in nitrate concentrations up to and including 2024, following peak levels in late 2018-2019. This period of nitrogen reductions coincided with reductions in nitrogen inputs and increases in nitrogen use

While the reduction in nitrogen concentrations up to 2024 was very welcome, the recent Early Insights Nitrogen Indicator report[31] showed a 16% increase in average nitrogen concentrations in the first half of 2025, relative to the same period in 2024. Nitrogen concentrations, particularly in the south and south east of the country, remain too high to achieve water quality objectives. Measures to reduce nitrogen losses to water should be targeted into higher risk, freely draining, agricultural areas. The EPA Farm and Landscape measures for Agriculture (FLAG) map[32] helps to identify where these measures will be of greatest benefit to water quality.

Box 8.1 Actions on Cypermethrin Use lead to Water Quality Improvements

Previous ecological assessments showed a decline in water quality across several rivers in Co. Donegal, linked to suspected toxic effects from cypermethrin – a synthetic insecticide widely used in sheep dipping. With Donegal's high sheep density, management of sheep dip was considered a factor in ecological degradation, particularly in 2015 and 2016 when macroinvertebrate communities showed evidence of toxic impact. Given cypermethrin's toxicity to aquatic life, preventing contamination from spent sheep dip requires robust source control measures and targeted education. The CatchmentCare Project led by the Loughs Agency and Donegal County Council, ran in the Finn Catchment from 2018 to 2023. Recent improvements in water quality have been observed in the catchment, where there has been targeted engagement with the farming community. Macroinvertebrate communities recovered from a predominantly poor condition in 2016 to mostly moderate condition in 2019. Between 2019 and 2022, the number of survey sites in the catchment achieving good or high Macroinvertebrate status has increased. The suspected toxic impacts identified at six of the 26 sample stations on the river in 2016, have not since re-occurred.

