

CITIZEN SCIENCE FILLS DATA GAPS

Finding clean water habitats in urban landscapes: professional researcher and citizen science approaches

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This study investigated patterns of nutrient pollution (nitrate, phosphate) in water bodies across London and compared the results of citizen scientists (76 self-selected sites) and professional ecologists (495 randomly selected sites). Results were similar between citizen and professional scientists and showed that standing waterbodies significantly lower average nutrient concentrations than running waters. *McGoff et al. (2017) Sci Total Environ.581-582:105-16*

Aims

The study focused on two widespread pollutants: nitrate and phosphate which are amongst the most pervasive in freshwater ecosystems globally. It aimed to:

- evaluate patterns of water quality across all types of freshwater body, and across catchments with different levels of urbanisation, in Greater London.
- establish whether data collected by citizen scientists shows similar patterns to data obtained by professional researchers

Approach

The research took place in Greater London, UK, between April 2013 and March 2015. Professional surveys were conducted across ponds, lakes, rivers, streams and ditches using a stratified random sampling approach designed to survey 100 locations for each waterbody type across Greater London. Citizen scientists self-selected sites.

Citizen scientists tested water quality in their local waterbodies (76 self-selected sites) in the same area of London. Each participant received a day's training in testing methods (see FreshWater Watch protocol) before collecting data independently over the proceeding year. Thirty six participant teams collected data in total. Spatial analysis was used to classify the landcover at each survey site and the water catchment each surveyed waterbody fell into.

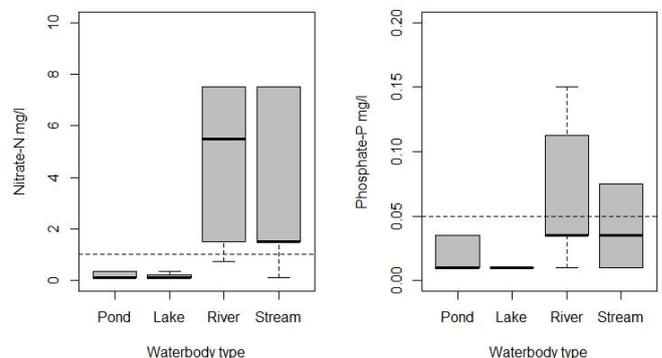
Impacts

The results of this study suggest citizen science could complement professional surveys conducted by government agencies and environmental managers, who typically only have capacity to survey fewer, larger waterbodies. Citizen scientists could also help to identify clean water sites that require protection.



Key results

- Citizen scientists' results matched those of professional scientists, showing that ponds and lakes were the least nutrient polluted and were significantly cleaner than rivers and streams.
- Citizen scientists typically chose higher quality waterbodies, primarily ponds, introducing some survey bias to their results. This could be minimised by allocating specific sites to volunteers.
- A greater diversity of waterbodies could be monitored if govt. agencies focused on larger waterbodies and incorporated citizen science measurements into their monitoring programmes.



Comparison of nitrate-N and phosphate-P (mg/l) levels across waterbodies for citizen science dataset (n: ponds=40; lakes= 7; rivers= 16, streams= 13). Clean water threshold indicated by dashed grey line. Dark mid line represents the median, the box represents the interquartile range, and the whiskers the minimum and maximum values.