The Lough Neagh *Report*

Blue Green Algae and Water Quality in Northern Ireland

July 2024

Department of
Agriculture, Environment and Rural Affairs
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Ministerial Foreword

The scenes witnessed at Lough Neagh in 2023 and more recently highlights the impact of a collective failure to deal with the environmental challenges we face in Northern Ireland, we need to take action and deliver solutions by working together.

For too long, the balance between growing the economy and safeguarding our environment has not been right.

While we are all aware of the impact of climate change, we have ignored the catastrophic impact of pollution on our natural environment for far too long. The world has changed, how we use our land has changed and as science has modernised, we know a lot more about the impact of our actions on the environment.

Whilst it is important that we learn lessons from the past, including previous government policy, this report and action plan is future-focused and will enable targeted, proportionate and sustainable actions through partnership working, and will make a difference for the better.

We already know that the main contributing factors are agriculture and wastewater from both treatment works and septic tanks. We also know that this is where the majority of the solutions lie.

As Minister with responsibility for agriculture, environment and rural affairs, I recognise that agriculture and the agri-food industry are key parts of our economy in Northern Ireland but the science shows us very clearly that things must change. We cannot ignore the problem and hope it goes away. Reducing pollution into our waterways must be our focus and I want to work alongside people in agriculture, Northern Ireland Water and septic tank owners to achieve that.

As Minister I am dedicated to supporting our farmers in the essential task of food production, whilst helping them in their role as custodians of the land and in protecting the environment on which we all rely.

This will mean new approaches to ensure that the funding we provide for agriculture is allocated in a way that protects water quality and biodiversity and adapts for resilience as our climate changes. The unprecedented scale and pace of change in agriculture is fully acknowledged and my Department will take a pragmatic and sensible approach going forward. Continued and sustained engagement alongside liaison with UK Government to secure certainty on future funding will also be paramount as we work together to deliver a resilient and sustainable future.

We have all heard a lot about improving enforcement by way of detections and convictions. Whilst my Department will not hesitate to take action against those who pollute our waterways, I want to be very clear that my focus is to stop pollution and damage happening in the first place.

Going forward, therefore, I will promote a framework that focuses on four key approaches, underpinned by science:

Education to empower knowledge and skills essential to underpin effective decision making.

Investment with incentivisation and innovation that drives the adoption of sustainable practices and promotes the importance of behavioural change/science.

Regulation to ensure that we have a robust legislative framework in place that ensures the protection of our environment and

Enforcement - a readiness and a determination to take strong, meaningful action when compliance with the regulation fails in a fair, balanced and proportionate manner.

Prevention through the pillars of education, investment and regulation is critical and where a significant and substantial amount of work is focused upon.

Some of the interventions that are required to address these issues are going to be challenging. This is a difficult and complex issue which will require changes in our behaviours and practices. A strong and committed focus to engagement, support and communications will underpin the way ahead. I am determined to build and sustain a culture of environmental responsibility fostering an attitude of zero tolerance to pollution.

I am delighted that the Assembly and Executive share my concerns and have taken the lead to make Lough Neagh, and the wider environmental issues affecting it, a priority.

I am continuing to work with colleagues to obtain Executive approval for the Environmental Improvement Plan (EIP). The EIP acts as Northern Ireland's first Environment Strategy and covers six Strategic Environmental Outcomes (SEOs), encompassing the full breadth of environmental and climate policy. The actions in this Lough Neagh report will build on and support the objectives to improve water quality across Northern Ireland contained in the EIP.

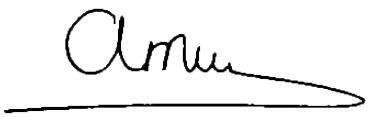
A cohesive and integrated approach to environmental protection is key for any meaningful, sustained improvement in water quality - as such, this Action Plan must be considered within the overarching remit of the EIP in order that it delivers the intended outcomes.

We all (central and local government, together with users, local residents and stakeholder organisations) need to work collectively to deliver sustainable solutions to address the issues facing Lough Neagh and return Lough Neagh to its rightful state as an ecological jewel at the heart of Northern Ireland.

Engagement with the Irish Government, including shared learning, expertise and research will continue in the light of common environmental challenges, including those facing our water courses.

Future structures, governance and co-ordination arrangements including engagement and communications with stakeholders and the wider public will be critical. I will seek to drive forward this process as Minister initially chairing quarterly meetings as we move to deliver this Action Plan in an agile manner.

Every journey begins with the first step, and I believe that the actions proposed in this report will help deliver my vision to have a healthy, resilient environment with high water quality status and environment standards which support biodiversity and nature recovery in a living and productive landscape thereby contributing to the health and wellbeing of our citizens.



Andrew Muir MLA
Minister of Agriculture, Environment and Rural Affairs

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Executive Summary

The factors that came together in 2023 that resulted in the devastating spread of blue green algae in the internationally important Lough Neagh were:

- **Pollution** (excess phosphorus and nitrogen) entering our waterways from agriculture, wastewater treatment works, domestic systems and industry.
- **Climate change** resulting in record high water temperature.
- **Zebra mussels**, an invasive species known to disrupt ecosystems by impacting water clarity.

This report has considered all of these factors, however, the actions we can take to protect Lough Neagh must focus on reducing the level of all forms of pollution getting into our waterways.

The scope and aim of this report, developed in conjunction with officials from the Department of Infrastructure (DfI) and NI Water (NIW), addresses the specific water quality crisis experienced in Lough Neagh and other water bodies throughout Northern Ireland. It is acknowledged that resolving the biodiversity issues are as vital to the Lough and its recovery. While not the main focus of this report, robust conservation measures to restore ecological resilience are an integral part of this recovery. These measures will be reviewed under elements of Northern Ireland's first Environmental Improvement Plan, once approved by the Executive.

It is widely recognised that the intensification of agricultural production has had negative impacts on the environment. The RePhokUs report identified that high nutrient (phosphorus) levels in Northern Ireland waterbodies have three main sources - estimating, from a study of the food system, that 62% of the phosphorus inputs are from agriculture, 24% from wastewater treatment works and 12% from septic tanks[1]. Provisional Lough Neagh-specific source apportionment data produced by AFBI follows a similar pattern, with agriculture and wastewater treatment work effluent being the two principal nutrient input categories.

Lough Neagh specific data will be published later in the summer and is likely to identify that phosphorus inputs from agriculture are in the same order as those detailed in the RePhokUs report.

Given the longer-term assessment that blue green algae will return in subsequent years, it is understandable that the state of the Lough Neagh ecosystem and the safety of raw water abstracted from Lough Neagh to provide drinking water, is of the utmost importance and is one element of the basis of public concern.

1 Phosphorus stocks and flows in an intensive livestock dominated food system - PMC (nih.gov) 10.1016/j.resconrec.2020.105065

Despite the protected status of Lough Neagh as an ASSI, SPA and Ramsar site, our existing regulatory and policy frameworks have failed to adequately protect water quality, the Lough Neagh ecosystem and our wider environment. Our lakes, our rivers, our streams and our coastline are increasingly suffering from the effects of pollution. The environmental and societal impact of this is unsustainable.

To address this environmental decline, a joint DAERA/DfI working group has developed an action plan (Annex A). This plan has been informed by the work of the Science Advisory Group whose core membership comprises of leading scientists/professional experts from universities and science organisations across the UK and Ireland. The main areas of work reviewed by the Science Advisory Group are summarised in Annex B.

