

THE BIG WINDERMERE SURVEY

A CITIZEN SCIENCE APPROACH TO MONITORING WATER QUALITY

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#BigWindermereSurvey

Up to 110 locations sampled by more than 100 citizen scientists in the largest ever spatial survey of Windermere's water quality

300+ volunteers

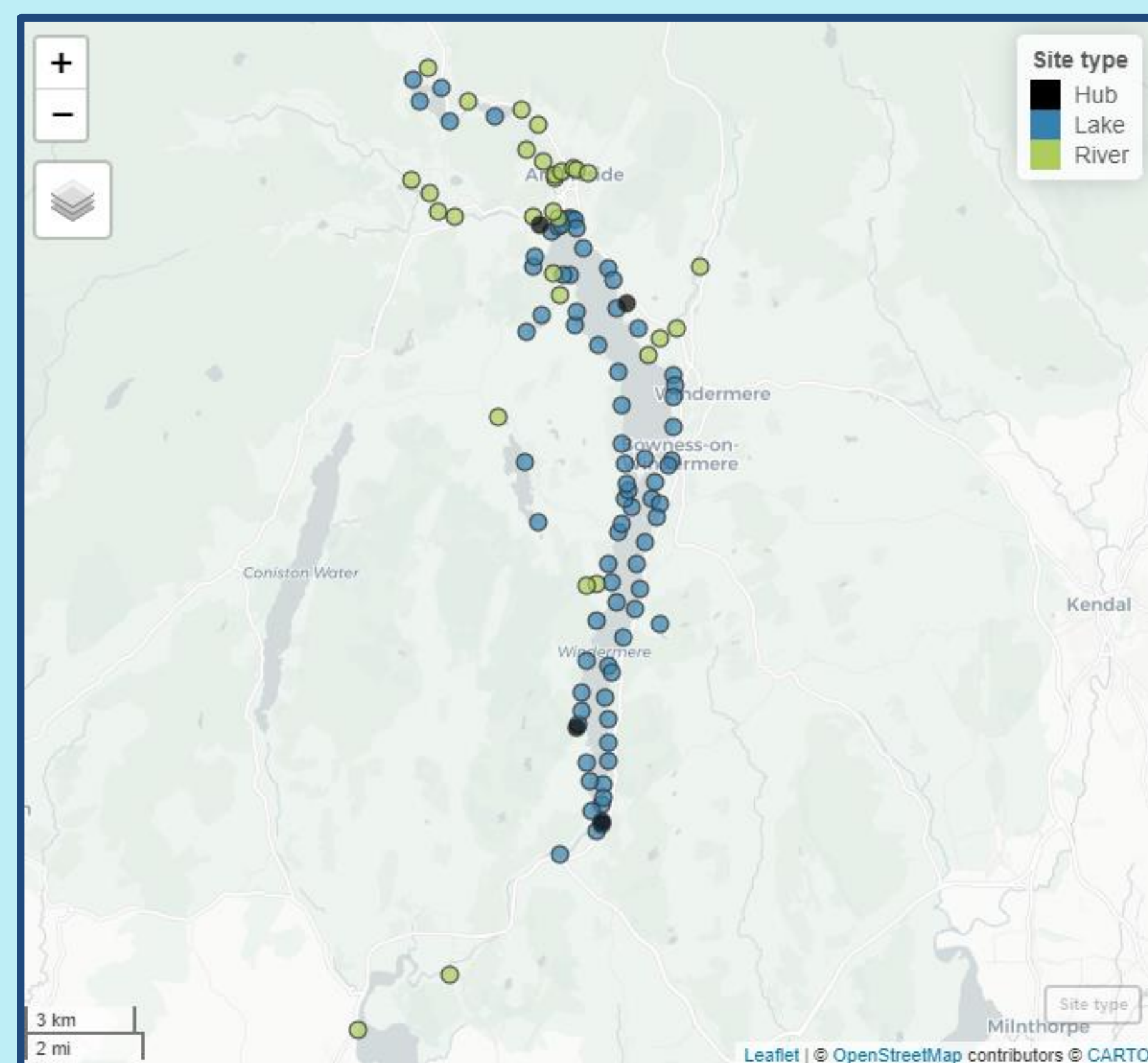
>1000 volunteer hours

Almost 2,500 samples analysed

BACKGROUND

Windermere is England's largest lake, situated in the Lake District National Park which is a UNESCO World Heritage Site. It faces many, complex and interacting pressures (e.g. nutrient inputs, faecal material inputs, land use change, invasive non-native species, climate change) and is also a major destination for tourism and recreation. Concerns have been raised about the health of the lake, specifically algal blooms and bacterial pollution that can potentially harm animals and humans.

