The Big Windermere Survey: a citizen science approach to monitoring water quality

Lynsey R. Harper, Emma Kelly, Trine Bregstein, Simon Johnson, Louise Lavictoire & Ben W. J. Surridge

@lynseyrharper
@freshwaterbio
@LancsUniLEC

@freshwaterbiological

#BigWindermereSurvey

FRESHWATER BIOLOGICAL ASSOCIATION

Lancaster University

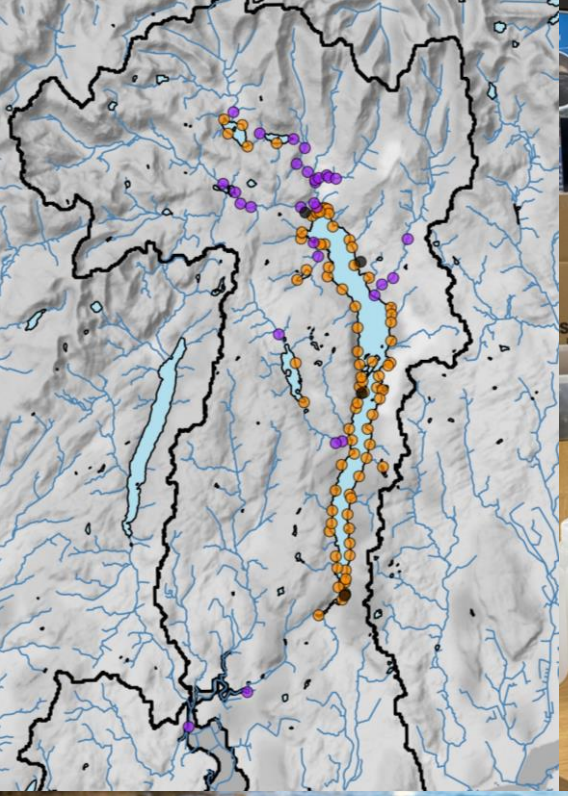
LOVE WINDERMERE

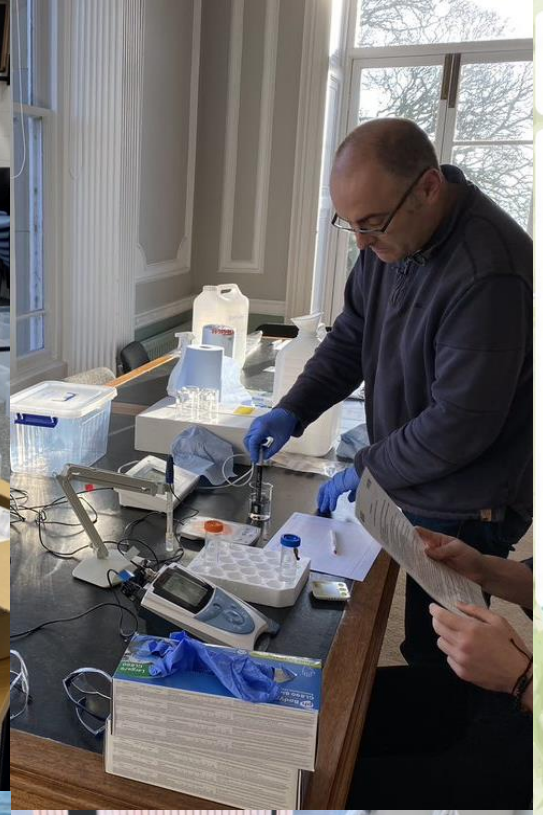
Background

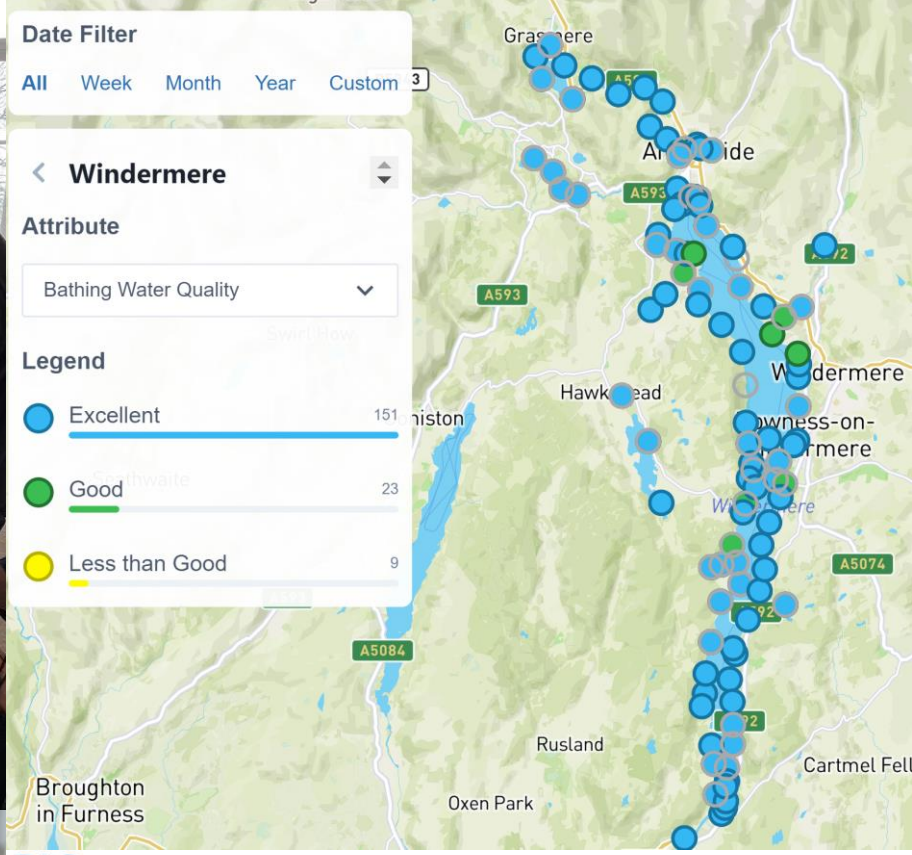