Our consideration of the science and evidence points to the following key steps that must be taken urgently if we are to reduce nutrient inputs -

1. Ensure all existing and emerging DAERA policies contribute to the achievement of "Good[2]" water quality status, given the increasing trends of excess nutrients in the environment from sources such as agriculture, wastewater, domestic discharges and industry.

   Proposals 2-5 will directly contribute to reducing the phosphorus surplus in the NI agricultural sector.

2. Introduce a new regulatory framework for the processing of livestock slurries to reduce land spreading of excess phosphorus, produce renewable energy and recycle/reuse of organic nutrients.

3. Review the Nutrients Action Programme (NAP) regulations. To include a consultation on restricting the use of chemical fertilisers containing phosphorus on grassland, guided by science and evidence including the Soil Nutrient Health Scheme (SNHS) with the understanding that Privacy Notice and agreements in terms of data use of Soil Nutrient Health Scheme remaining unaltered, including data not being shared for enforcement purposes and the establishment of a Fertiliser Database. Encourage and incentivise the continued uptake of Low Emission Slurry Spreading Equipment (LESSE).

4. Launch a Small Business Research Initiative (SBRI) Phase 2 project to improve the Sustainable Utilisation of Livestock Slurry (SULS) and develop demonstrator sites to process livestock manures/slurry.

5. Roll out of the Defra-Led Dairy Demonstrator Project to formulate and test on farm livestock diets which reduce ammonia emissions, phosphorus losses and greenhouse gas emissions in Dairy herds.

2 https://www.daera-ni.gov.uk/articles/water-framework-directive-statistics

6. Increased activity focused in areas of highest risk including cumulative breaches and informed by scientific evidence with a view to having a focussed enforcement taskforce.

7. Subject to funding availability seek to deliver on the Lough Neagh wastewater schemes as set out in the price control determination with a focus on reducing nutrient loading, especially phosphorus and nitrogen.

8. Deliver targeted education and training in compliance and environmental performance with participation introduced as a requirement for involvement in the Farm Support and Development Programme.

9. Initiate a Lough Neagh science platform to improve knowledge and understanding and provide evidence to inform policy, decision making and assist in both setting baseline data and measuring outcomes.

The **main actions** are structured around the following 4 pillars:

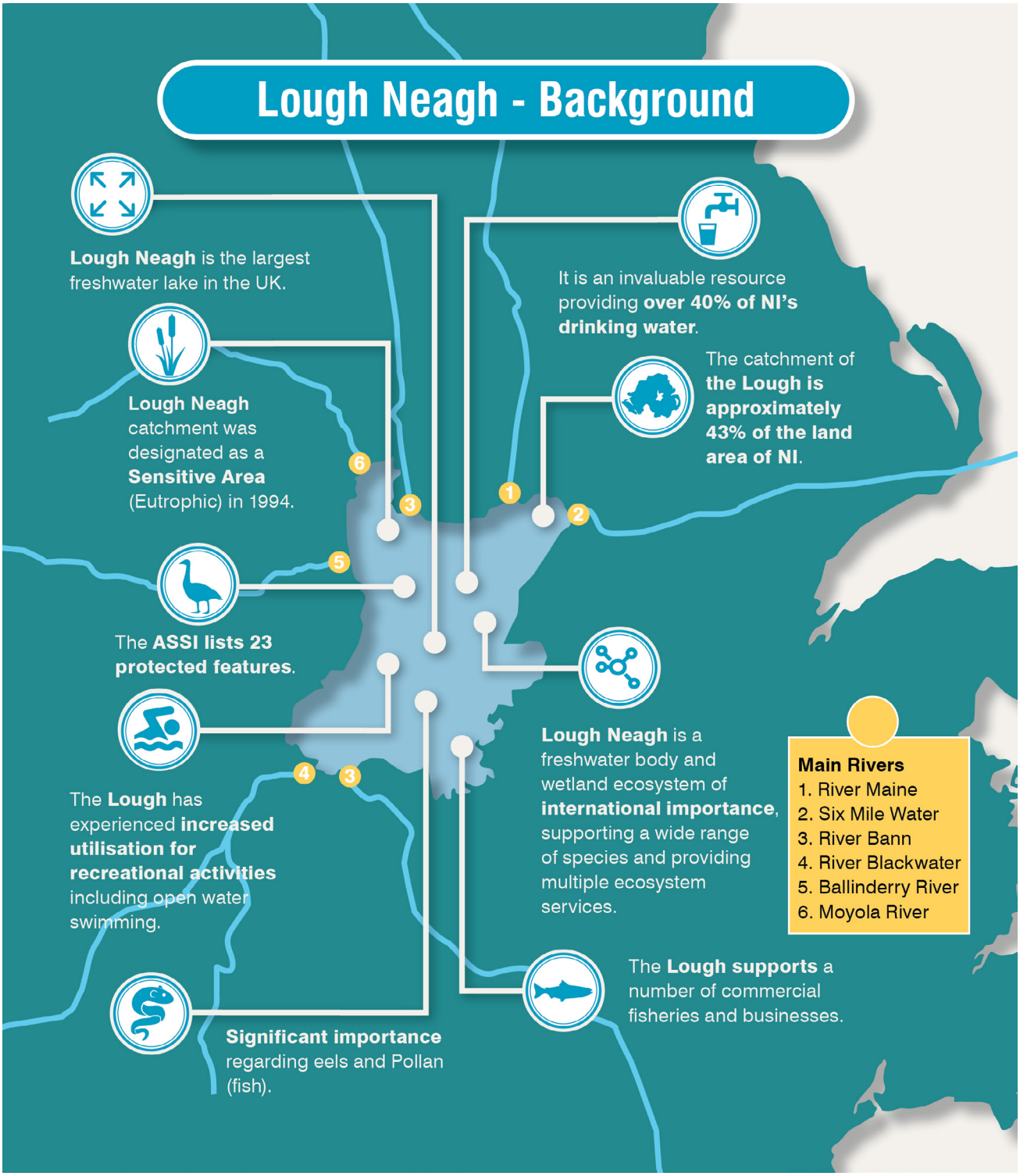
Action	
EDUCATION (based on experiential and social learning)	To empower knowledge and skills essential for decision making.
INVESTMENT	Investment, incentivisation and innovation aimed at motivating, and funding actions which will drive the adoption of behavioural change.
REGULATION	There is a statutory obligation to protect the quality of our water.
ENFORCEMENT	Action will be taken against those who fail to comply with the regulations.

Crucially, the above pillars will be underpinned by science.

Improving water quality in Northern Ireland requires action, resources and all of us working together. It requires us all to take responsibility for the waste we produce and the way we deal with it.

Section One - Background

The diagram below highlights the importance of Lough Neagh to the people of Northern Ireland. It is our most important natural resource and is of huge economic significance for those who depend on the Lough for drinking water, its fishing and eel industries. It is also of growing importance for recreation and tourism.