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 in each season from up to 110 different locations on Windermere and in the rivers and lakes that flow into it, producing the largest, one-day snapshot of conditions in and around Windermere.



ON THE DAY

Since June 2022, each seasonal Survey has taken place on a Sunday between 10:00 and 12:00. Sampling kits are provided for citizen scientists, based on research approaches and equipment, and a training video is available to guide them through the sampling process.

In the field, volunteers collect 1150 mL of water (2 x 500 mL, 2 x 50 mL unfiltered, 1 x 50 mL filtered), and record the time of sample collection, water temperature and field conditions.

Samples are returned to one of four science hubs around Windermere, where they are immediately tested for pH and electrical conductivity. They are then transported to Lancaster Environment Centre research laboratories for nutrients analysis, and externally-accredited laboratories for bacteriological analysis.

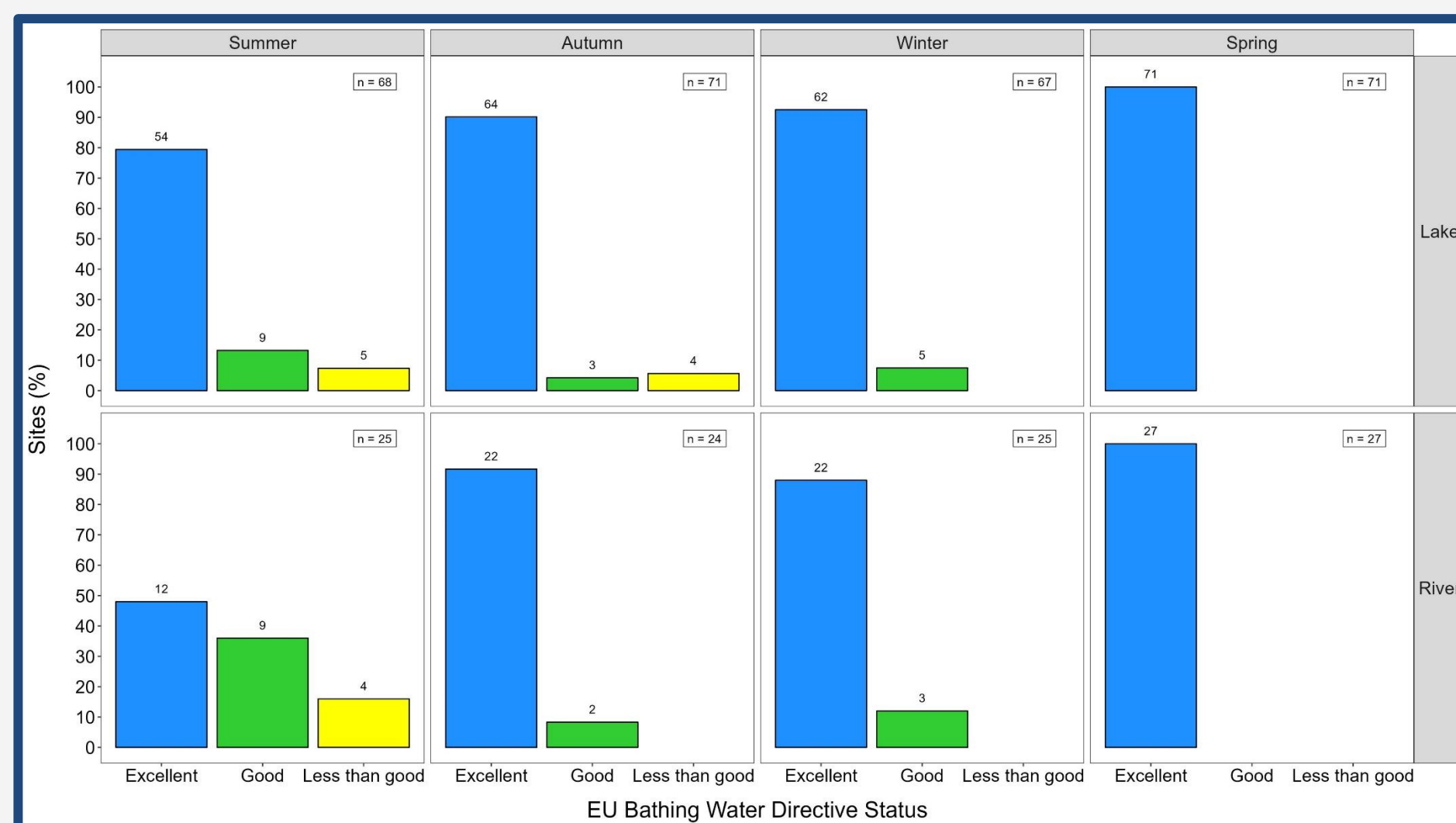
Summary reports are produced and data are published on Cartographer after each survey.