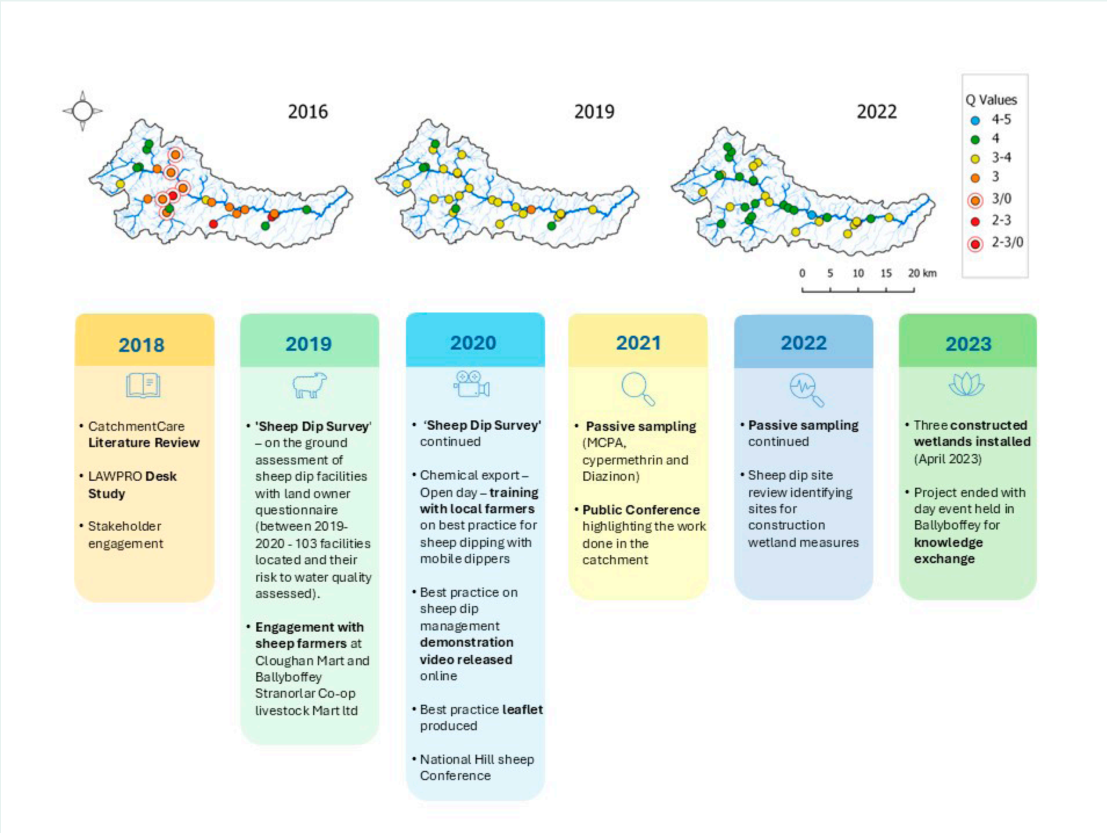
CatchmentCare Actions

- Surveys to locate sheep dip sites and assess their risk to water quality.
- Investigate chemical export from land
- Landowner questionnaires to raise awareness of cypermethrin's impact, supported by an advisory leaflet and demonstration video promoting best practices.
- Biological, chemical and habitat surveys to target action and strengthen community engagement.
- Three integrated constructed wetlands installed at publicly used sheep dipping facilities in 2023

30 https://www.epa.ie/publications/monitoring--assessment/freshwater--marine/evidence-based-targeting-of-agricultural-measures-to-reduce-nitrogen-in-catchments-to-achieve-water-quality-objectives.php

31 Early insights indicator report: Nitrogen concentrations in selected major rivers, January-June 2025 | Environmental Protection Agency

32 Farm and Landscape measures for Agriculture (FLAG) Map Updated 2025 - Catchments.ie - Catchments.ie



Going Forward

In 2018, the Finn catchment was selected as a Priority Area for Action under the 2nd cycle RBMP. LAWPRO completed a desk study in 2018 to support the CatchmentCare project and carried out local catchment assessment in 2023. Referrals have been issued to the ASSAP, where sheep dip management can be further addressed through Farming for Water EIP funding. In addition, the CALM project has been launched by the Loughs Agency, focusing on habitat improvements in the Finn Catchment.

As part of the National Hazardous Waste Management Plan (2021-2027), a forum was formed with representatives from Department of Agriculture Food and the Marine (DAFM), EPA, Donegal County Council, LAWPRO, and the Agri-Climate Rural Environment Scheme (ACRES). The group is drafting a Code of Practice for the full sheep dipping cycle, from product selection to disposal, and has proposed a professional user register under the Veterinary Medicinal Products Act (2023).

Work carried out in Finn catchment shows that targeted engagement and measures can lead to improved awareness, which in turn leads to improved water quality. However, while acute toxicity has been addressed, chronic toxicity and chemical detections remain barriers to full ecological recovery. Sustained, locally tailored collaboration is necessary to meet 2027 water quality targets.

8.5 What needs to be done

It is essential that the third and fourth River Basin Management Plans deliver action and improvements across each of the main water quality pressures. Tracking of measures and activities to better understand what is driving change will require improved data sharing and data management systems with greater integration between implementing bodies. A coordinated approach across all sectors and policies, implemented through Sectoral and Catchment Management Plans is now urgently needed.

There is a myriad of programmes designed to restore and protect water quality, including but not limited to: LAWPRO, ASSAP, the Farming for Water EIP, the Blue Dot Programme, Waters of Life, National Barrier Removal Programme, Teagasc Better Farming for Water, River Slaney Project. There are many actions underway to improve water quality, but the scale and pace of implementation needs to be increased. To achieve ecological objectives at scale, site specific measure effectiveness, directly relating actions to water quality outcomes needs to be collated, shared and communicated.

The Nitrates Action Programme must deliver reductions in nitrate losses to our waters, and there needs to be full implementation of existing regulations by the Local Authorities and the Department of Agriculture Food and Marine. Prioritisation of resources should be data driven and grounded in the framework of Integrated Catchment Management. Effective data sharing between regulatory authorities and the EPA is fundamental to understanding whether measures are working or not. The EPA will continue to oversee the National Agricultural Inspection Programme (NAIP).

Accelerated and sustained investment is needed by Uisce Eireann to address water quality issues from urban waste water and meet our Water Framework Directive targets.

A new regulatory framework for the protection of waters from hydromorphological pressures, and the establishment of a National Restoration Programme to mitigate the impact of hydromorphology as a significant pressure are urgently required.

The EPA will continue to develop and communicate the science and evidence required to inform policy and support the work of implementing bodies. Through its own work, the agency will continue to address pressures from EPA-regulated activities.