- Lough Neagh has a surface area of 392 km^2. It is approximately 31 km long and 14 km wide.
- The large catchment of the Lough (4,860 km^2) encompasses an area (400 km^2) of the Blackwater catchment located within the Republic of Ireland. The six main rivers entering Lough Neagh are the Moyola, Ballinderry, Blackwater, Upper Bann, Six Mile Water and Maine.
- This depicts how any credible action plan for Lough Neagh must go far beyond a localised approach; much of Northern Ireland's landmass is in fact inextricably linked via numerous waterways, alongside a portion of County Monaghan.

The Lough Neagh Catchment Area

- Lough Neagh has multiple designations, including Area of Special Scientific Interest (ASSI)[3], Special Protection Area (SPA)[4] and a Ramsar site[5].
- The ASSI lists 23 protected features including a range of aquatic birds, shoreline habitats, breeding and wintering birds, and freshwater invertebrate and fish assemblages.

3 The Environment (Northern Ireland) Order 2002.
4 Birds Directive/ The Conservation (Natural Habitats, etc.) Regulations (Northern Ireland) 1995.
5 An internationally-important wetland designated under the Ramsar Convention.

- The Pollan (fish) is also a feature, and in the UK occurs only in Lough Neagh and Lower Lough Erne. Lough Neagh is also home to the Dollaghan, a migratory ecotype (suited to a particular environment) of brown trout.
- The Lough Neagh catchment constitutes ~40% of Atlantic salmon escapement in Northern Ireland.
- The Lough Neagh catchment was designated as a Sensitive Area (Eutrophic) in 1994 under the Urban Wastewater Treatment Regulations as amended, due to nutrient enrichment. This designation resulted in additional treatment requirements for nutrient removal being put in place for certain larger wastewater discharges within the catchment.
- There is a bathing water site at Rea's Wood in Antrim.
- Lough Neagh eels have been awarded the highly prestigious PGI [Protected Geographical Indication] status.

Section Two - What caused the Blue Green Algae Crisis in Lough Neagh in 2023?

Blue Green Algae (also known as Cyanobacteria) naturally inhabit our freshwater, coastal and marine waters and, like plants, require sunlight, nutrients and carbon dioxide to grow and reproduce. Cyanobacteria can increase greatly in numbers and form visible 'blooms.' These blooms occur throughout the year and are also found worldwide.

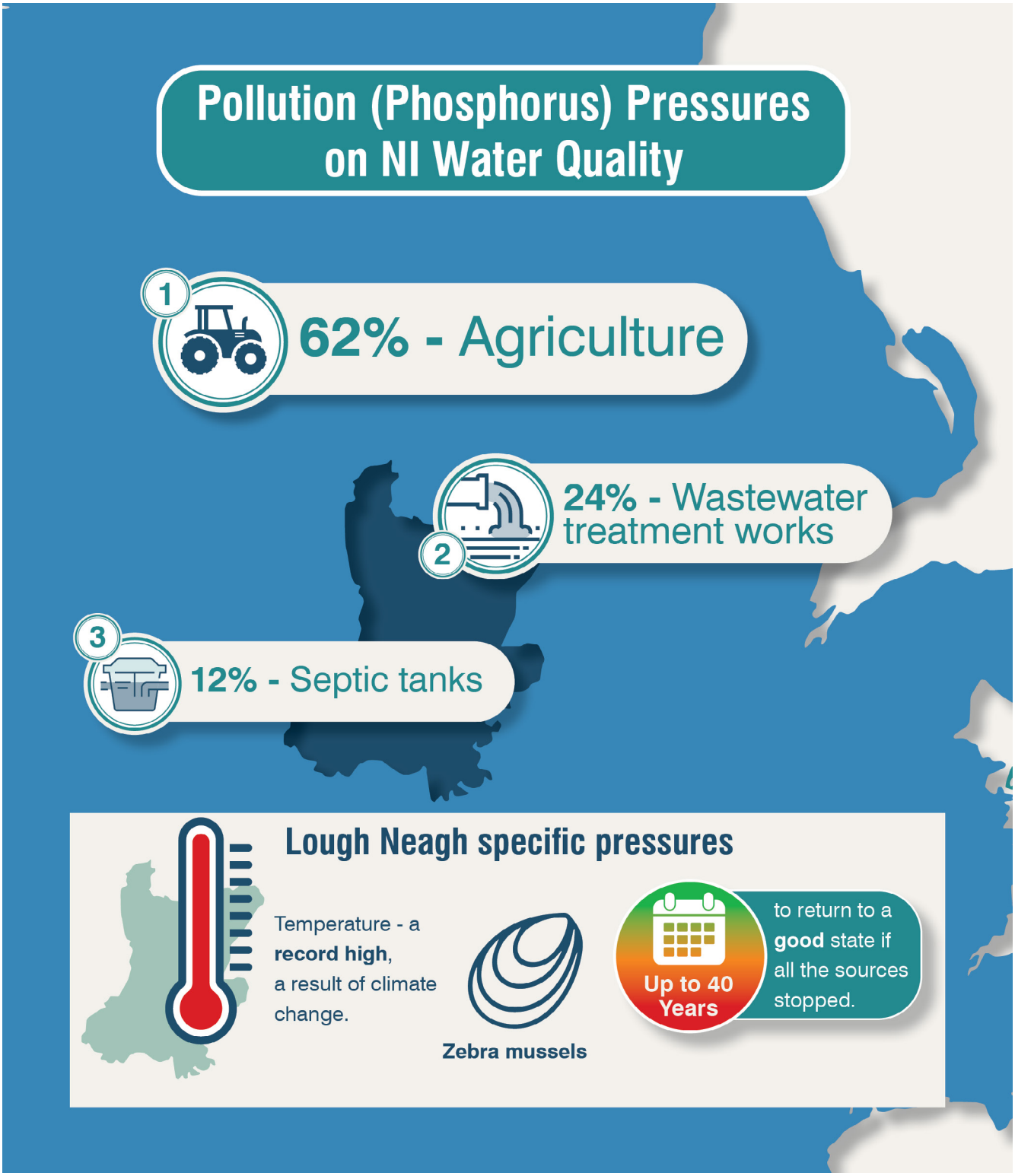
The significant blooms witnessed in Lough Neagh and later deposited along our North coast and beaches in 2023 were due to a combination of factors. These factors include decades of pollution by nutrients from agriculture, wastewater, septic tanks and industrial processes.

During 2023, this pollution, which society has the power to reduce, was exacerbated by the impacts of an increase in water temperature caused by climate change and the presence of the invasive zebra mussel. Zebra mussels graze selectively on existing phytoplankton species but not blue-green algae. This reduces the competition for resources and makes the water clearer allowing light to penetrate deeper enabling blue green algae to flourish. This is expected to continue in future years.

The RePhoKUs report, a mix of modelling and data analysis related to the NI food system, has shown that phosphorus pollution comes from agriculture, wastewater treatment works, septic tanks and industry, as illustrated below on a Northern Ireland-wide basis. Provisional Lough Neagh-specific source apportionment data produced by AFBI follows a similar pattern (Annex B).

The water quality improvements achieved from the introduction of the NAP in 2007 up to 2012 have in general been reversed due to an intensification and expansion of the agricultural sector over the last 10 years. The increased imports of concentrate feed stuffs and consequent rise in the NI agricultural Phosphorus surplus have resulted in higher losses of Phosphorus (P) to waterways. At present approximately 40%[6] of agricultural land has excess soil P and therefore can be a significant source of diffuse nutrient pollution. Climate change is also a factor to consider as changes occurring to rainfall intensity and soil temperature patterns are important drivers of nutrient mobility in soils. Against this background, a major reduction in the P surplus of the NI Agricultural sector is therefore fundamental to improving water quality.