Nearly 600 L of water sampled

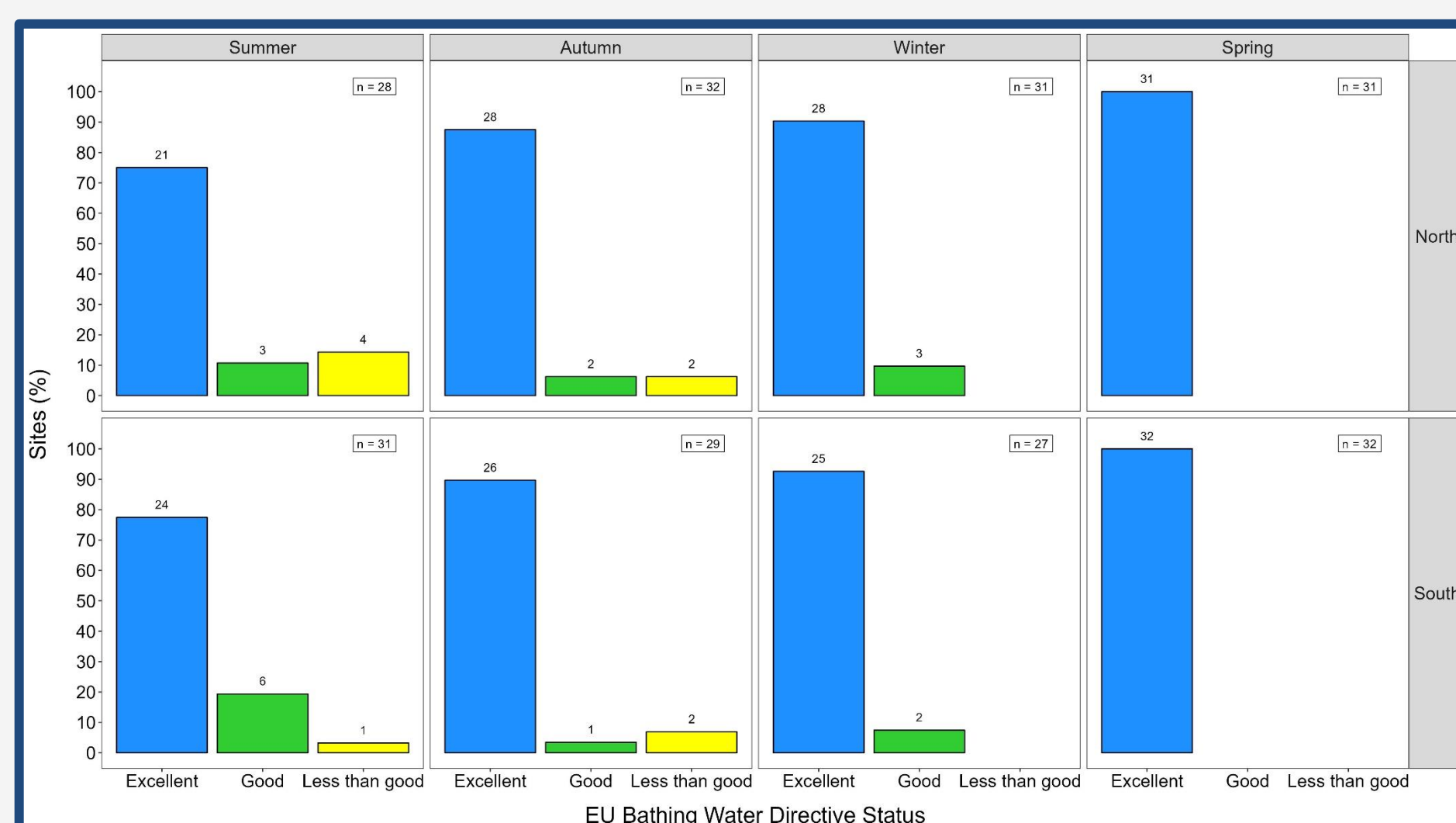
YEAR 1 (2022 – 2023) RESULTS

BACTERIA

The majority (>90%) of sites were consistent with Excellent or Good bathing water status in summer and autumn. All sites were consistent with standards for Excellent or Good status in winter and spring.