The Big Windermere Survey is a citizen-science led, participatory approach to monitoring water quality in Windermere and the wider Leven catchment.

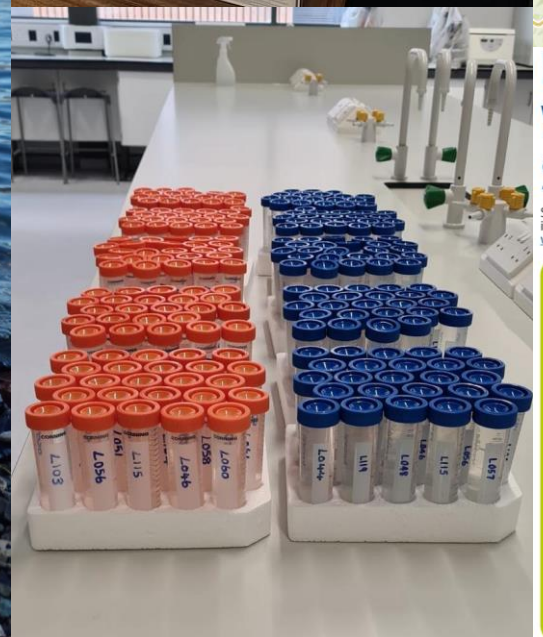
Citizen scientists are trained to collect water samples from approximately 100 different locations on Windermere and in the rivers and lakes that flow into it.

The samples are analysed at independent laboratories for nutrient and bacterial concentrations that indicate the potential for algal blooms and faecal pollution, producing the largest, one-day snapshot of conditions in Windermere.