6 https://www.sciencedirect.com/science/article/pii/S0048969719325136?via%3Dihub


Pollution (Phosphorus) Pressures on NI Water Quality
1
62% - Agriculture
2
24% - Wastewater treatment works
3
12% - Septic tanks
Lough Neagh specific pressures
Temperature - a record high, a result of climate change.
Zebra mussels
Up to 40 Years
to return to a good state if all the sources stopped.

Given the longer-term assessment that blue green algal blooms are likely to return in subsequent years, it is understandable that the safety of raw water abstracted from Lough Neagh to provide drinking water is of the utmost importance and is a major public concern. The water treatment works that abstract from Lough Neagh are designed and operated for the successful removal of blue green algae. Northern Ireland Water (NIW) monitors the performance of these water treatment plants daily to ensure that drinking water supplied to consumers meets strict regulatory drinking water quality standards.

Failing to build upon the appropriate levels of action will, in the longer term, result in the significant impacts we saw in 2023 becoming the norm, with potential adverse impact on both human health and animal health (impacted by cyanobacteria/ toxins). Added to this is the potential for further economic impacts to fishing interests and water-related businesses (not only on the Lough but across to the coast due to the uncertainty around the extent and duration of the blooms and the likely business impact).

In terms of the actions we can take to halt and address this decline, we must deal with the significant amount of pollution getting into the Lough by targeting interventions at the areas that will have the most impact - doing nothing is not an option.

Section Three - Key Proposals for Action

We need to act immediately. Our first set of actions are designed to improve water quality and to deal effectively with blue green algae. They have been informed by the work of the Science Advisory Group and are detailed below.

Interagency Protocol

The Department has led work with other government agencies to develop an Interagency Monitoring Protocol to clarify what monitoring will be carried out, and by whom, in the event that there is a similar bloom of blue green algae at any site in the future. The Protocol presents a categorisation of surface waters, with bathing waters representing the highest risk in terms of public health. It then presents the monitoring approach by water type, the use of appropriate thresholds for providing public health advice, and a tiered approach to monitoring, which is increased in the event of a bloom event. The Group has included representation from all those involved in monitoring Lough Neagh: NIEA, DAERA Marine and Fisheries, AFBI, Food Standards Agency, NI Water and has also included the Public Health Agency. The Department is already using the Protocol, and has also developed messaging for the public, giving cautionary advice on blue-green algae. The Protocol can be used by councils and water business operators looking for advice on how to monitor sites being managed, and how to advise the public.

Small Business Research Initiative (SBRI)

The Department is leading an SBRI to explore potential solutions to treat/reduce blue green algae blooms without impacting the natural environment of Lough Neagh and associated Northern Ireland water ways. The competition process is being managed on behalf of DAERA by the Strategic Investment Board (SIB).

We plan to use the first two phases of the SBRI process listed below:

- **Phase 1** - Up to six applicants selected to develop concepts.
- **Phase 2** - Two to three concepts selected and developed as potential solutions.

There is scope for physical, chemical or biological, or a combination of solutions (information provided by the Science Advisory Group on in-lake management options can be found in Section 4 of Annex B). However, whatever solution is developed it must not contribute to further environmental degradation. It must also comply with legislation and environmental designations.

The SBRI is ready to launch once budget confirmation has been received. A supplier information event will be held after the launch. The application phase for Phase 1 is five weeks. Phase 1 will run through to March 2025 with Phase 2 running through to early 2026.

The action plan, at Annex A, has been set out against four key pillars:

1) Education

Education is about equipping businesses and individuals with the knowledge and skills necessary to understand their obligations and the behaviours necessary to implement them. Education provides lifelong learning opportunities that promote critical thinking, creativity and problem-solving, which foster a culture of innovation and adaptability. Awareness raising, experiential learning, knowledge exchange and co-creation will lead to social learning that is the basis of system transformation.

2) Investment, Incentivisation, Innovation

This will motivate and reinforce behavioural change by assisting with the adoption of sustainable practices. Effective incentivisation involves a balance of rewards, recognition, and consequences, ensuring that actions are driven by intrinsic and extrinsic motivations while minimising unintended consequences.

3) Regulation

Our current policy and delivery framework is not sufficiently effective and needs enhancing. We will bring forward well-designed and implemented regulations that can safeguard our environment for the benefit of all while also promoting sustainable growth.

4) Enforcement

Enforcement mechanisms are essential for ensuring compliance with regulations. If there is evidence of breaches or non-compliance, DAERA will take whatever enforcement action may be necessary to be effective against the pollution of NI waterways.

The plan at Annex A includes 37 actions, the majority of which are attributed to DAERA, with DfI and DoJ input required across a smaller number of the overall actions.

A summary report of the extensive work of the Science Advisory Group is set out in Annex B.

Section Four - Looking Forward

Successful delivery and oversight of this action plan will depend on engagement, consensus-building, budget availability and the development of strong partnerships. Therefore, delivery, formulation of future strategy and creation of a long-term vision for the Lough will be driven by a partnership based on the successful Forever Mournes model. This central partnership engaged widely with Mourne stakeholders through an innovation lab, bringing all relevant interests together to identify, assess and capture solutions. We will pursue a similar 'Forever Lough Neagh' partnership type model.

Innovation labs take a multidisciplinary approach to solving problems while keeping the citizen (or user) needs at its core. They use a wide range of different processes and tools to systematically dissect a challenge and seek consensus with stakeholders and users as to possible solutions. These are bespoke products structured to suit the subject matter in hand and the audience.

For Lough Neagh, DAERA will establish a partnership based on similar principles, led by relevant NGOs and including key stakeholders. To begin this process, we are already working with the Department of Finance to commission an Innovation Lab to take place as soon as is practicable. The Lab will bring all interested parties together to scope the way forward.

The ownership of Lough Neagh has not been scoped in this report. A change in ownership will not provide the immediate solutions that we need to tackle the problems affecting the Lough in the short term.

We note the National Lottery Heritage Fund award with respect to the Lough Neagh Heritage Resilience Project, led by the Lough Neagh Partnership. This will include a range of activities including investigation into the feasibility of acquiring and transferring ownership of the bed and soil to public and / or community ownership. Once complete, this review will assist in informing the next steps in this matter.

Costs

Successful delivery of the actions in this plan will require significant investment from the Executive to ensure the long-term improvement in water quality across Northern Ireland, a key strategic objective within the Environmental Improvement Plan. Estimated costs have been provided wherever possible and these are scalable. While our ambition and determination remain high, the pace of progress will depend to some extent on the funding available.