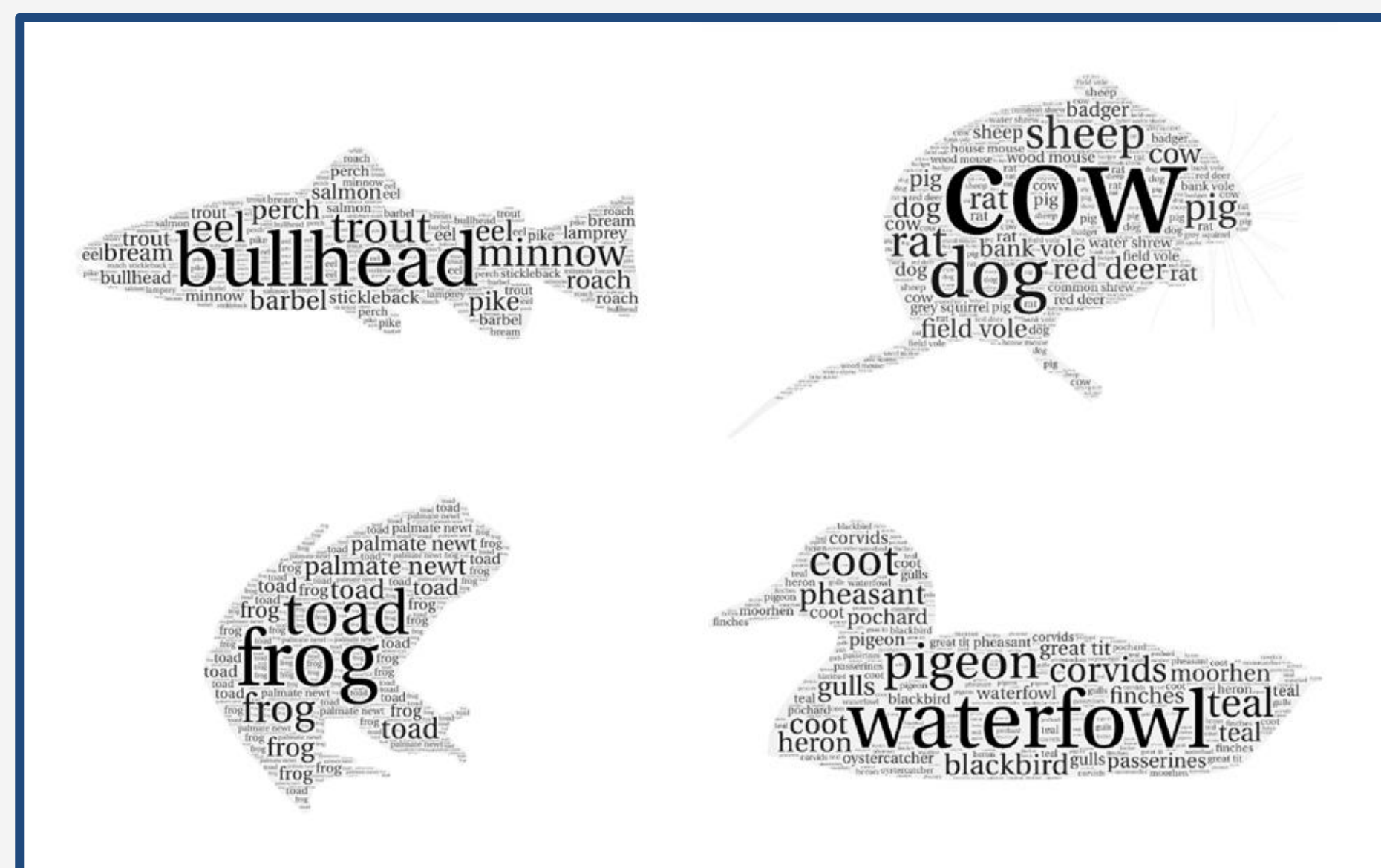


Bathing water quality was similar between both basins of Windermere in each season.



