



# Topical Digest

## Algal blooms in Lough Neagh

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## Algal blooms in Lough Neagh

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**This Topical Digest provides a reading list on the issue of algal blooms in Lough Neagh. Lough Neagh, the largest lake in the UK, has been experiencing recurrent algal blooms, notably in the summer of 2023 restricting recreational and commercial usage of the lake. Concerns have been raised about the water quality and ecological health of the lake. This digest draws upon experiences of algal blooms locally in Northern Ireland, the UK, and Europe, bringing together background publications, key legislation, research papers, government department publications, a briefing paper, and local media.**

**Should MLAs or their constituency staff have suggestions for information they would like to see in the guide, or have links to useful sources that they would like to share, please feel free to contact the Research and Information Service at:**

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Front cover image: Algal bloom in the Vlatava by [Mihály Köles](#) on [Unsplash](#)

# 1 Introduction

This Topical Digest provides a reading list on the issue of algal blooms in Lough Neagh. Lough Neagh, the largest lake in the UK, has been experiencing recurrent algal blooms, notably in the summer of 2023, restricting recreational and commercial usage of the lake. Concerns have been raised about the water quality and ecological health of the lake.

Algal blooms are a phenomenon experienced globally and are characterised by a rapid accumulation of algae. Algal blooms can occur due to a variety of causes, such as eutrophication, and have varying impacts on human and animal health, ecosystems, and industries such as tourism and fishing. Recently, blue-green algal blooms have [occurred widely across Northern Ireland](#) however, those at Lough Neagh have received particular attention. Lough Neagh sits in the centre of the Neagh Bann river basin district bordering five out of six counties and has experienced large-scale public attention due to algal blooms. This has led to questions over the safety of the water supply and lake.

Under the [UK Environment Act 2021](#), Northern Ireland (NI) developed a draft [environment strategy](#) in 2022 setting its targets regarding water quality and other environmental issues. Previously, the EU's [Water Framework Directive](#) (WFD) applied in NI. Since 2000, the WFD has been the main law for water protection in Europe requiring Member States to use their River Basin Management Plans (RBMPs) and Programmes of Measures (PoMs) to protect and restore water bodies to reach good status and prevent deterioration. Regulations for this directive including monitoring and reporting criteria were detailed in [2017](#) and revised in [2019](#) to ensure operation in a post EU exit NI. Regulations regarding chemical substances used in popular fertilizers ([phosphorous](#) and [nitrates](#)) were replaced in 2019 by the [Nutrient Action Programme Regulations \(Northern Ireland\) 2019](#) (NAP). The NAP ensures regulations set under the [Nitrates Directive 1991](#) remain in a post EU exit NI. Previously regulations focused on nitrates. However, the NAP encompasses phosphorous regulation and extends Cross Compliance Standards to the use of chemical phosphorous.

A [2020 consultation](#) to inform the new RBMP identified Lough Neagh to be in poor status with bad ecological potential. Further, the Department of Agriculture, Environment and Rural Affairs (DAERA) released [The Water Framework Directive Statistics Report](#) addressing the status of water bodies in NI and adding new priority chemical substances to the monitoring requirements.

## 2 Understanding freshwater algal blooms: cause

- Environment Agency, [Algal blooms: advice for the public and landowners](#) (2017)
- US EPA, [Climate Change and Freshwater Harmful Algal Blooms](#) (2024)
- US EPA, [Phosphorous](#) (2023)

## 3 Understanding freshwater algal blooms: impact

- US EPA, [What are the effects of Harmful Algal Blooms?](#) (2024)
- CDC, [Harmful Algal Bloom \(HAB\)-Associated Illness](#) (2021)
- Association of State and Territorial Health Officials, USA, [Cyanobacterial Blooms and Associated Illnesses](#)
- Oregon Health Authority, [Cyanobacteria \(Harmful Algae\) Bloom Guidance, A resource for local public health authorities](#) (2020)
- CDC, [Harmful Algal Bloom \(HAB\)-Associated Illness: Information for Veterinarians](#) (2021)
- Oregon Department for Fish and Wildlife, [Fishing during blue-green algae \(cyanobacterial\) blooms](#) (Accessed: 12 April 2024)

## 4 Northern Ireland

- [The Water Environment \(Water Framework Directive\) Regulations \(Northern Ireland\) 2017](#)
- [The Water \(Amendment\) \(Northern Ireland\) \(EU Exit\) Regulations 2019](#)
- [Nutrient Action Programme Regulations \(Northern Ireland\) 2019](#)
- DAERA, [2020 consultation for the new cycle of the River Basin Management Plan: for the North Western, Neagh Bann and North Eastern River Basin Districts \(2021-2027\)](#) (2020)
- DAERA, [The Water Framework Directive Statistics Report](#) (December 2021)
- DAERA, [Draft Environment Strategy for Northern Ireland](#) (2022)
- Lough Neagh Working Group, [Oral questions for answer Agriculture and Rural development \(questions 1 and 4\)](#) (25 November 2013)
- NIEA, [Blue-Green Algae - Confirmed Locations](#) (11 April 2024)

