Bloomin’ Algae: a surveillance network for detecting algal blooms

UKCEH Our planet. Decoded.

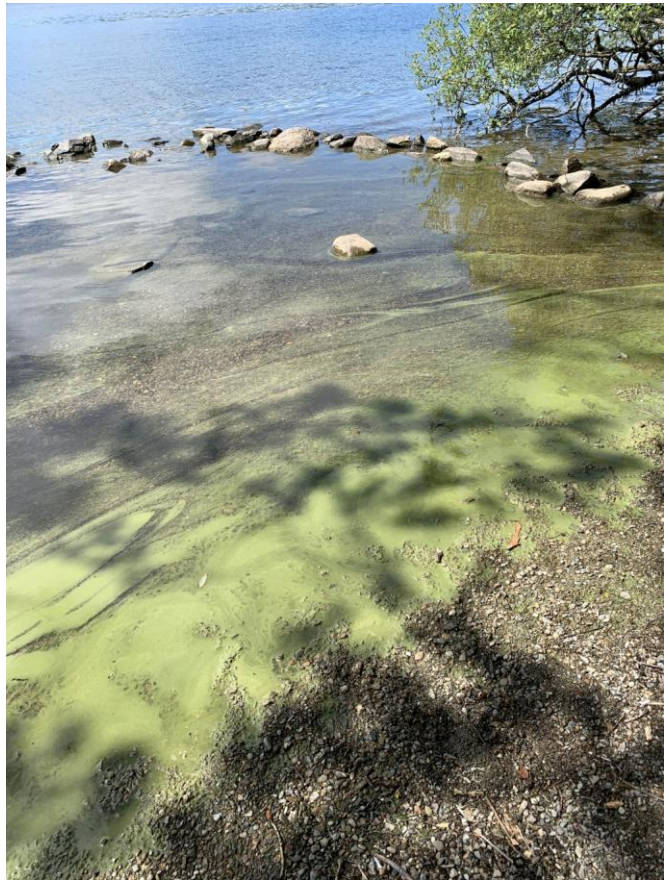
Ellie Mackay

02.11.2026



Overview

- What are harmful algal blooms?
- Why do they matter?
- The Bloomin’ Algae app
- What does the data tell us?
- Who uses the data?





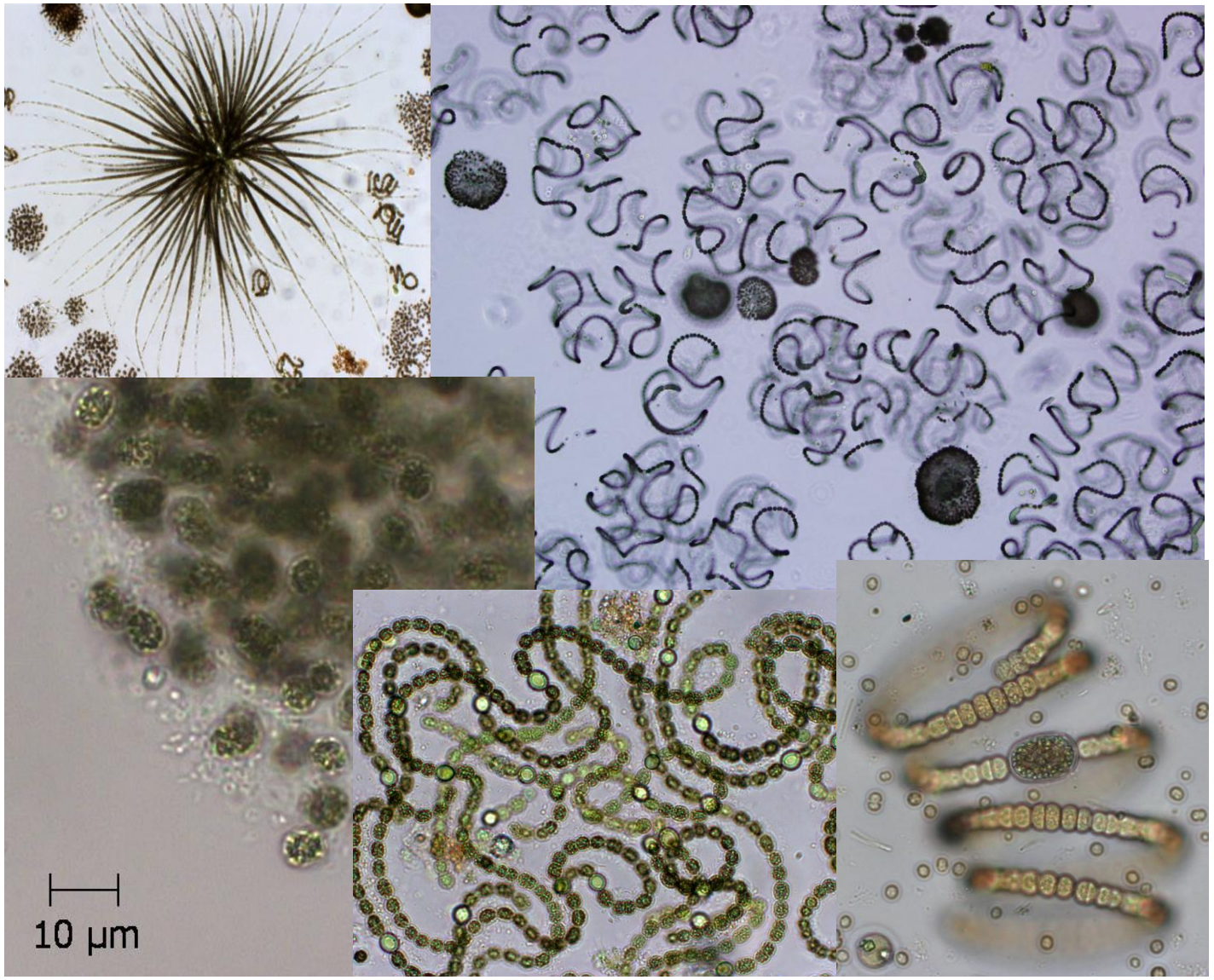
What algae cause harmful algal blooms?

Cyanobacteria (blue-green algae)

- Ancient (3 billion years)
- Evolution of oxygen in atmosphere

- Planktonic and benthic
  - Single cells
  - Filaments
  - Colonies
- Aerotopes – buoyancy regulation

⟶ Surface “blooms”



Why can harmful algal blooms be a problem?