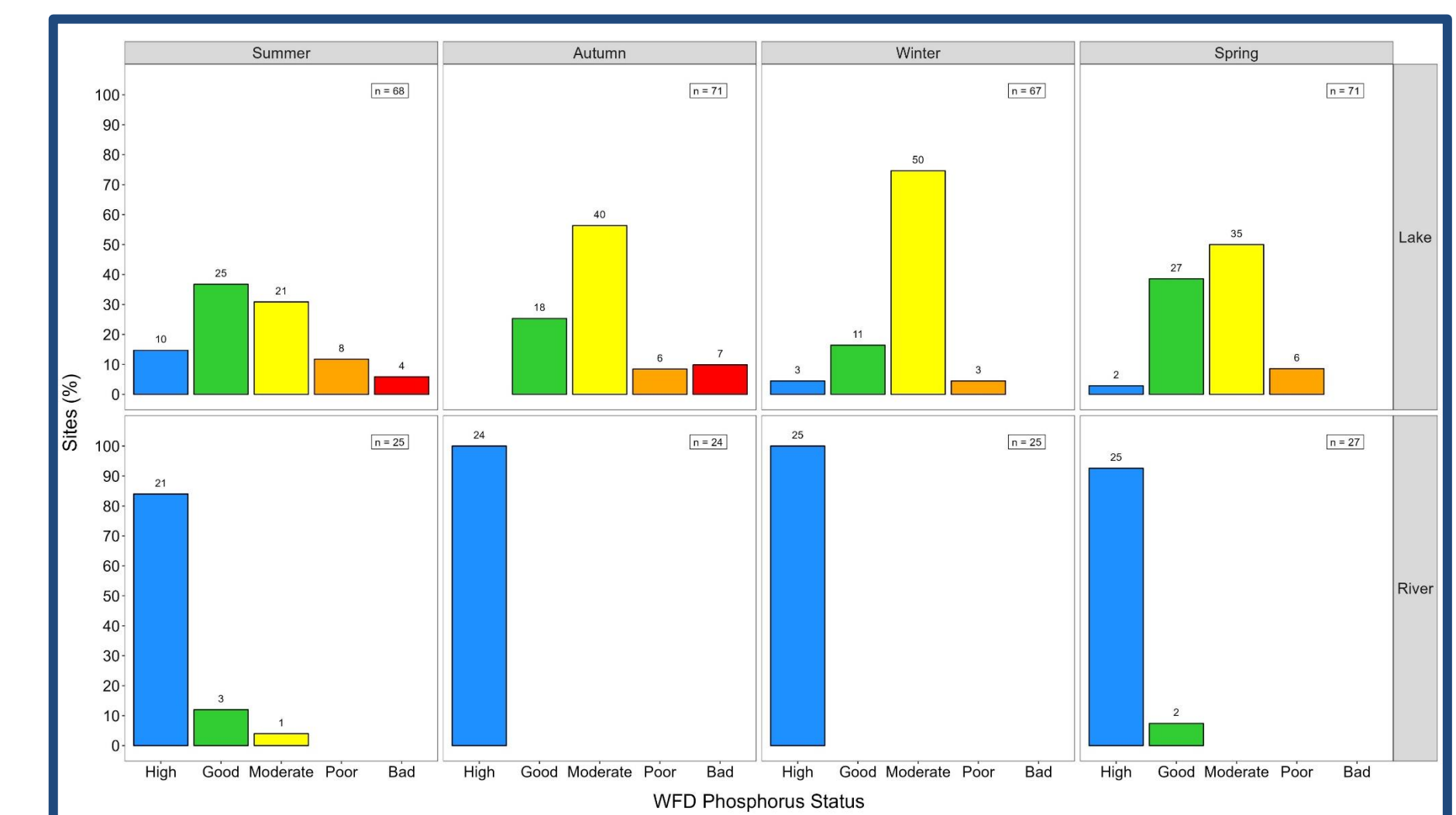
BIOLOGY

A total of 52 vertebrate species, including rare and protected fish, were identified by environmental DNA (eDNA) analysis performed on just 19 samples in winter (February 2023). Waterfowl (ducks, geese and swans combined) and cow were the most common species overall.