BIG WINDERMERE SURVEY

Summary results from June 2022 survey - full information and dataset available from www.fba.org.uk/bws-june-2022

Key findings

Bacteria
- 90% of sites meet standards for Good or Excellent quality, based on *E.coli* and intestinal enterococci

Phosphorus
- 96% of river sites meet standards for High or Good status
- 52% of lake sites meet standards for High or Good status; 48% meet lower standards for Moderate, Poor or Bad status

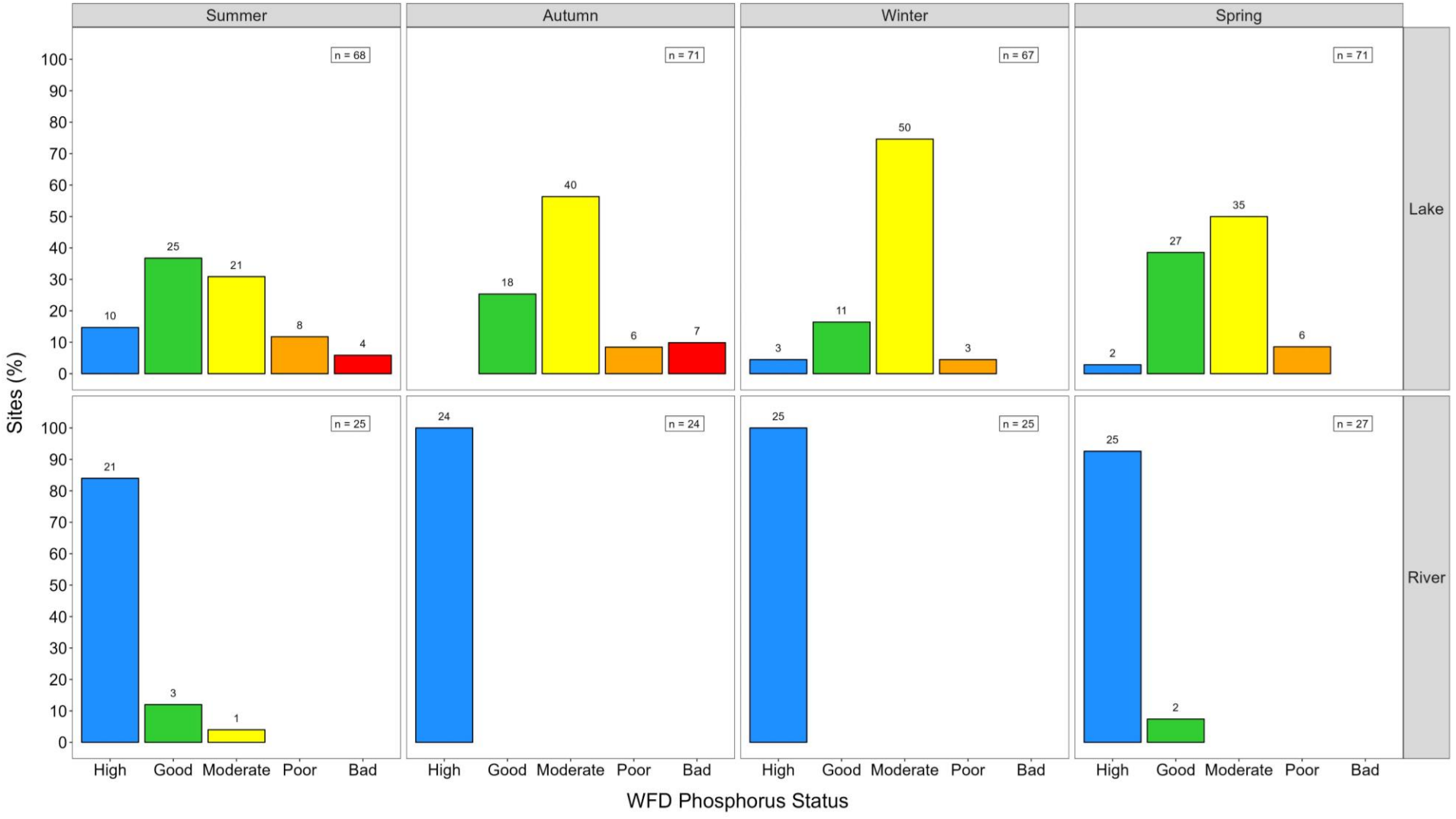
Nitrogen
- Nitrate concentrations were <1.1 mg N/L in all samples; substantially below the drinking water limit of 11.3 mg N/L
- Total ammonia concentrations were very low, many being below the detection limit

FRESHWATER BIOLOGICAL ASSOCIATION

Lancaster University

Visit the FBA website to sign up for the next survey and find out more

EU Water Framework Directive Phosphorus Status

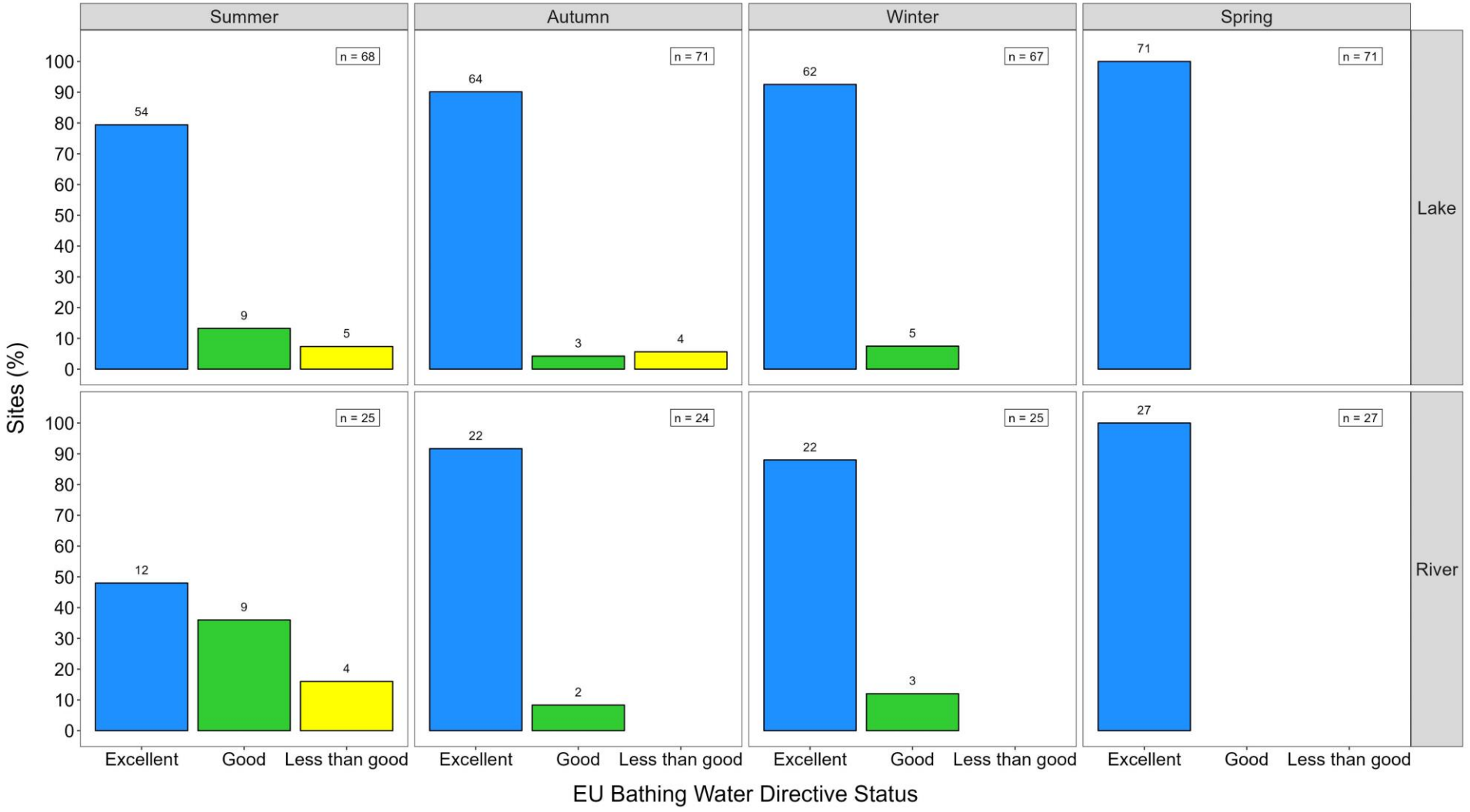


Phosphorus concentrations showed a mixed and seasonally variable picture.

Most river sites consistently met standards for High or Good phosphorus status.

More lake sites met standards for High or Good status in summer and spring. Increasing dominance of sites with Moderate status seen in autumn and winter.

EU Bathing Water Directive

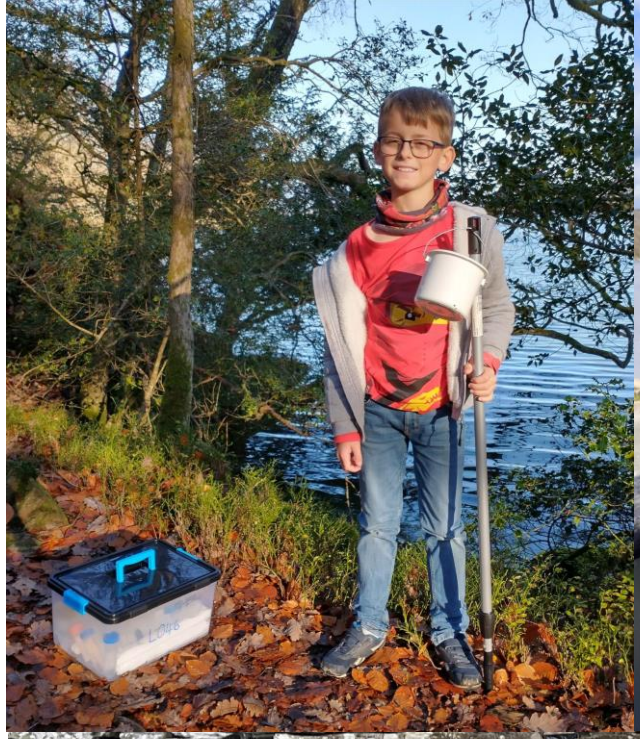


The majority (>90%) of sites were consistent with Excellent or Good status in summer and autumn.

All sites were consistent with standards for Excellent or Good status in winter and spring.

Positive impacts

- Unrivalled spatial dataset describing water quality in the Leven catchment.
- Hotspots of poorer water quality identified, supporting action to address these, e.g. Stock Ghyll in Ambleside, River Brathay around Skelwith Bridge.
- New analyses are extending the scope of the survey, such as eDNA metabarcoding.
- Created a platform supporting year-round engagement with local community.
- This has involved over 450 citizen scientists and hub staff (225 volunteer days).
- Volunteers span ages from under 10 to over 90 - scope to engage current and future generations in understanding Windermere.



Next steps

- Summary of and technical report on first year of survey data.
- Engagement and communication activities focused on the first year of the survey.
- Community and scientific benefits rely on continuation of the survey over the longer-term.
- Commitment to an annual funding model would support a more strategic approach, enabling maximum benefits from the Big Windermere Survey.

Special thanks to Lancaster University, Environment Agency, United Utilities, National Trust, and Lake District Foundation for funding surveys to date. Thanks to our partner organisations for their continued support!

Questions?

LHarper@fba.org.uk

@lynseyrharper
@freshwaterbio
@LancsUniLEC

@freshwaterbiological

#BigWindermereSurvey

FRESHWATER BIOLOGICAL ASSOCIATION

Lancaster University

LOVE WINDERMERE