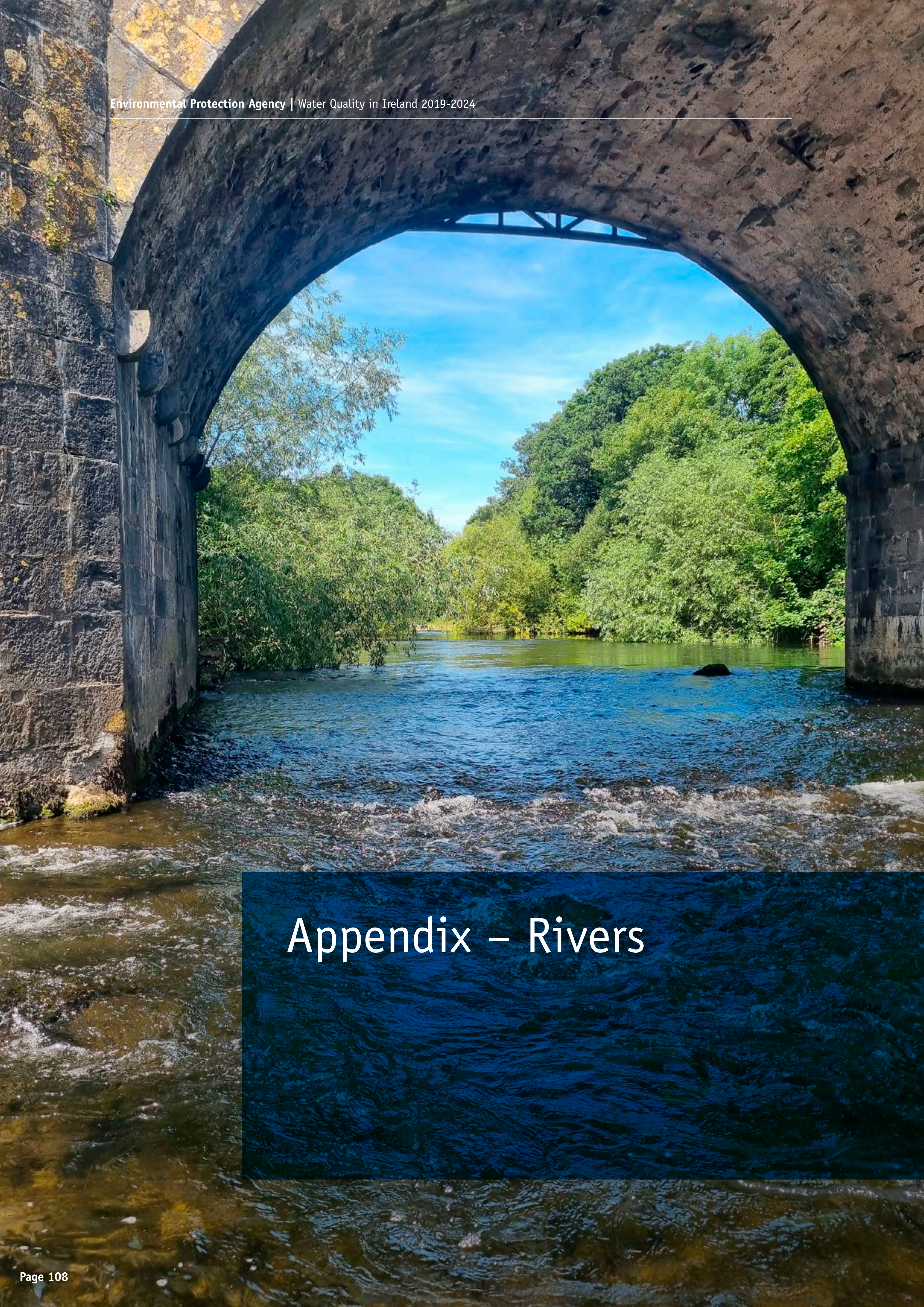
Further information on water quality data and catchment assessments is available on www.catchments.ie.

8.6 Conclusion

The current assessment highlights that overall, water quality remains in decline, despite significant actions and programmes underway nationally to improve water quality. The evidence shows that there are improvements occurring in some areas and across all sectors, but these are unfortunately being offset by declines elsewhere. Excess nutrients in our waters from agriculture and waste water remains the greatest issue, together with activities impacting on physical habitat conditions (hydromorphology).