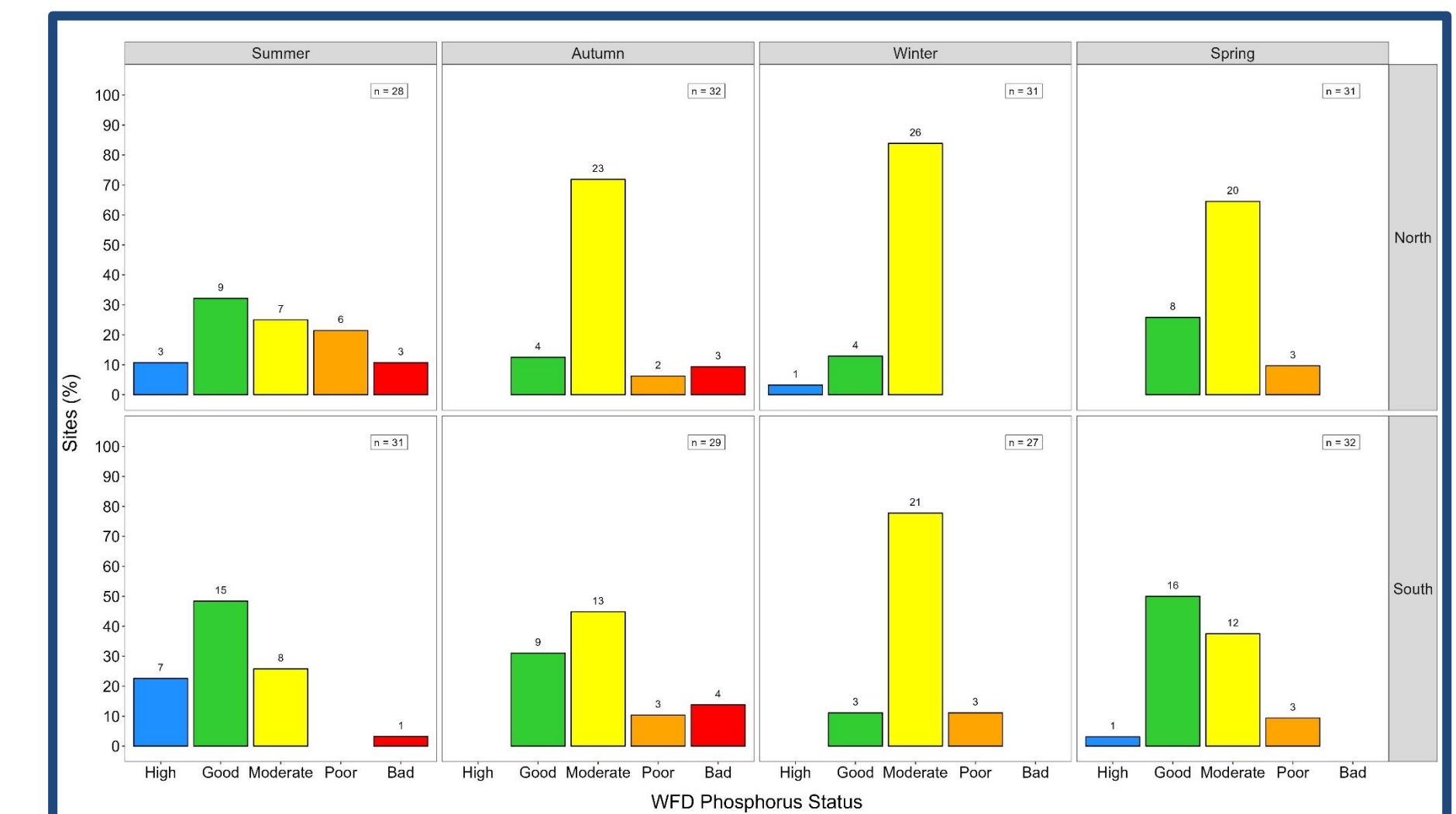


PHOSPHORUS

Most river sites consistently met standards for High or Good phosphorus status in all seasons. More lake sites met standards for High or Good status in summer and spring, with sites of Moderate status becoming more dominant in autumn and winter.