## 5 England

- [UK Environment Act 2021](#)
- DEFRA, [Environmental Improvement Plan](#) (2023)
- DEFRA, [The Environment Land Management Scheme \(ELMS\)](#) (2021)

- DEFRA, [Environmental Land Management \(ELM\) update: how government will pay for land-based environment and climate goods and services](#) (2023)
- Environment Agency, [Nitrates: challenges for the water environment](#) (2021)
- Environment Agency, [Phosphorous: challenges for the water environment](#) (2022)

## 6 Europe

- [The Water Framework Directive 2000](#)
- [The Nitrates Directive 1991](#)
- EEA, [Nutrients in freshwater in Europe](#) (14 December 2023)
- EEA European Topic Centre on Inland, Coastal and Marine Waters, [European assessment of eutrophication abatement measures across land-based sources, inland, coastal and marine waters](#) (2016)
- L Carvallo *et al.*, '[Sustaining recreational quality of European lakes: minimizing the health risks from algal blooms through phosphorus control](#),' *Journal of Applied Ecology* (2013) Vol. 20, p315-323
- G Cronburg, '[Phytoplankton changes in Lake Trummen, Sweden, induced by restoration](#),' *Folia Limnologica Scandinavica* (1982) Vol. 18

## 7 RalSe briefing papers

- RalSe, [An overview of algal bloom in Lough Neagh](#) (2023)
- RalSe, [Zebra mussels in Northern Ireland](#) (2023)

## 8 Additional research papers

- B Rippey, *et al.*, '[Timescale of reduction of long-term phosphorous release from sediment in lakes](#),' *Water Research* (2021) Vol. 200, p117283
- L Bláha, P Babica & B Maršálek, '[Toxins produced in cyanobacterial water blooms – toxicity and risks](#),' *Interdisciplinary Toxicology* (2009) Vol. 2, p36-41
- C Bahlai, *et al.*, '[Cascading effects: insights from the U.S. Long Term Ecological Research Network](#),' *Ecosphere* (2021) Vol. 12
- Y McElarney, *et al.*, '[Development of targeted ecological modelling tools for lake management: Summary findings and recommendations](#),' *AFBI website* (2014)

- J Vymazal, '[Removal of nutrients in various types of constructed wetlands](#)', *Science of the Total Environment* (2007) Vol. 380, p48-65
- R Harrington and C Ryder, '[The use of integrated constructed wetlands \(ICW's\) in the management of farmyard runoff and waste water](#)', *National Hydrology Seminar* (2002) p55-63
- D Molloy, '[Biological control of zebra mussels](#)', *Proceedings of the Third California Conference on Biological Control* (2002) p86-94
- H Matthijs, *et al.*, '[Selective suppression of harmful cyanobacteria in an entire lake with hydrogen peroxide](#)', *Water Research* (2012) Vol. 46, p1460-1472

## 9 Stakeholder insights

- Food Standards Agency, '[Food Standards Agency confirms fish caught from Lough Neagh is safe to eat](#)' (7 March 2024).
- NI Water, '[Your water is safe to drink](#)' (29 September 2023)
- Lough Neagh Partnership, '[Lough Neagh Partnership Engages with Key NI Political Parties to Address Lough Neagh's Challenges](#)' (9 November 2023)
- Friends of the Earth, '[Why's Lough Neagh dying? Northern Ireland's most precious wildlife site is facing disaster](#)' (2 February 2024)
- The Rivers Trust, '[Press release: The Rivers Trust issues summer season alert about increasing toxic blue-green algae blooms in Northern Ireland water bodies](#)' (7 July 2023)
- RSPB, '[RSPB NI are urgently calling for a multi-departmental emergency response plan for Lough Neagh and funding to ensure it is delivered](#)' (20 September 2023)
- AFBI, '[Why has Lough Neagh been going green in the sun?](#)' (28 June 2023)

## 10 Selection of media and other articles

- '[NI weather: Constant rain may be a pain, but it is also a threat to very thing that keeps us alive](#)', *Belfast Telegraph*, 29 March 2024
- '['Difficult interventions' needed to address Lough Neagh crisis, warns minister](#)', *The Independent*, 27 March 2024
- '['Save Lough Neagh': Environmental campaigners stage protest outside Stormont](#)', *Belfast Telegraph*, 12 March 2024
- '['Desperate state': None of NI's rivers in good overall health and Lough Neagh an 'ecological disaster'](#)', *Belfast Telegraph Online*, 27 February 2024

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- [Lough Neagh bed owner remains open to exploring future ownership options](#), *Belfast Telegraph Online*, 22 February 2024
  - [NI Water: Lough Neagh algae bloom expected to be 'more severe' this summer](#), *Irish news*, 31 January 2024
  - [Lough Neagh will remain seriously polluted for 20 years, even if we cut emissions — which are still increasing](#), *Belfast Telegraph*, 22 September 2023
  - [Public meeting highlights problem of toxic algae in Lough Neagh](#), *Irish News*, 20 September 2023
  - [Fishing for world renowned Lough Neagh eels has collapsed: fishermen](#), *Irish News*, 15 September 2023

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