A key measure in the 2nd and 3rd cycle river basin management plans was the creation of Priority Areas for Action, where targeted actions are underway to improve water quality. The work is being led by LAWPRO and other stakeholders, including ASSAP where agriculture is the significant pressure. In these areas, the concentrations of phosphorus are improving which is a welcome first step towards improving ecological status. Nitrogen concentrations have also reduced in recent years although they remain too high in the southeastern half of the country.

The scale and pace of implementation of targeted measures needs to increase. It is essential that tracking of measures and activities is carried out to better understand what is driving change. This will require improved data sharing and data management systems with greater integration between implementing bodies to ensure that the right measures are being implemented.



Appendix – Rivers

Appendix – Rivers

Map A. The location of Ireland's river catchments

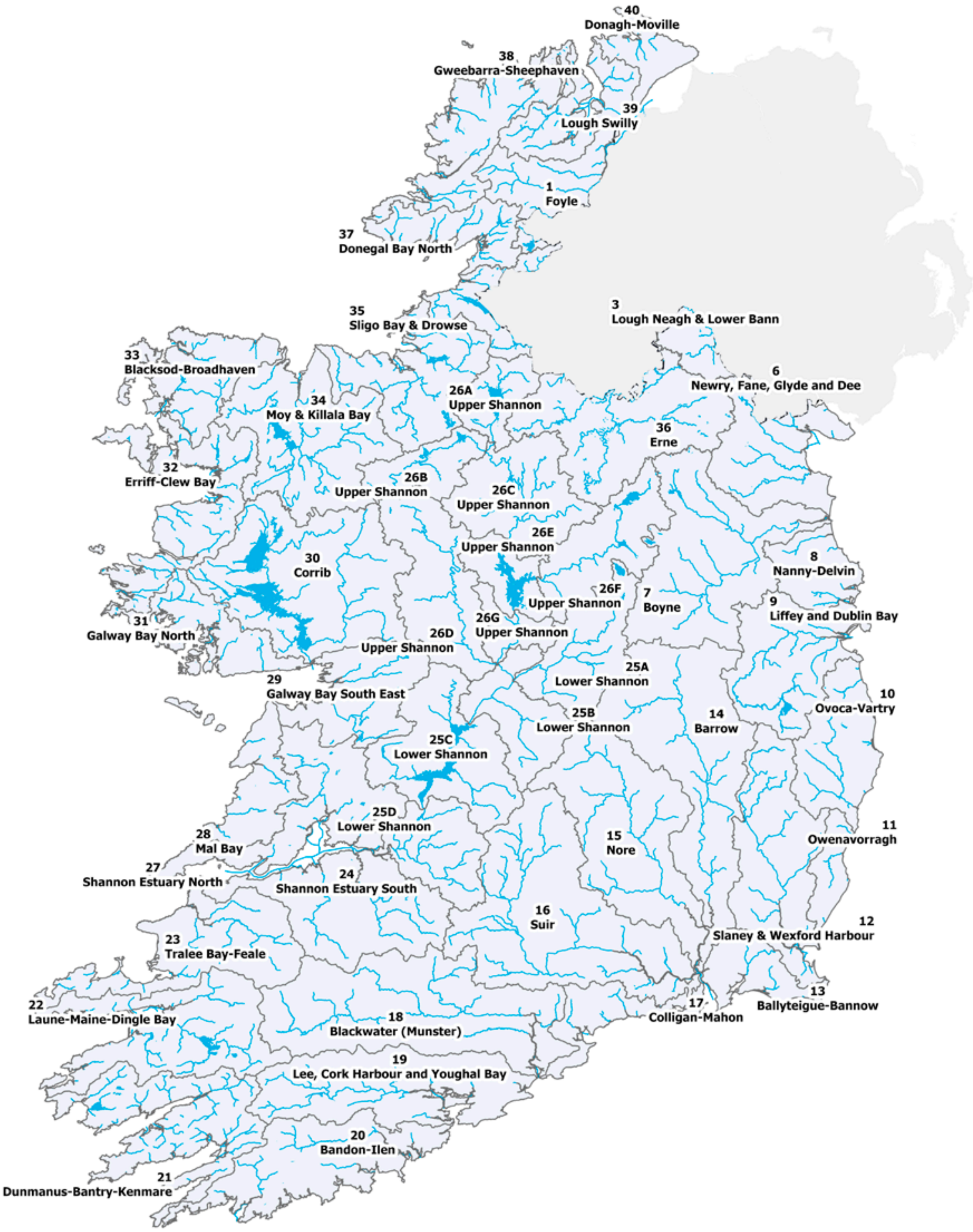


Figure A.1: Ecological status change in monitored river water bodies (RWB) between 2019-2024 and 2016-2021 ordered by the greatest declines at catchment level