Human and animal health risks:

cyanobacteria toxins are a high risk to public and animal health

High hazard: hepatotoxins and neurotoxins

- skin and eye irritations
- gastrointestinal upsets
- severe illness or death in people and animals
- links to MND under investigation

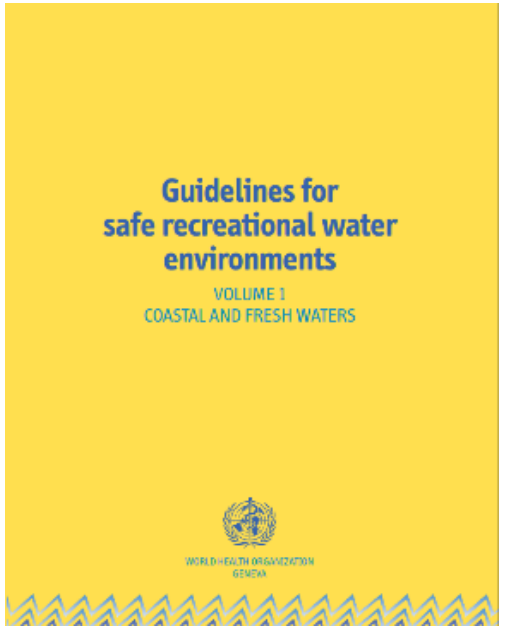
Widespread exposure:

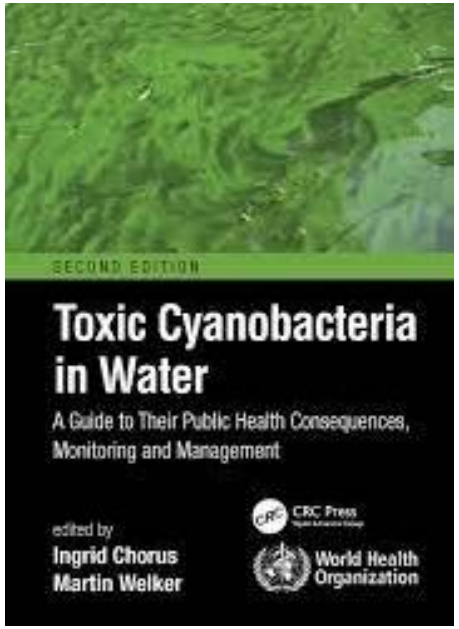
- skin contact
- ingestion - through water or food
- inhalation – spray irrigation
- aerosols





World Health Organisation Guidelines on Algal Blooms





WHO Guidance (2003, 2021)

HEALTH RISK	cells/ml	chlorophyll$_a$ µg l^{-1}	microcystin concentration
HIGH	scums		1 or more mg l^{-1}
MED	100000	50	10-20 (up to 50) µg l^{-1}
LOW	20000	10	2-4 (up to 10) µg l^{-1}



Scottish Government guidance to local authorities and the public (2012, 2024)

Why do we need to record blooms?

- Detecting blooms and shoreline scums can be difficult
- We need to know about where and when they are happening:

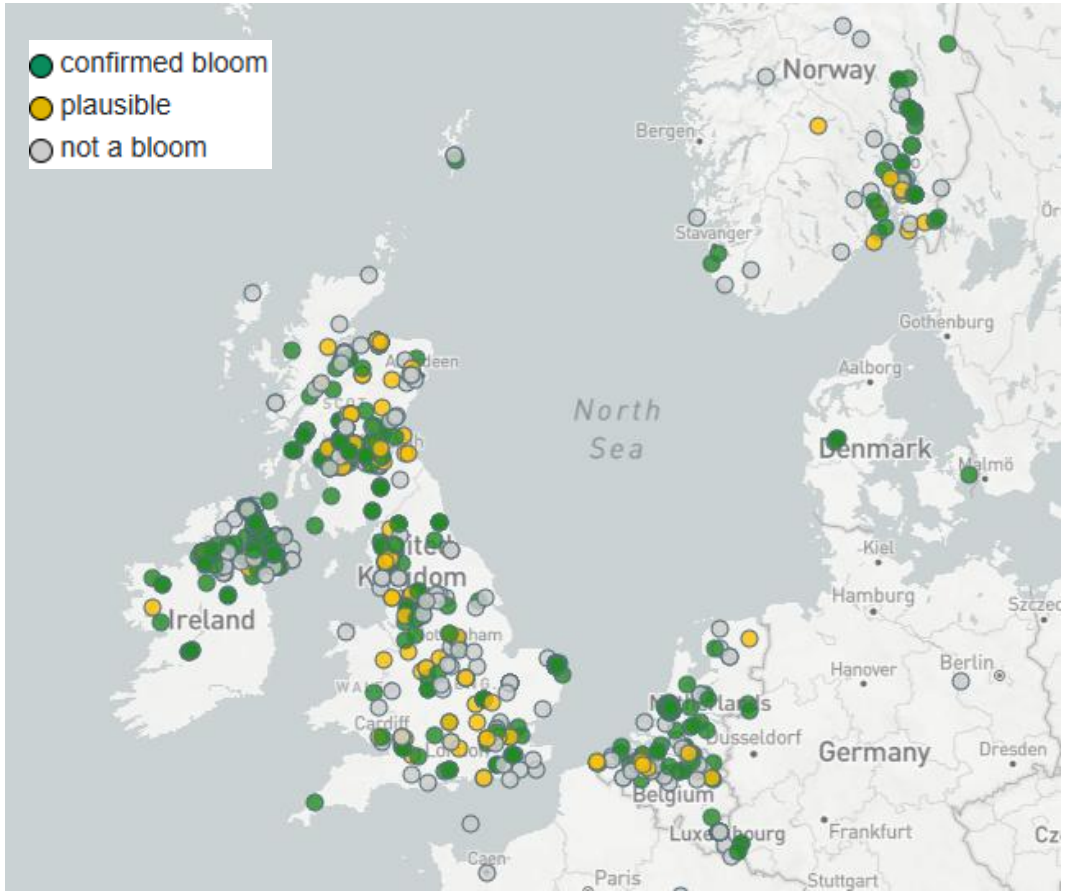
What conditions lead to blooms?

How many blooms are there?

What waterbodies are at risk?

Let other water users know about the risks

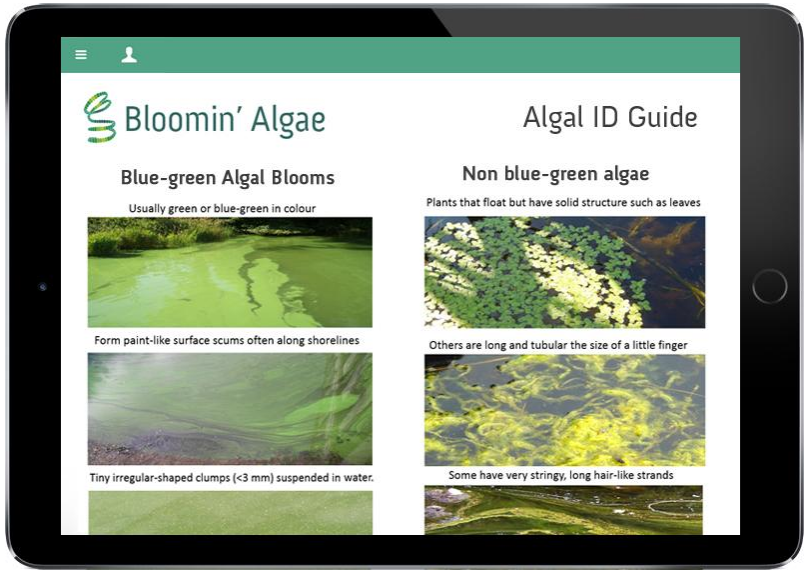
Inform authorities and landowners to take action



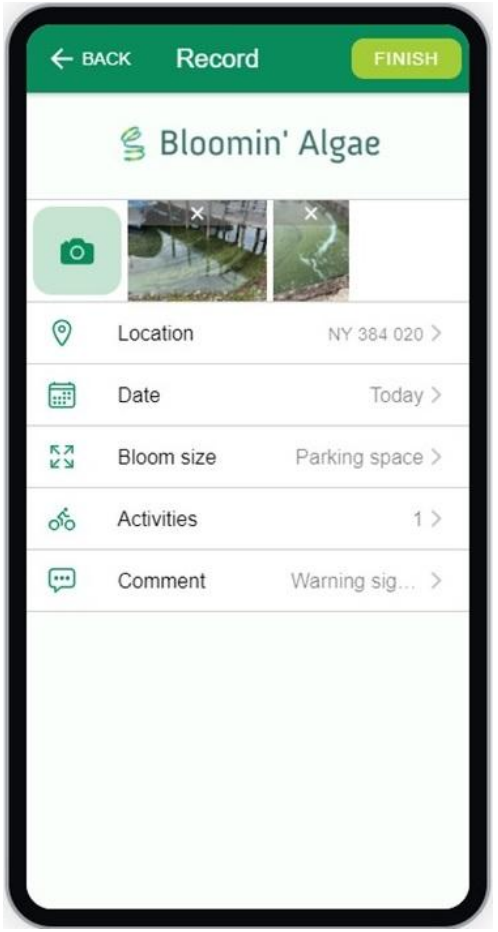
Bloomin' Algae App



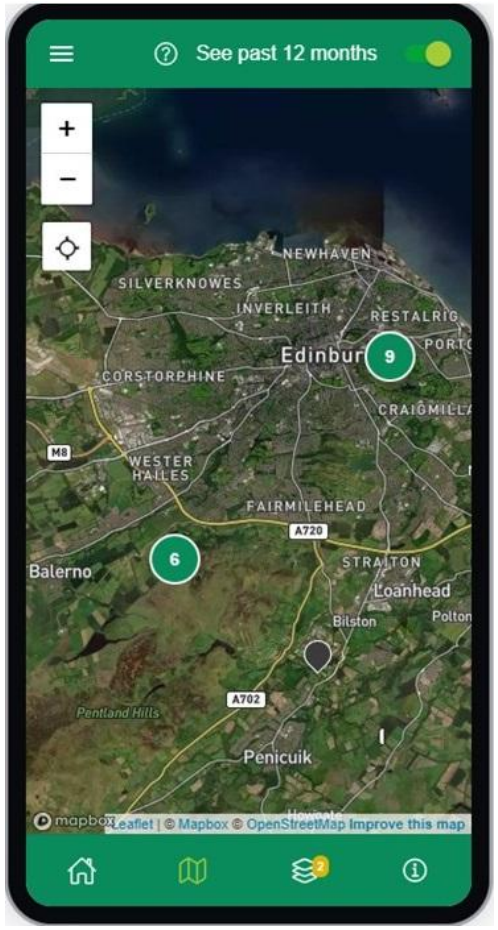
1. Photo guide



2. Record a bloom



3. See where blooms are



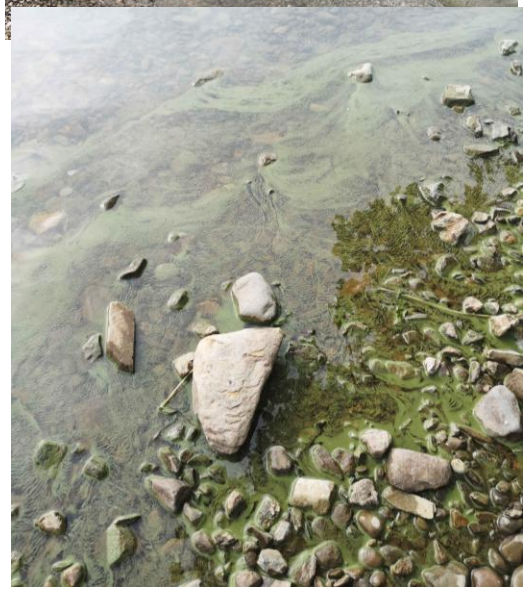
Advice when providing a record

- Good images are critical to enable an assessment:

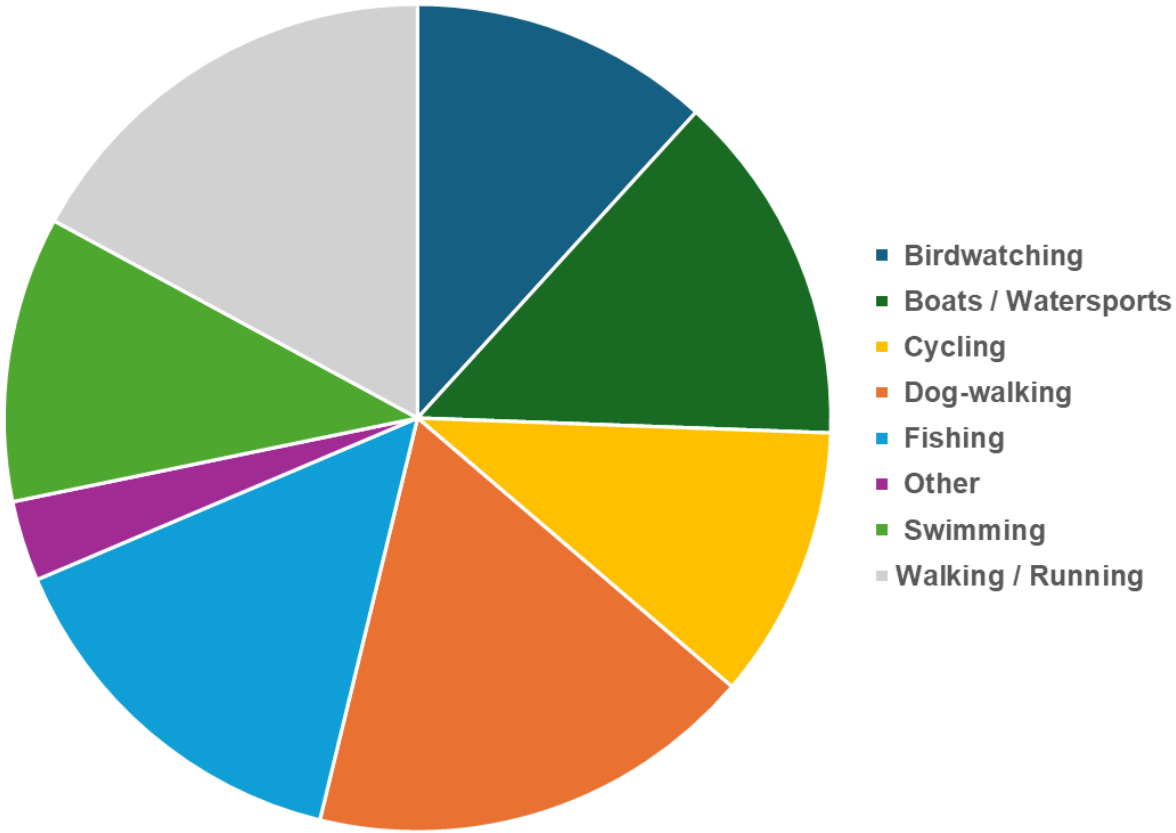
Try to get an overview of the bloom



And some close-up images



- Notes on size and activities at the location are helpful for context



Bloomin' Algae Website

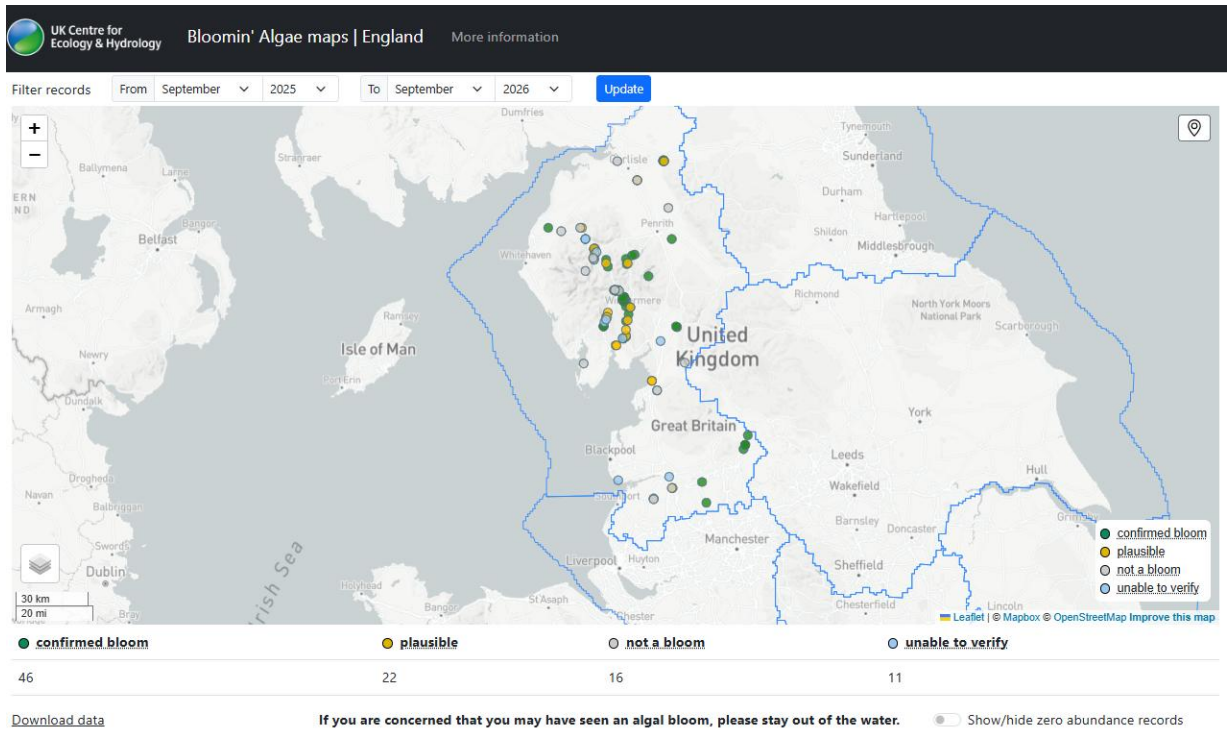
https://www.ceh.ac.uk/our-science/projects/bloomin-algae

▼ RECEIVING NOTIFICATIONS OF RECORDS IN YOUR AREA

With an iRecord account you can set up an alert to receive email notifications of bloom records in your area. You can do this by going to iRecord's Species alert notifications.

You can view submitted records from your area in the app or on regional maps:

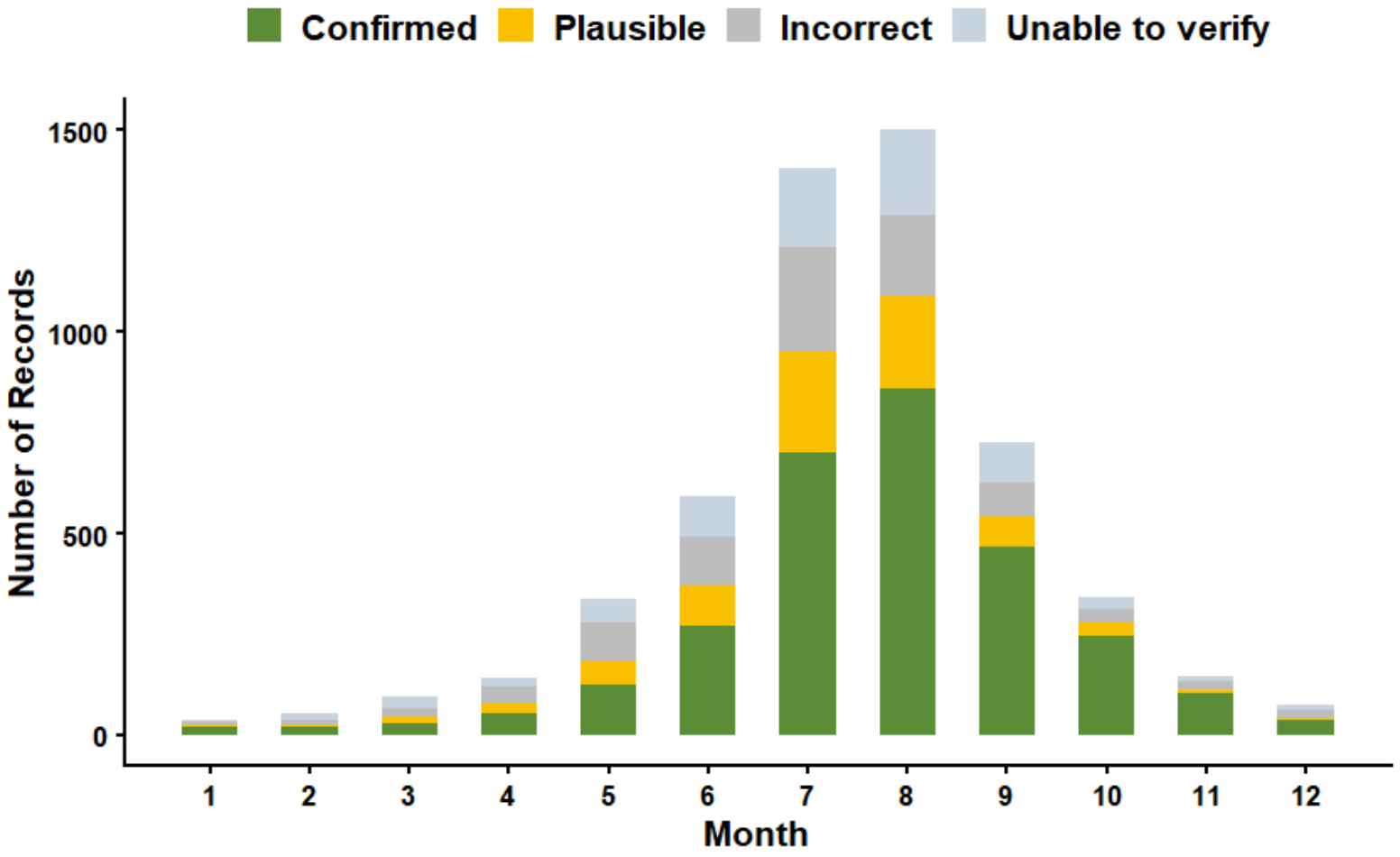
- England (divided into Environment Agency areas)
- Northern Ireland
- Scotland
- Wales
- Ireland



Seasonality of reports

- Most bloom records occur over the summer
- However, verified blooms do also occur in winter – even under ice!