Outcomes

Any actions need to have clear outcomes if we are to be confident that we are on the right path to making a tangible improvement to Lough Neagh, its catchment and the wider water environment. The actions set out in this plan are designed to deliver to the following outcomes:

- A clear policy framework and associated route map to improving the environmental status of Lough Neagh, its wider ecosystem and waterbodies across Northern Ireland and improving water quality over the longer term.
- Significant reductions in application of excess nutrients to agricultural land, and subsequent losses to waterways draining to Lough Neagh.
- Changes in agricultural practices, significantly reduced agricultural run-off and point source pollution incidents.
- Reduction of pollution incidents from NIW infrastructure to waterways draining to Lough Neagh.
- Reduction in the impact on waterbodies from domestic wastewater systems, in particular septic tanks, currently estimated at 12% across Northern Ireland.
- A reduction in the extent and frequency of algal blooms in Lough Neagh and other waterbodies, with the associated impacts on water users, ecological habitats and water-dependent businesses.
- An overall improvement in the ecological water status and ecological functioning of Lough Neagh and other surface waterbodies across Northern Ireland, currently at 32% ‘good or better’ ecological status.
- Maintenance of effective drinking water treatment processes to deal with the blue green algae present in raw water at Water Treatment Works.
- Resilient management of drinking water supply shortages during warm weather caused by intakes being impacted by algal blooms.

We acknowledge some of the outcomes are currently non-quantitative but we are committed to using the best available science and research to ensure positive outcomes for water quality and the environment.

Several sources of baseline data exist against which we will measure progress. These include NISRA Northern Ireland Environmental Statistics report, Departmental data on nutrient balances, regulatory compliance and pollution incidents and environmental monitoring data for the Water Framework Directive Regulations. Scientific research from the Agri-Food &

Biosciences Institute (AFBI) also provides a baseline breakdown estimate of nutrient inputs from agriculture, wastewater treatment works and domestic systems. An integrated data analytics and reporting platform for Lough Neagh, bringing together information from a wide range of sources is currently being developed by DAERA which will play an important role in informing, monitoring and evaluating policy interventions and decision making.

Assessment of Effectiveness

DAERA's approach will remain flexible and we will continuously review the effectiveness of the actions outlined in this report through detailed scientific and policy analysis. Further potential actions have been identified by the Science Advisory Group, including in-lake mitigations and additional future actions are likely following further research, the SBRIs and the Innovation Lab. Updates on future actions will be provided in due course.

Annex A - Action Plan

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
Education			
1. DAERA	Deliver Water Quality monitoring outreach events to farm businesses in the Lough Neagh catchment to build on the information provided by soil analysis and runoff risk mapping within the Soil Nutrient Health Scheme (SNHS). **To optimise nutrient application on the farm.**	Complete by 31 March 2025.	Included in the overall SNHS scheme cost.
2. DAERA/ AFBI	Develop a Lough Neagh science platform incorporating an online portal providing up to near real time water quality and safety monitoring and integrated ecosystem monitoring data. To improve scientific understanding and inform education and knowledge exchange programmes and support stakeholder engagement. • Development of an integrated data platform with modelling capacity for Lough Neagh and its catchments to inform policy directions and decision-making. • Research to develop an in-depth understanding of the Blue-Green Algal bloom and toxin (*cyanotoxin*) dynamics, cycle and fates to inform future surveillance programmes. • Increased level of Microbial Source Tracking to strengthen understanding of antimicrobial resistance in the environment. Further details relating to the Lough Neagh science platform (incorporating an integrated data platform) are provided in Action 33.	Commence science commissioning from June 2024.	DAERA Internal Resources, funding the DAERA portfolio of research including the DAERA-directed AFBI programme and Climate Plus Co-Centre.

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
3. DAERA	Provision of training in compliance and environmental performance to slurry spreading contractors. **To reduce risk of runoff to watercourses.**	Commence 2025.	*£0.03m Resource.
4. DAERA	Scope and implement a suite of water quality-based initiatives including farm sustainability training and advisory campaigns, ensuring that these incorporate actions **to promote experiential learning.**	Scoped by October 2024.	Funding for farmer training will be provided from the HMT ear-marked budget *£0.5m Resource.
5. DAERA/ NIW	Deliver a communications plan, including an education campaign **to build awareness and influence positive behavioural change** on specific water topic areas including: • the personal responsibility on water use • highlighting bad practices in the home • maintenance of domestic discharge systems (Septic tanks)	Commence delivery from October 2024.	*£0.6m Resource (Staff and campaign resources).
6. DAERA	Scope a Conservation Management Plan for Lough Neagh, to inform a future management plan towards **restoring the Lough Neagh ecosystem** to favourable conservation status.	Scope by 31 March 2025. Complete by March 2028.	*£0.2m Resource. *£1m Resource.
7. DAERA	Deliver a Lough Neagh Catchment wide awareness campaign on Education and Enforcement practices through a departmental mailshot **to raise awareness**.	Complete by 31 March 2025.	*£0.03m Resource.

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
8. DAERA	Reinvigorate a catchment stakeholder group to engage the public with industry and government in the improvement of water quality **to ensure robust public participation in policy development**.	By 30 November 2024.	*£0.05m Resource.
9. DAERA	Scope the development of a simple information system for slurry spreading. To provide a warning when heavy rainfall is forecast and conditions are unsuitable for slurry spreading and consulting upon mandating adherence to this advice. **Reducing point source nutrient losses from agriculture**.	December 2024.	To be confirmed.
10. DAERA	Launch a Small Business Research Initiative (SBRI) Phase 2 project to improve the Sustainable Utilisation of Livestock Slurry (SULS) and develop demonstrator sites to process livestock manure/slurry. **Removes excess phosphorus from the environment**.	Commence 2024.	*£1.5m in 2024/25, £5.5m in 2025/26 and £5m in 2026/27. All Capital.
11. DAERA	Establish and deliver a Livestock Dietary Emissions Challenge through the Defra-Led Dairy Demonstrator Project to formulate and test on farm livestock diets which reduce ammonia emissions, phosphorus losses and greenhouse gas in Dairy herds in Northern Ireland. **Reduces phosphorus and nitrogen inputs**.	Call for applications launched by Defra in November 2023 -award of contract anticipated imminently.	Project is Defra led.

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
12. DfI	Subject to funding availability seek to deliver on the Lough Neagh wastewater schemes as set out in the price control determination with a focus on reducing nutrient loading, especially phosphorus and nitrogen.	Long Term.	Investment need has already been identified as part of the price control process for NI Water assets surrounding Lough Neagh.
13. DAERA	Commence a Small Business Research Initiative to investigate feasible and affordable solutions to **reduce Blue Green Algal blooms** when they occur.	SBRI: Commencing in August 2024.	*£0.5m Capital.
14. DAERA	Initiate research as part of the Lough Neagh Science Platform focussing on the nutrient recovery management options and evaluating the impacts of interventions on the ecology of the Lough in test areas, including zebra mussel populations. **Provide evidence to inform policy and decision making**. See Annex B.	DAERA-directed AFBI research call issued April 2024.	Full costs incorporated in Action 2.
15. DAERA	Scope the expansion of the Sustainable Catchment Programme (SCP) into more Lough Neagh catchment areas. **Reducing point and diffuse nutrient losses from agricultural sources**. Scope the mandatory participation in the SCP within the FwN packages.	By September 2024.	*£0.5m pa currently. Resource.
16. DAERA	Deliver the Farming with Nature (FwN) Package.	Roll out by 2026.	FwN will primarily be funded from the HMT ear-marked budget.

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
17. DAERA	Scope and report on the most effective domestic Wastewater Treatment systems with the potential to expand to a septic tank replacement scheme. **To improve water quality**.	December 2025.	*£0.2m Resource
18. DAERA	Establish a pilot tree planting project to test effectiveness of riparian buffer zones, focused on Lough Neagh and incorporate the learning into future programmes. **Improve water quality whilst incorporating climate change mitigation and adaptation and biodiversity corridors**.	November 2024.	*£0.2m Capital
19. DAERA	Continue Lough Neagh Environmental Farming Scheme Group Project. **To ensure an Environmental Management Plan for each participating farm**.	Continuation.	2024/25 £0.04m 2025/26 £0.04m April to December 2026 £0.03m
20. DAERA	Scope a community challenge fund in association with 'Live Here Love Here', whose aim is to unite people in a shared effort to **create a cleaner, greener Northern Ireland**.	March 2025.	£0.04m Resource
21. DAERA	Bid for new grant programme to support organisations working to **improve water quality and conservation** of Lough Neagh.	Commence June 2024.	*£1m Resource
Regulation			
22. DAERA	Complete the statutory review of the Nutrients Action Programme (NAP), consult on proposals within the updated NAP and introduce revised NAP Regulations. **Reduce the nutrient losses to water from agricultural sources**.	March 2025.	DAERA Internal resources.

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
23. DAERA	Consult on restricting the use of chemical fertilisers containing phosphorus on grassland, guided by science and evidence including the SNHS, with the understanding that Privacy Notice and agreements in terms of data use of Soil Nutrient Health Scheme remaining unaltered, including data not being shared for enforcement purposes in the NAP Review consultation during 2024. Reduce phosphorus loading to land and improve farm efficiency.	Consultation August 2024.	DAERA Internal resources.
24. DAERA	Introduce a Fertiliser Database to record fertiliser movements along the supply chain in NI from merchants/suppliers to farmers. Consult within the NAP Review during 2024. **Improve nutrient management and farm efficiency.**	Subject to funding, this project could commence in 2024.	*£1.5m Capital.
25. DAERA	Establish a DAERA group to develop a proposed response to the excess nutrient problem that will significantly reduce the adverse environmental consequences. Engage and fully consult with stakeholders regarding a new regulatory framework for the processing of slurry to reduce land spreading of excess phosphorus, resulting in renewable energy production and recycling/reuse of organic nutrients. **Reduce phosphorus loading to land**.	July 2024. December 2026.	*£0.25m Resource.
26. DAERA	Review of 3rd cycle River Basin Management Plan and programme of measures as overall water quality improvement strategy for DAERA. **Improving water quality**.	December 2024.	DAERA Internal Resources.

Number and Key Department for Delivery	Key Actions/Recommendations	Timescale: Short <6 months, Medium 6 - 12 months Long term >12 months	Costs/Funding Estimate (£) *Pending Funding
Enforcement			
27. DAERA	Increased activity focused in areas of highest risk including cumulative breaches and informed by scientific evidence with a view to having a focussed enforcement taskforce. **Improving water quality**.	April 2025.	*£0.45m pa Resource.
28. DAERA	The provision of additional Water Quality Inspectors to enhance responses to reports of water pollution. **Improving water quality**.	April 2025.	*£0.69m pa Resource.
29. DAERA	Establish an enforcement project team to explore and fully consult on enforcement methods including fixed penalty notices for non-compliance. **Deterrent to reduce pollution incidents**.	By September 2024.	DAERA Internal Resources.
30. DAERA/ DOJ	Review and consult on penalties and fines for Environmental Crimes, including pollution offences in consultation with Department of Justice, with a separate cross compliance penalty regime. **Deterrent to reduce pollution incidents**.	By September 2024.	DAERA Internal Resources.
31. DAERA	Scope the provision of a dedicated team for those catchments of poorest water quality. Initially focused on the Lough Neagh catchment. This team, separate from NIEA, will work alongside key stakeholders to educate and support farm businesses in steps that can be taken to improve water quality, allowing space and time to implement these improvements and following up with appropriate enforcement action.	December 2024	*£0.03m Resource

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
32. DAERA/ DOJ	Following consultation, introduce a streamlined and more effective penalty regime, in consultation with Department of Justice, supported by targeted, risk-based inspections, to drive compliance with the new Farm Sustainability Standards and to aid environmental protection. **Deterrent to reduce pollution incidents**.	January 2026.	*£0.035m Resource.
Science and Governance			
33. DAERA/ AFBI	Lough Neagh Science Platform incorporating: Single accessible IT-enabled platform providing access to datasets from Lough Neagh and its tributaries. • Public facing science portal presenting water quality parameters up to in near real time with a set of tools and applications co-designed by stakeholders. • A suite of models to enable (1) source apportionment of nutrient enrichment in the Lough Neagh catchment and sub-catchments (2) evaluation of potential interventions to improve water quality, ecosystem health and safety (*cyanotoxins*) and other environmental and economic outcomes. • Co-ordinated monitoring and surveillance programme integrated with R&D, and with strong linkages with knowledge exchange and education. • To assist in building and maintaining consensus, research to be commissioned based on a 'Values Landscape Approach' to be considered. This will help	Commence science commissioning from June 2024.	DAERA Internal Resources, funding the DAERA portfolio of research including the DAERA-directed AFBI programme and Climate Plus Co-Centre. Plus additional costs *Capital £8m *Recurring costs £1m

Number and Key Department for Delivery	Key Actions/Recommendations	**Timescale:** Short <6 months, Medium 6 - 12 months Long term >12 months	**Costs/Funding Estimate (£)** *Pending Funding
	give direction on building and maintaining consensus. • Cross-organisational science oversight group creating linkages with similar water quality initiatives across the UK and Ireland and internationally. **Provide evidence to inform policy and decision making.**		
34. DAERA	Within the DAERA Postgraduate Studentship Scheme, have a focus on PhDs on nature-based solutions for Lough Neagh. **To increase knowledge and understanding**.	December 2024.	DAERA Internal Resources, funding the DAERA portfolio of research.
35. DAERA	Commission an Innovation Lab to generate solutions and long-term vision **to improve water quality using a Forever Mournes partnership type model**, to include quarterly reference group meeting chaired by Minister.	June 2024.	£0.1m Resource.
36. DAERA	Commence a scientific review of the environmental impact of sand extraction at Lough Neagh. Phase 1 Report (Review of existing evidence).	Internal report due March 2025.	To be confirmed.
37. DAERA	Implement the InterAgency Blue-Green Algae monitoring protocol. Response to incidents and public health advice.	Bathing Waters element commenced March 2024.	*£0.85m Resource to implement bathing waters element. *£0.31m Resource to implement NIEA response and verification element and additional monitoring.

Annex B - Summary report of the work of the Science Advisory Group

1. Background

A Water Quality Science Advisory Group (SAG) was established in autumn 2023 comprising of eight academics/professional experts from universities and science organisations across the UK and Ireland, complementing five leading science evidence representatives from the Chief Scientific Adviser's Offices in Defra and Scottish Government (Environment, Natural Resources and Agriculture) and the Strategic Evidence Unit within Welsh Government. Scientists from across DAERA Environment Marine and Fisheries Group (EMFG), NI Environment Agency (NIEA) and Agri-Food and Biosciences Institute (AFBI) also sit on the SAG as observers.

The role of the SAG has been to provide independent challenge and scrutiny to the ongoing review of all policies and operational activities led by the Review Team and for members of the group to share their experiences and lessons learnt from related water quality initiatives in the UK and Ireland and internationally, including the risk management of blue green algae and their toxins.

This report, produced by the DAERA CSA-Office, summarises the main issues reviewed by the SAG in structured discussions (over 12 meetings), and in associated technical papers produced by the group. For each topic area detailed below, the DAERA CSA-Office has presented on the main messages from SAG and outlined how appropriate actions can be taken forward (italics text).

2. Source apportionment

Source apportionment is the estimation of the contribution by different sectors and spatial areas to water pollution based on data analysis. For Lough Neagh, like many waterbodies across the globe, the primary environmental problem is the excessive enrichment of waters with nutrients, specifically phosphorus and nitrogen. Right from the start of their input, SAG members highlighted the importance of robust source apportionment data to understand the sources of nutrient pollution, and hence direct focus on the most appropriate interventions to address the very high nutrient concentrations in the Lough.

Completed in 2020 using a Stocks and Flow Analysis (SFA) model, AFBI-led work focused on the NI food system, estimated that 62% of phosphorus lost to NI waterbodies was from the agricultural sector, 24% from the wastewater treatment sector and 12% from septic tanks (RephoKUs project)[7]. An updated SFA model is currently being applied to the Lough Neagh

7 Doody, D.G.; Rothwell, S.A., Martin-Ortega, J., Johnston, C., Anderson, A., Okumah, M., Lyon, C. Sherry, E. 2020. Phosphorus Stock and Flows in the Northern Ireland Food System. RePhoKUs report. Published at https://www.afbini.gov.uk/sites/afbini.gov.uk/files/publications/RePhoKUs%20report%20October%202020x.pdf

catchment with outputs expected in summer 2024. In the meantime, AFBI has produced outputs from the Source Load Apportionment Model (SLAM), estimating total Phosphorus (TP) loads from different sources in the Lough Neagh catchment, which also includes direct inputs and diffuse pollution from non-agricultural land (forestry and urban). Provisional estimates based on this work (excluding atmospheric/rainfall deposition), report 56% of the TP load from the agricultural sector, 31% from wastewater treatment works, 1% from septic tanks, and 12% from other diffuse pollution (forestry and urban). AFBI has noted that SFA and SLAM model approaches use different approaches to estimating the load contributions from septic tanks, and that additional data is needed to improve accuracy and confidence in model estimates.

SAG recognised that there are significant caveats with the current source apportionment estimates, and the data must be treated with caution, but nonetheless concluded that the findings give the order of magnitude of each sector's contribution to nutrient pollution in Lough Neagh. SAG supported outline proposals for further developmental work by AFBI and partners to produce a suite of higher resolution (in space and time) integrated Lough Neagh water quality models. These will provide a more accurate representation of the finer scale land use and wastewater processes to inform an integrated whole catchment approach to determining the sources and fates of nutrient enrichment.

Furthermore, SAG highlighted that short duration storm/flood events deliver significant phosphorus loading to waterbodies. High frequency monitoring in major tributaries is required to detect and quantify such events and to more robustly characterise the contribution of nutrient losses from different sectors and both point and diffuse sources. This will allow for a more detailed understanding of the main pathways and the seasonality of diffuse pollution and provide a means of monitoring and evaluating the effectiveness of implemented measures to reduce the nutrient exports to surface waterbodies.

Main messages and actions to take forward:

Overall, modelling data indicates that around 62% of phosphorus lost to NI waterbodies was from the agricultural sector, 24% from the wastewater treatment sector and 12% from septic tanks. Provisional Lough Neagh-specific data indicates a similar pattern estimating that 56% of the total phosphorus load reaching the Lough is from the agricultural sector, 31% from wastewater treatment works, 1% from septic tanks, and 12% from other diffuse pollution (forestry and urban).

Whilst giving good information on the relative contribution of different sectors, the absolute values estimated for nutrient losses to waterbodies from the modelling are likely to be underestimates for all sectors. Data weaknesses and gaps are being addressed in ongoing and planned studies led by AFBI in collaboration with DAERA EMFG, NIEA and NIW which will complement work of the Climate Plus Co-Centre (AFBI, QUB and UU involved).

3. Monitoring and surveillance.

An overview of water quality and safety monitoring and surveillance science, including blue green algal populations and cyanotoxins, was reviewed by the SAG. This includes a range of water body types (groundwater, transitional and coastal water bodies, bathing waters, as well as protected sites), and is jointly undertaken by NIEA (Water Management Unit, Regulation Unit, and Natural Environment Division), AFBI and DAERA EMFG.

Overall, an extensive wide-ranging monitoring and surveillance programme on water quality is in place for the Lough with a primary focus on fulfilling statutory monitoring and surveillance requirements. However, additional approaches providing near real time water quality data and enhanced source apportionment data at targeted locations would add value for decision-makers and stakeholders.

Indeed, high frequency monitoring of water quality in Lough Neagh its main feeder rivers and Lower Bann (water quality and quantity) would not only better define the dynamic characteristics of catchments but would also contribute significantly to an online Lough Neagh science portal to disseminate up to near real-time information. This portal would present information to stakeholders to drive engagement and help inform, monitor and evaluate catchment-based interventions.

Main actions to take forward:

A programme of water quality sampling and analysis in Lough Neagh and its tributaries, fully co-ordinated with statutory (Water Framework Regulations) related surveillance and the Climate Plus Co-Centre research programme, to guide the development and validation of new catchment-based models. This should include increased frequency of nutrient load monitoring (from weekly to sub daily) at the six Lough Neagh tributaries so that a catchment normalised load can be calculated.

Collation of data sets for Lough Neagh and its tributaries into a single accessible IT enabled platform. When developed this platform should aim to provide near-real time water quality information to stakeholders and be a tool for behavioural change.

Continued model development research is required to evaluate options and to recommend the most appropriate approaches to develop an integrated model for Lough Neagh and its catchments to inform policy directions and decision-making.

To develop an in-depth understanding of the Blue-Green Algal (BGA) bloom cycle (considering environmental conditions, bloom species composition, toxicity, longevity and decline), a new research project for cyanobacteria and cyanotoxins should be established to complement the Inter-Agency BGA monitoring protocol reviewed by SAG.

Increase the level of Microbial Source Tracking across a range of environmental sources, including surface water, wastewater, agricultural areas, shellfish and bathing waters. This work will strengthen our understanding of antimicrobial resistance in the environment, including the relative importance of different sources, transmission routes and the implications for people, animals, food and ecosystems.

4. Social sciences

SAG reviewed the key role of social sciences in understanding values and behaviours thus helping to inform the nature and type of policy interventions to drive the transformational change required for Lough Neagh. The main areas considered by SAG are summarised below.

Farmers' awareness and behaviour. A pathway can be established between increasing farmers awareness and adoption of best management practices that, in turn, leads to improved water quality and safety. However, the pathway is not direct and is mediated by a number of psychosocial, economic and catchment factors. Greater benefits are obtained when farmers practice what they are taught (vs. advice only), hence experiential learning should be built into education and knowledge exchange programmes, wherever possible. Early stakeholder engagement, trusted intermediaries and tailored messaging are key factors for success[8].

Public views, perceptions and values. Understanding public views, perceptions and values in relation to Lough Neagh is critical as part of evaluation of any interventions and being able to gauge public support and anticipate and manage conflict. A 'Values Landscape Approach' enables different types of values and preferences for policy interventions to be identified[9]. It is particularly useful to identify the root of different preferences that the public might have in relation to particular interventions and whether this can explain seemingly intractable conflicts.

Stakeholders and system transformation. Engagement with NI stakeholders to discuss systems transformation in relation to phosphorus has been studied showing that the biggest barriers appear to be related to governance and cross sectoral collaboration. Some deeper levers of change to address the diffuse pollution issue were identified. These included new types of food production, re-imagined technological design around livestock manures and recycled phosphorus and strategic integrated carbon, phosphorus and nitrogen solutions. It is well established that catchment platforms can provide an effective stakeholder engagement to underpin transformational changes in relation to water quality, based on true models of co-construction of solutions with the stakeholders.

8 Okumah, H., Martin-Ortga, J., Chapman, P.J., Novo, P., Cassidy, R., Lyon, C., Higgins, A. and Doody, D. 2021. The role of experiential learning in the adoption of best land management practices. Land Use Policy, 105, p. 105397.

9 Schulz, C., Martin-Ortega, J., Glenk, K., & Ioris, A. A. 2017. The value base of water governance: A multi-disciplinary perspective. Ecological Economics, 131, 241-249.

Main messages and actions to take forward:

Experiential learning is a key principle in DAERA education and knowledge exchange and should continue to be embedded into all education and knowledge exchange programmes, wherever possible. Linkages to data platforms providing up to near real-time water quality data and local source apportionment would add value.

To assist in building and maintaining consensus, commissioning research based on a 'Values Landscape Approach' needs to be considered. This will help give direction on building and maintaining consensus.

Early stakeholder engagement, trusted intermediaries and tailored messaging are key factors for success. Based on this, governance arrangements should be developed to provide leadership and direction and facilitate cross sectoral working.

Stakeholder catchment platforms are a well-proven model on which local stakeholder engagement can be based.

5. Catchment management

As advocated internationally for the risk management of blue-green algal blooms, the SAG highlighted the fundamental importance of catchment management in addressing the water quality issues of Lough Neagh and that improvements in water quality and ensuring water is a safe resource requires collective action by all sectors to achieve the required reductions in nutrient loadings to waterbodies.

SAG noted the ongoing review of the Nutrients Action Programme (NAP) and highlighted the importance of quantifying (through modelling) the impacts of interventions to help inform decisions to achieve the necessary levels of load reductions.

6. In-lake management options

SAG, whilst highlighting that catchment management to reduce nutrient loadings is fundamental to address Lough Neagh water quality issues, recognised that it was also appropriate to consider in-lake management issues, given the legacy nutrient issues which will persist from the release of stored nutrients in the Lough sediment and the potential need for a response in the case of another bloom.

Blue-green algal blooms and nutrients

In-lake management options aim to prevent Blue Green Algal (BGA) bloom formation and spread, treat significant blooms and tackle legacy nutrient issues from sediment release. SAG evaluated the potential of a range of in-lake management options based on published research findings and applying the first-hand experiences of individuals within the group.

The complex nature and scale of Lough Neagh as an ecosystem, drinking water source and recreational water restrict many of the potential approaches. Effectiveness, risk and the ability to control a measure once introduced were key aspects taken into consideration in the SAG evaluation.

From the review, possible management options to address bloom formation and proliferation include those based on ultrasound, hydrogen peroxide, modified soil flocculation, oxygenation and the addition of barley straw bales. SAG highlighted that care must be taken to avoid addition of chemicals and agents which could have longer-term negative impacts including damage to, removal or smothering of natural habitats.

The most suitable measures to disrupt in-lake nutrient cycling and recovery of legacy nutrients from Lough Neagh include aquatic plant harvesting and recovery of BGA biomass from the Lough. Both are difficult propositions and will require assessments of impact, development time and initial piloting.

Control of zebra mussels

Zebra mussels *(Dreissena polymorpha)* have been implicated as a factor contributing to the conditions in Lough Neagh which supported the BGA bloom of 2023. They are filter feeders, removing suspended material from the water column allowing light to penetrate more easily. This has several consequences for the ecosystem, food web and species composition of Lough Neagh which requires more research to be more fully understood.

Any invasive control needs to be undertaken in a sympathetic manner with regards to key species and habitats. Control is difficult in natural loughs, especially one as sizeable and complex as Lough Neagh. Without taking extreme measures it is unlikely that the zebra mussel can be eradicated, hence a continued presence should be factored into future remediation planning.

Evidence suggests some invasive species provide mutually beneficial environments for each other's growth. The Zebra mussel provides water clarity for Elodea nuttallii (western waterweed) growth and in turn the plant provides habitat for the mussels. Thus, indirect control through removal of associated invasive aquatic plants may prove a simple and effective reduction mechanism. Whilst not conclusive, there is enough evidence to warrant R&D trials using established plant harvesting techniques.

Main messages and actions to take forward:

A small business research initiative (SBRI) is planned which will provide an opportunity for industry-led trials to test management options.

More basic research has the potential to complement the SBRI focussing on the nutrient recovery management options and evaluating the impacts of interventions on the ecology of the Lough in test areas.

Lough Neagh Science Platform

SAG work has highlighted that an extensive programme of monitoring and surveillance and R&D science is in place for Lough Neagh, to meet statutory reporting requirements, and giving a solid understanding of the main sources of nutrient pollution and the processes driving BGA blooms. As noted previously, building on this, with additional high frequency near real time water quality monitoring, and reporting other Lough Neagh related data through an online portal, would provide a platform for really strong catchment-based stakeholder engagement. Furthermore, such developments would provide the basis for modelling studies to produce source apportionment at local level and help inform decision-making and best tailor future direction.

Main features of the proposed Lough Neagh science platform are:

- Single accessible IT-enabled platform providing access to datasets from Lough Neagh and its tributaries.
- Public facing science portal presenting water quality and safety parameters up to in near real time with a set of tools and applications co-designed by stakeholders.
- A suite of models to enable (1) source apportionment of nutrient enrichment in the Lough Neagh catchment and sub-catchments and (2) testing of potential interventions to improve water quality and safety, ecosystem health and other environmental and economic outcomes.
- Co-ordinated monitoring and surveillance programme integrated with R&D, and with strong linkages to knowledge exchange and education programmes.
- Cross-organisational science oversight group creating linkages with similar water quality initiatives across the UK & Ireland and internationally.

Main actions to take forward:

DAERA is putting in place the building blocks for such a platform, including:

- *As part of the DAERA Science Transformation Programme:*
  - *New oversight arrangements are being put in place across the DAERA family to facilitate additional co-ordination within and between monitoring and surveillance programmes and research and development.*
  - *A new Laboratory Information Management System (LIMS) is being rolled-out across laboratories in the DAERA family, creating the platform to centrally store, mange, make available and report on data sets*.

- *The DAERA-directed AFBI research call for 2024 is requesting detailed proposals, co-ordinated with the work of the Climate plus Co-Centre (incl. AFBI, QUB, and UU), to meet the evidence and innovation gaps identified in the SAG work.*
- *DAERA will explore collaborative funding arrangements with other public funders, including UKRI-NERC, as the Lough Neagh Science Platform has the potential to be a leading science platform with learnings applicable across the UK & Ireland and internationally.*

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