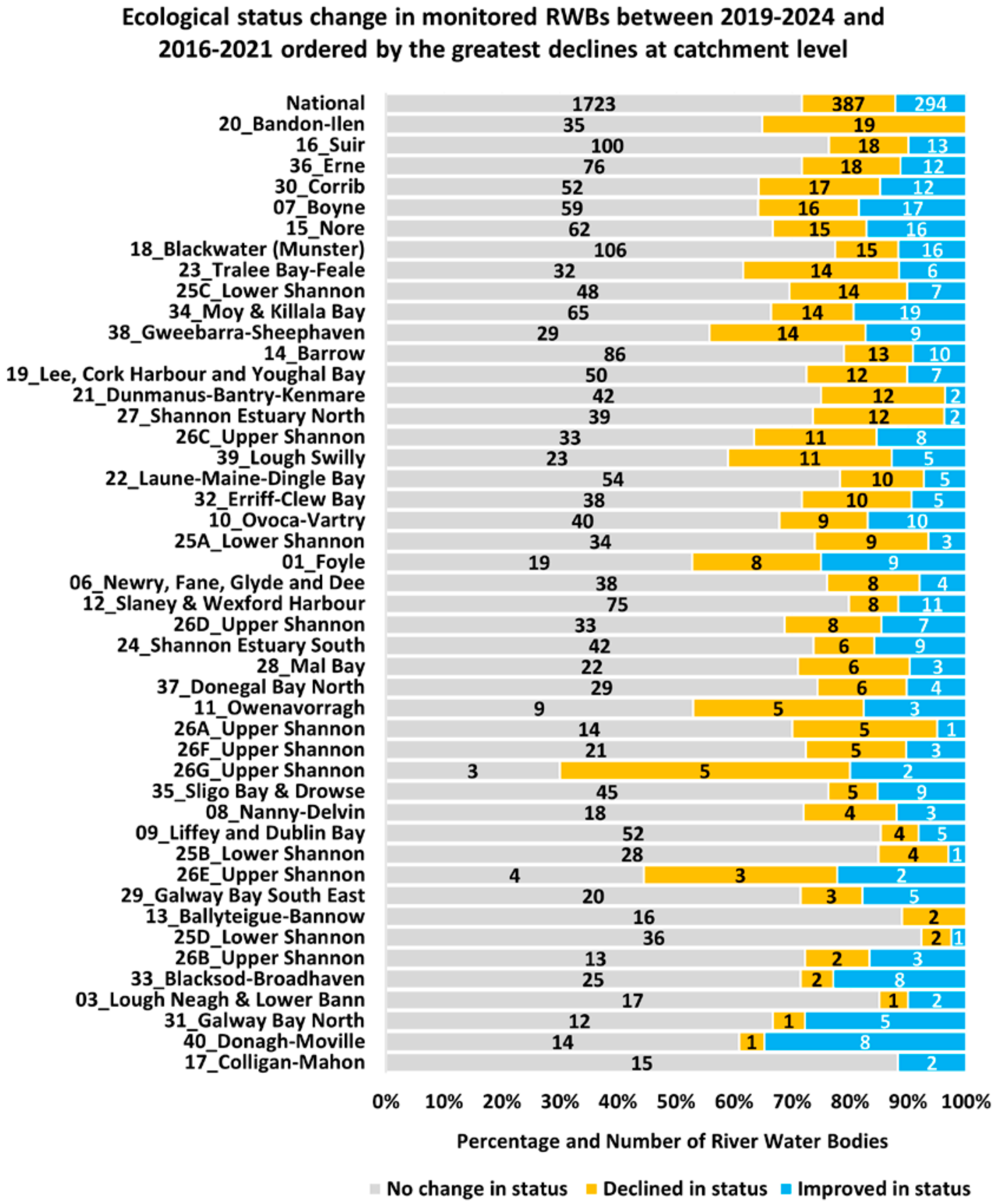
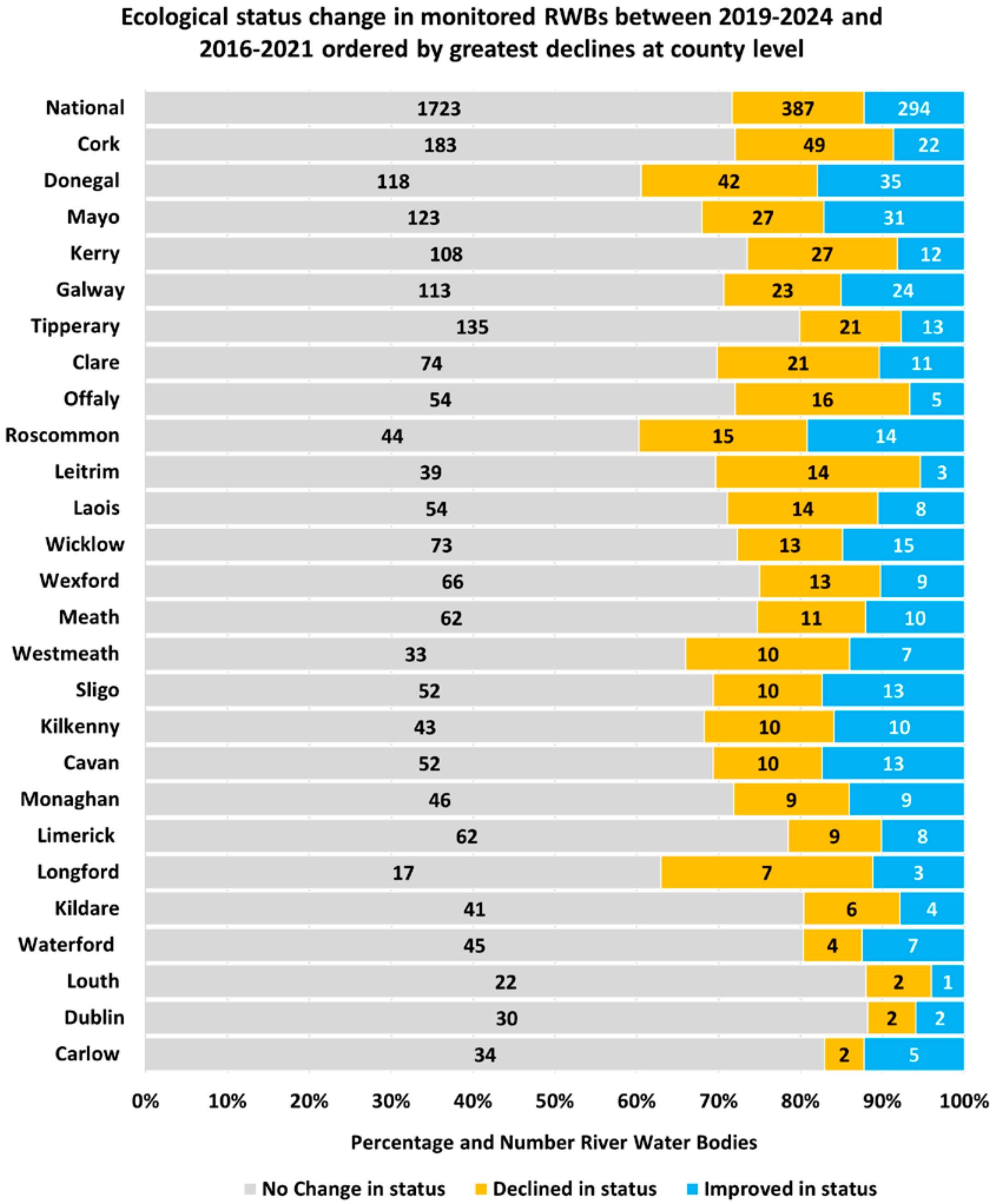


Figure A.2: Ecological status change in monitored river water bodies (RWB) 2019-2024 and 2016-2021 ordered by the greatest declines at county level



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 AGUS 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.

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