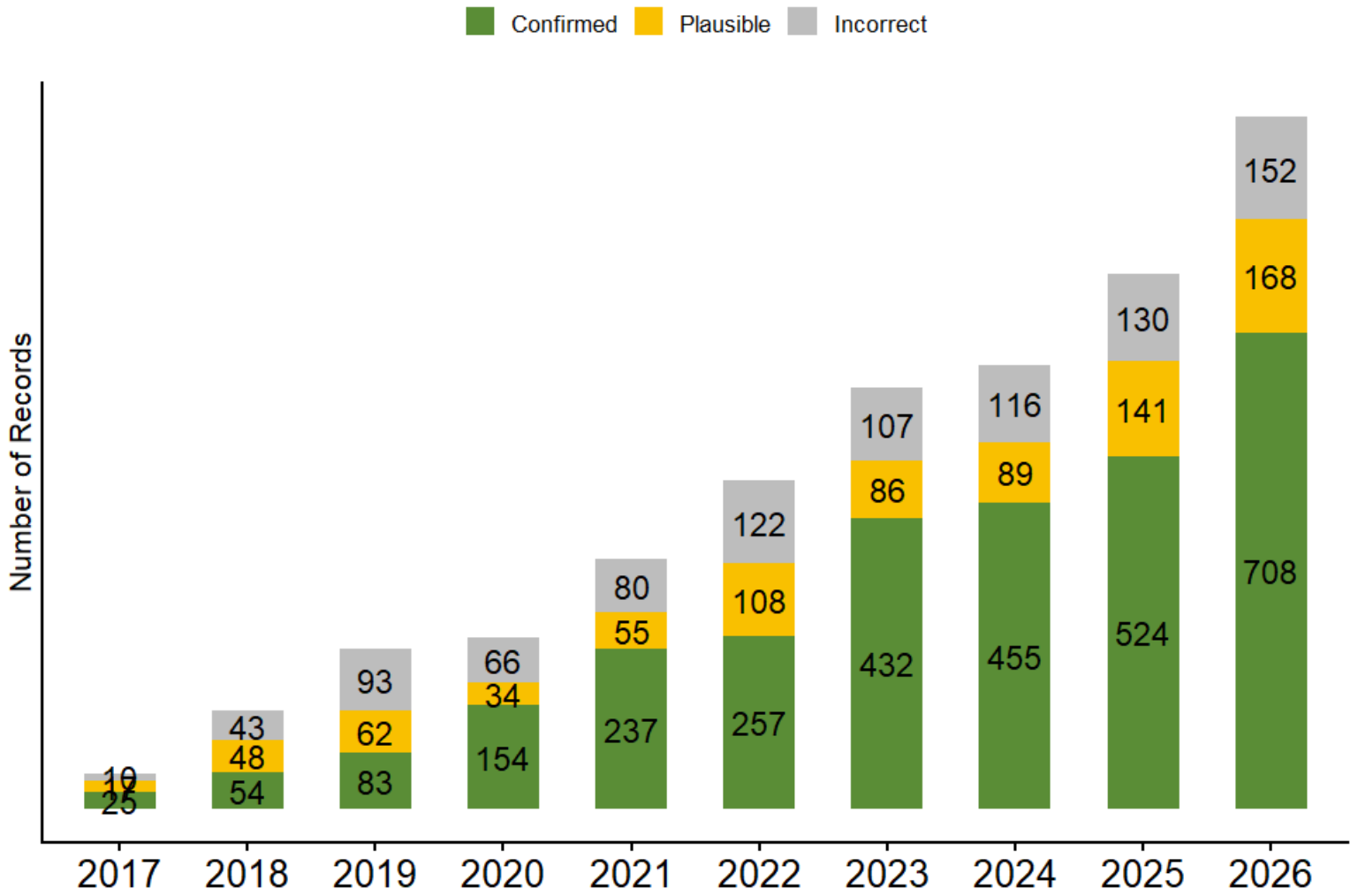




Records submitted over time

- Increase in the records submitted to the app over time
- Proportion of 'correct' records has increased

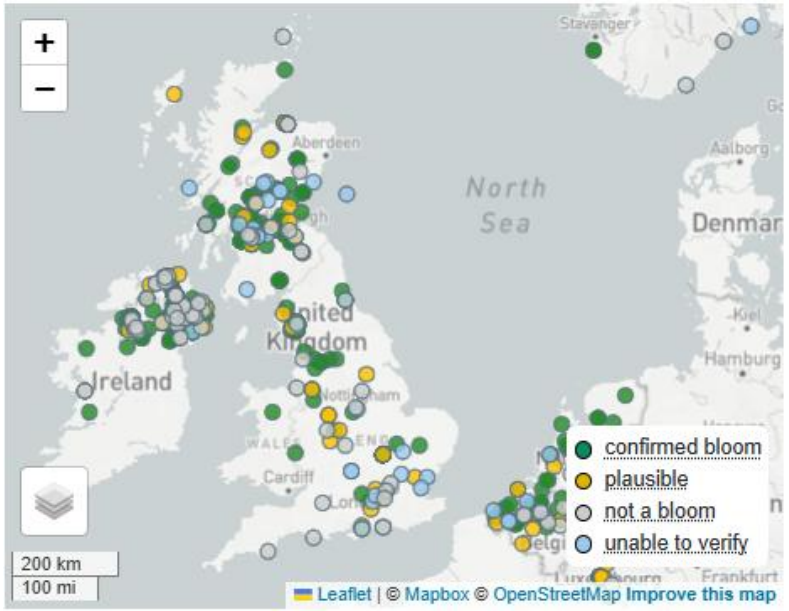
No. records is not the same as no. blooms!



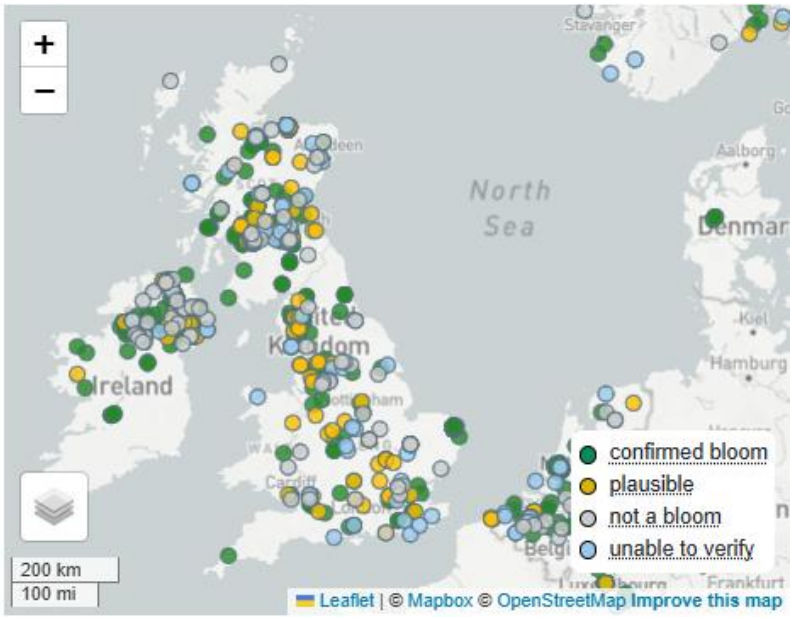
Spatial distribution of bloom records

- View when and where blooms have been reported across the country

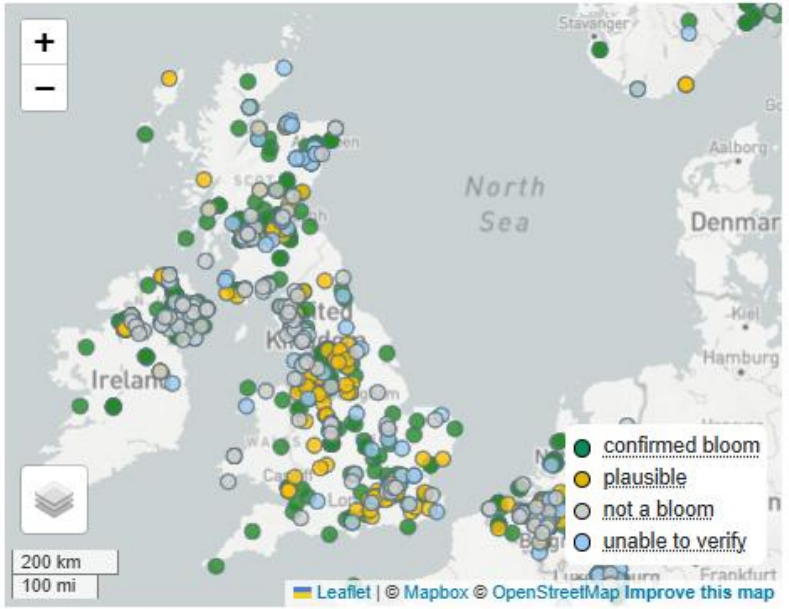
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2024



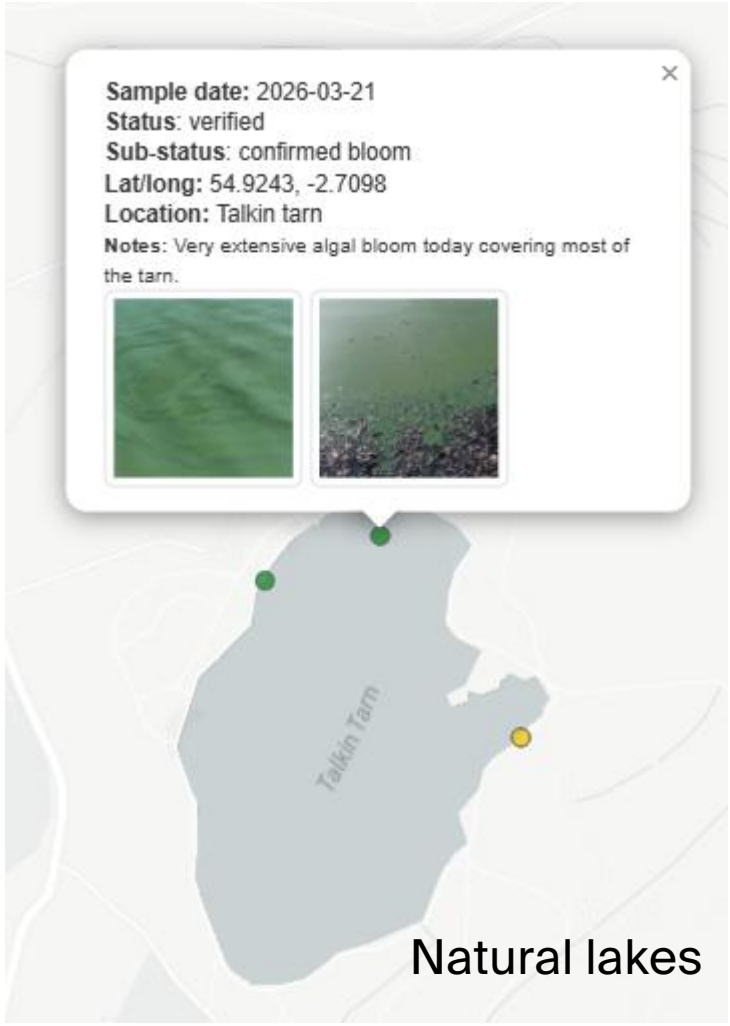
2025

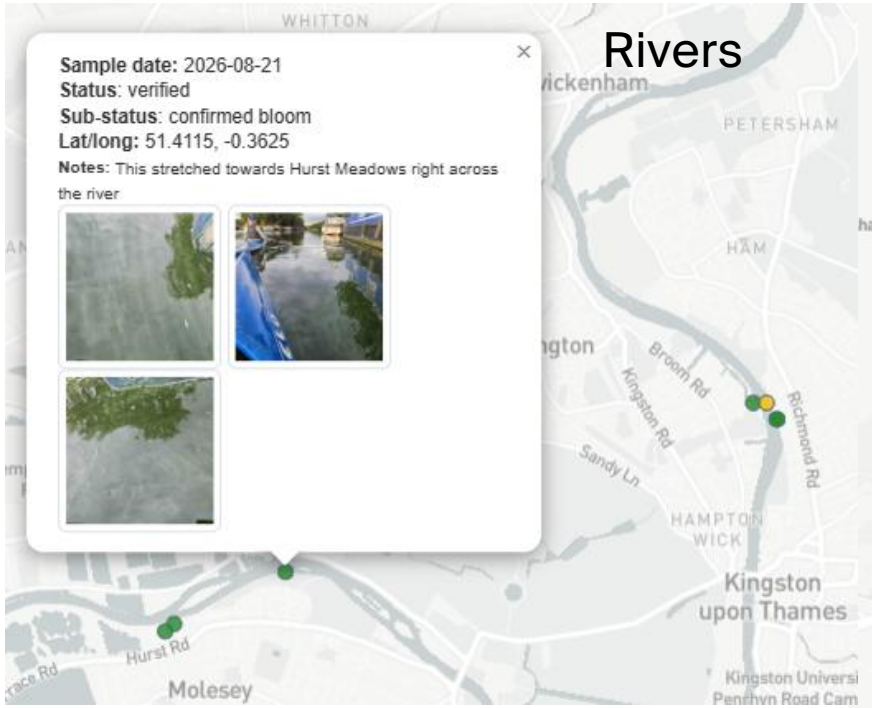


2026 so far...

Spatial distribution of bloom records

- Types of waterbody impacted



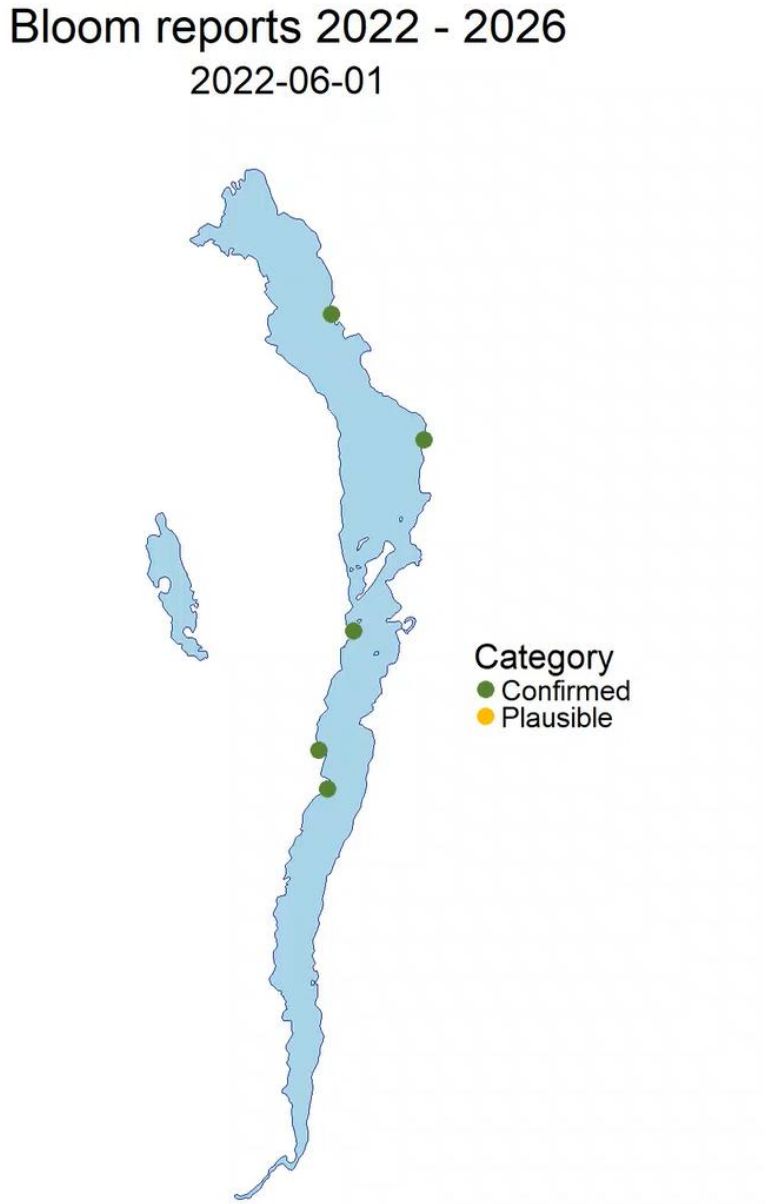




Focus on Windermere over time

- The records can help us understand where and when scums are forming

- At Windermere bloom records tend to be from:
  - Windward shores,
  - Sheltered bays and
  - Locations where people are visiting the lake



Where is the app being used?

- UK and Ireland, Netherlands, Norway, Belgium and Luxembourg
- Newly added EU countries: Denmark, Finland, Greece & Poland using citizen science (EU funding - FutureLakes)
- Chile (UNEP/GRF funding)
- Kenya (NC-International funding)
- New Zealand
- France





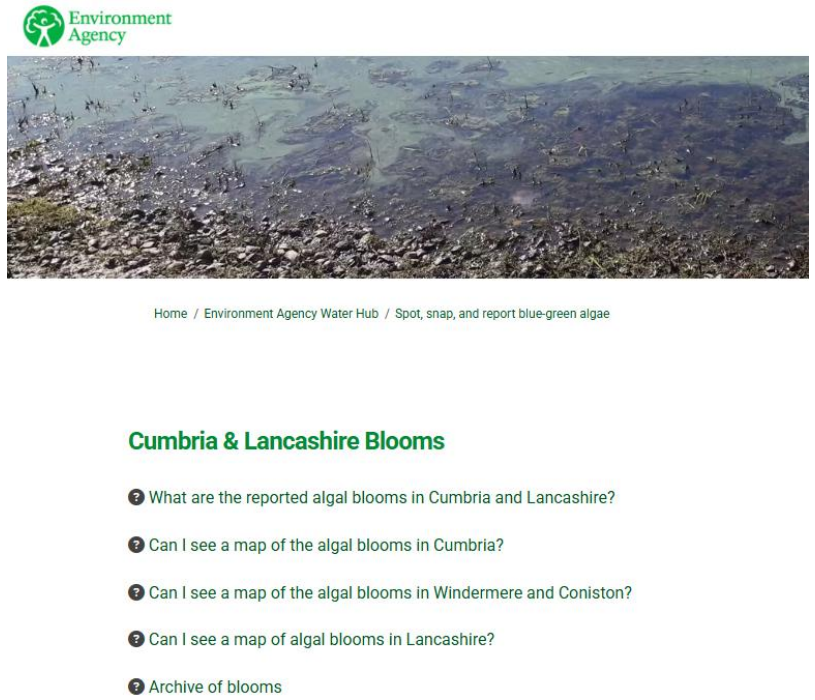
Who is using the data?

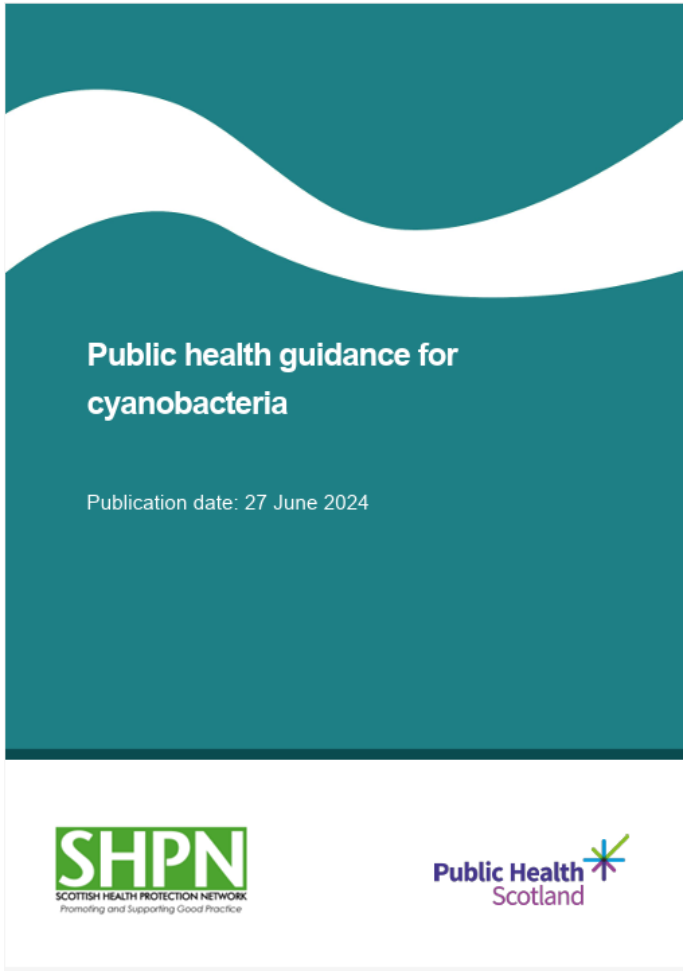
- App users
- Landowners
- Environmental regulators:

  SEPA (Scotland)

  DAERA (Northern Ireland)

  Environment Agency (Cumbria and Lancashire)
- Public Health Scotland
- Researchers





Public Health Guidance in Scotland (2024)

Bloomin' Algae can enhance risk management of blooms



- Support agencies, local authorities and landowners in rapid warnings to reduce public and animal health risks
- Reduce monitoring costs for agencies and local authorities
- Trigger operational decisions to enhance monitoring or risk management actions
- Provide enhanced scientific understanding of drivers of high-risk events and impacts on water use

How can I get involved?



https://www.ceh.ac.uk/our-science/projects/bloomin-algae

- Download the App:

- Record blooms
- Sign up for bloom alerts for your area
- Use information posters to inform people of the risks

Thank you.

Bloomin' Algae Team:

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UKCEH

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