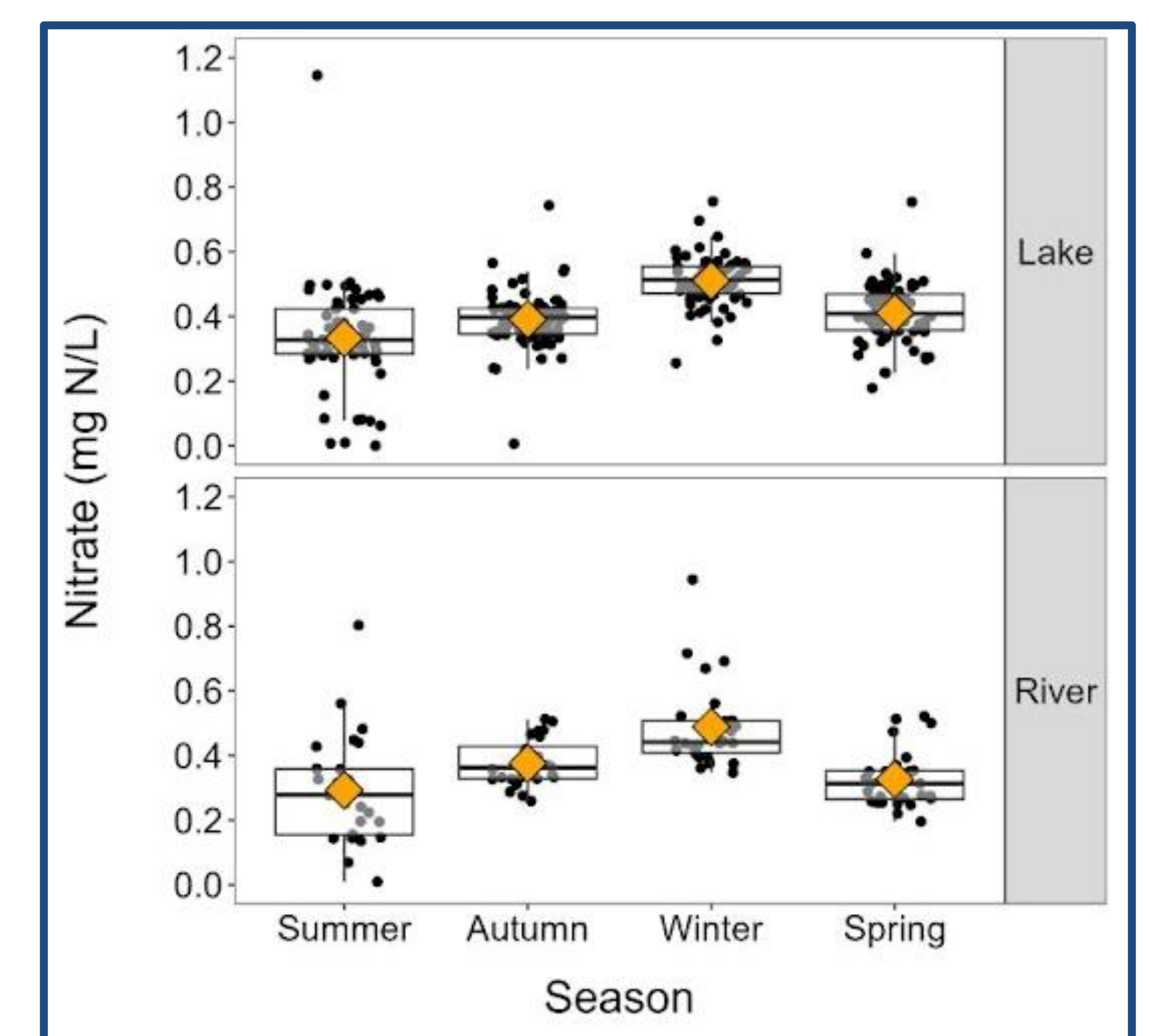


More sites with Moderate status were seen in Windermere's North Basin in most seasons.



NITROGEN

Survey data show that nitrate, a form of nitrogen used by algae, is present all year round, and at higher concentrations in winter.



KEY MESSAGES

- Phosphorus concentrations in Windermere are widely above target levels, likely due to a number of input sources.
- Other lakes in the catchment (and nationally and globally) face similar challenges.
- Other nutrients must be considered in debates and management.
- Concentrations of bacteria were generally low in all seasons across 2022 - 2023, but some sites in some seasons see much higher concentrations, particularly in summer and autumn and within Windermere.

NEXT STEPS

- Summary of and technical report on the first year of survey data as well as engagement and communication activities around results.
- Continuation of the survey over the longer-term via securing sustainable funding.

Further information:

