

BioBase survey report

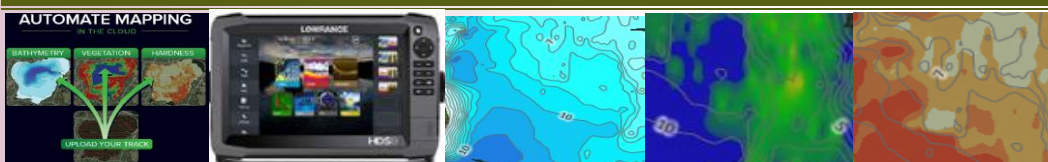
Branston Water Park, 2021

This report provides a summary of results from a *BioBase* acoustic habitat mapping survey. The survey was carried out by National Fisheries Services, with assistance from the West Midlands Area Fisheries, Biodiversity and Geomorphology team. The information provides bathymetry, vegetation and bed type mapping to contribute towards an evidence-based approach to managing the environment.



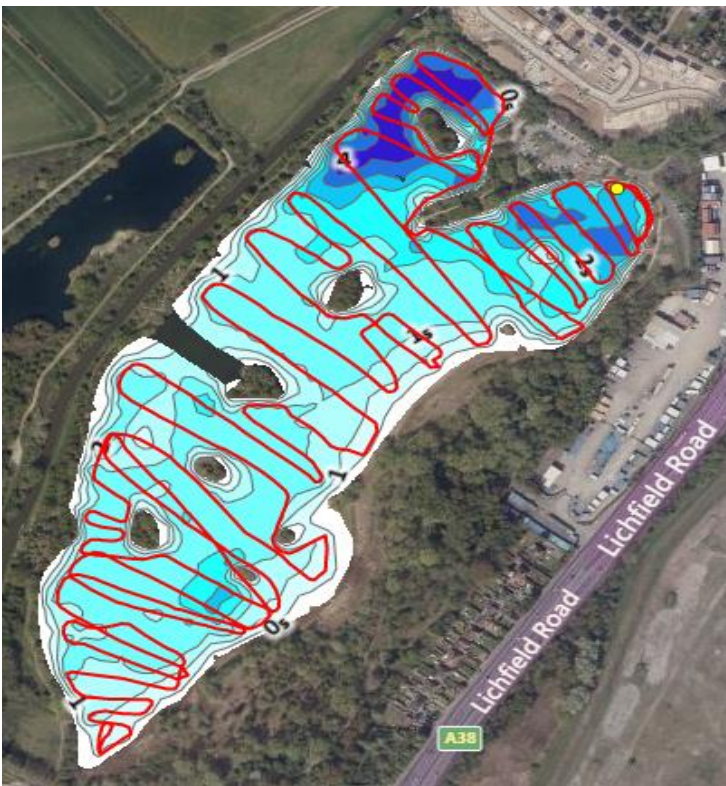
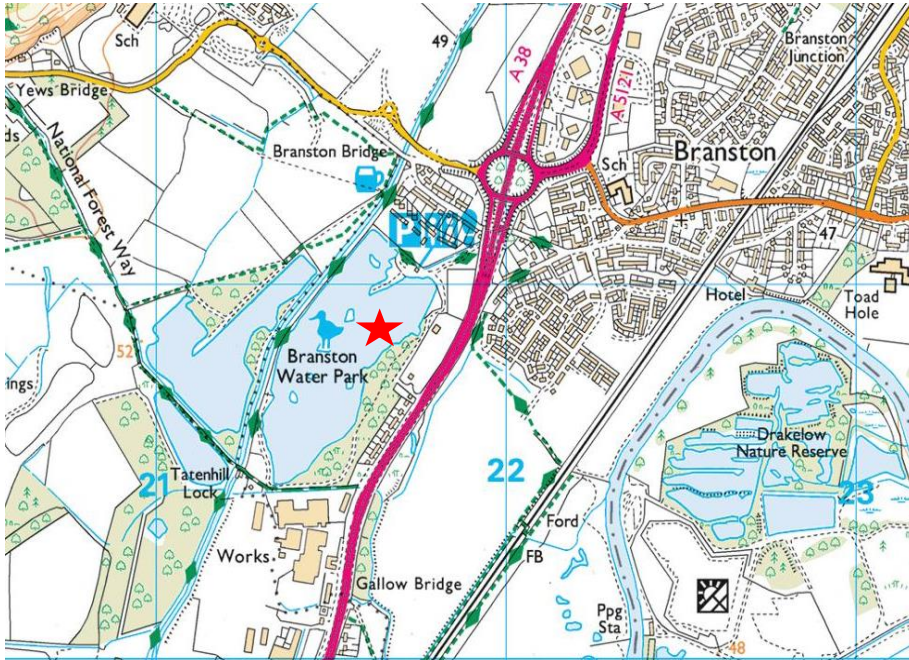
View from the boat launch site at the northern end of the lake.

Technical delivery	National Fisheries Services.
Primary customer	FBG (West Midlands)
Report author	Jim Lyons
Survey date	26 th May, 2021



Site and method information

- 13.06 hectares
- NGR (centre of lake): SK 21512 20841
- 26th May, 2021
- Transducer depth = 0.3m below water surface.



Site map (above image) and survey transect design (below image).

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Survey results

- Air temperature = 12.0⁰ C
- Weather = dry; 11mph NW wind; 5-8/8 cloud cover.
- Water temperature = 14.0⁰ C
- Transect buffer distance = 25 m
- Total transect length = 5.01 km
- Survey volume (estimated) = 213,096 m³
- Lake volume (estimated) = 216,732 m³
- Average depth (grid)¹ = 1.63 m (depth range = 0.06 m – 4.03 m).
- Maximum depth recorded (point)² = 4.09 m
- Average depth recorded (point)² = 2.05 m (depth range = 0.64 m – 4.09 m).
- Vegetation area cover (grid)^{1,3} = 73.0%
- Average vegetation biovolume (grid)^{*1,4} = 15.0% (±16.5%)
- Max vegetation depth recorded (point) = 4.09 m
- Bed type composition (%) (grid) ^{**1,5} = soft (71.80); medium (28.19); hard (0.01); v.hard (0.00)

Data Glossary

*Refers to the average percentage of the water column taken up by vegetation regardless of whether vegetation exists. In areas where no vegetation exists, a zero value is entered into the calculation.

** Bottom returns from area with dense plant growth compromise the sonar signal and the ability to assess hardness. Biovolume values >60% are cleansed from the data collected. Interpolated results may not expand over all covered areas or be extrapolated over areas that were cleansed.

¹ Geostatistical Interpolated Grid: Interpolated and evenly spaced values representing kriged (smoothed) output of aggregated data points.

² A single point represents a summary of sonar pings and the derived bottom and canopy depths. Individual point data create an irregularly spaced dataset that may have overlaps and/or gaps in the data resulting in an increased potential for error.

³ Percent Area Cover: Refers to the overall surface area that has vegetation growing.

⁴ Percent biovolume (otherwise known as Percent Volume Inhabited or PVI) represents the percent of the water column occupied by plant matter at each GPS location. It's a simply plant height divided by water depth multiplied by 100 for the collection of pings bound to each GPS location along a travelled path. Biovolume ranges from 0% (bare bottom) to 100% (vegetation growth to the surface).

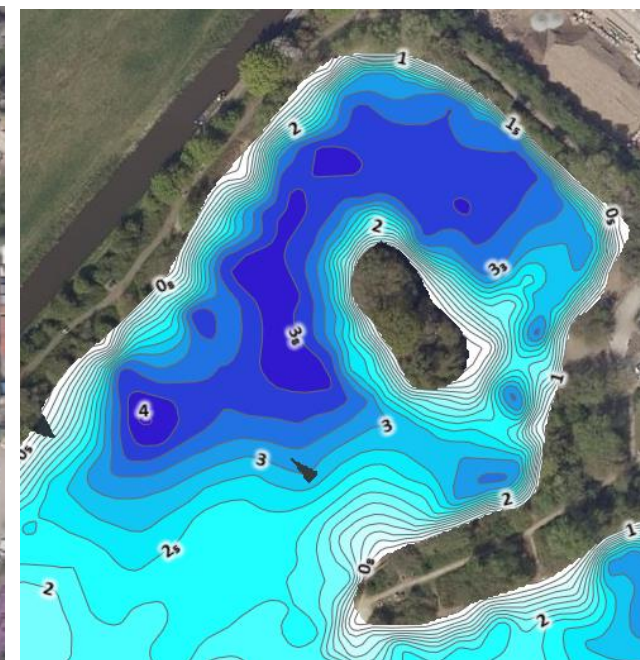
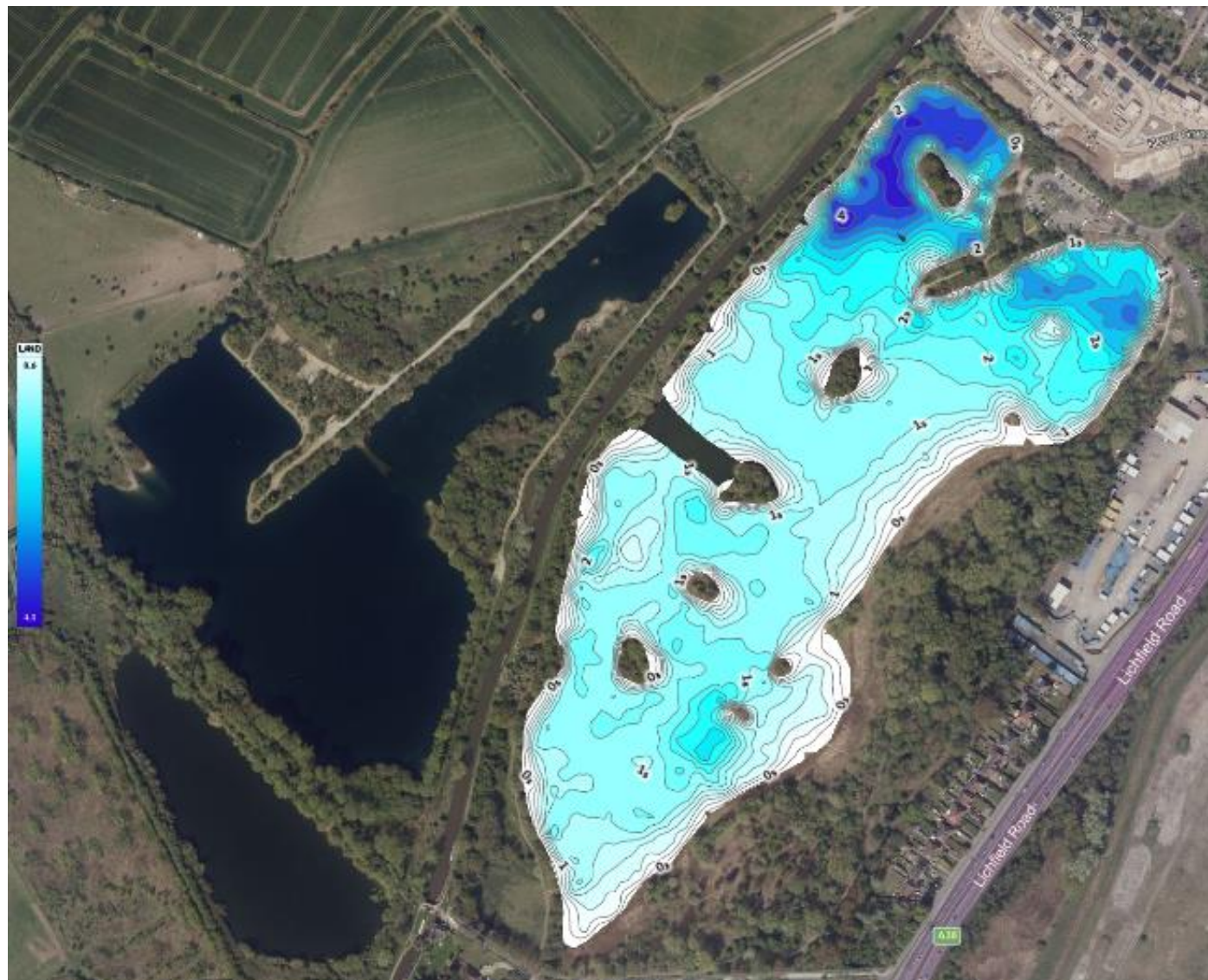
⁵ Bed hardness is a measure of acoustic 'reflectivity'. The hardness data generated is on a relative but continuous scale that ranges from 0-0.25 (soft), 0.25-0.4 (medium), 0.4-0.5 (hard) and >0.5 (v. hard). Soft bottoms include loose silt or sand. Hard bottoms are compacted sand, gravel and rock.

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Bathymetry map (0 m – 4.09 m) of lake and detailed view of the deepest water.

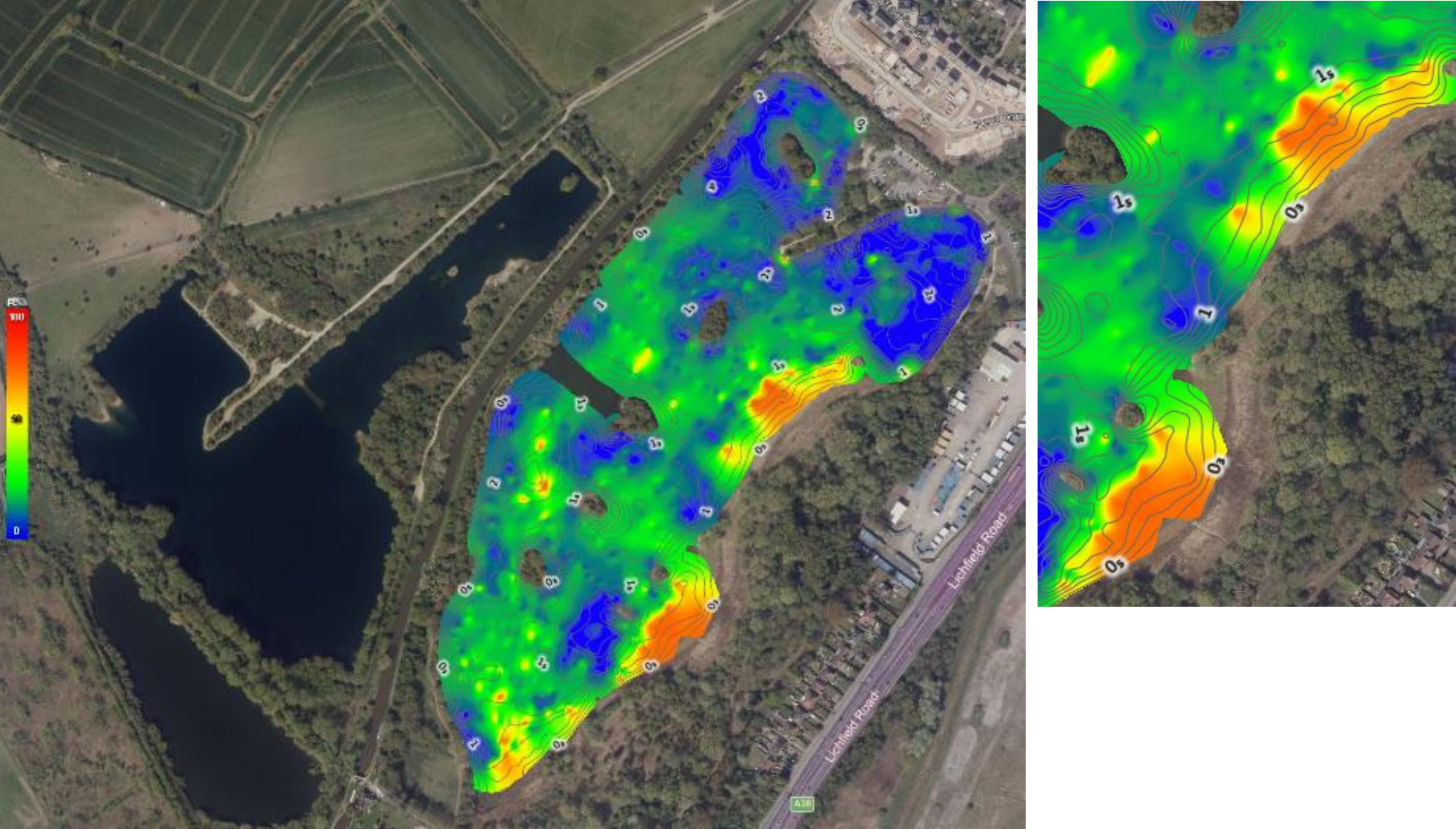


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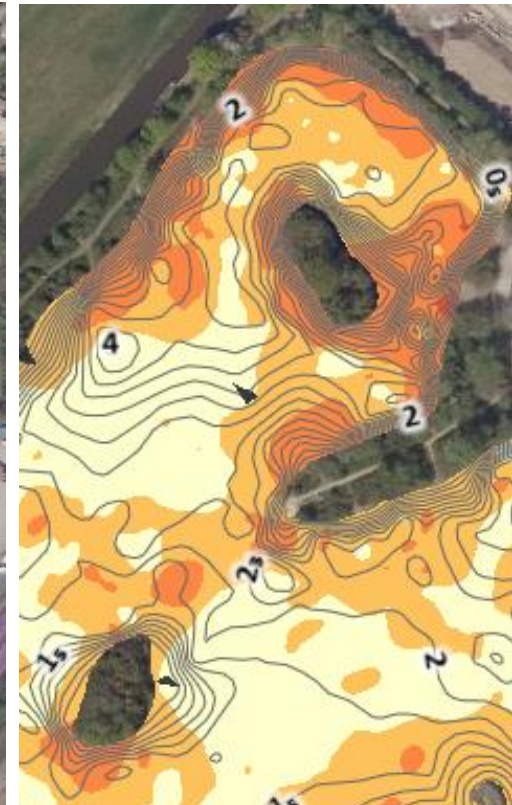
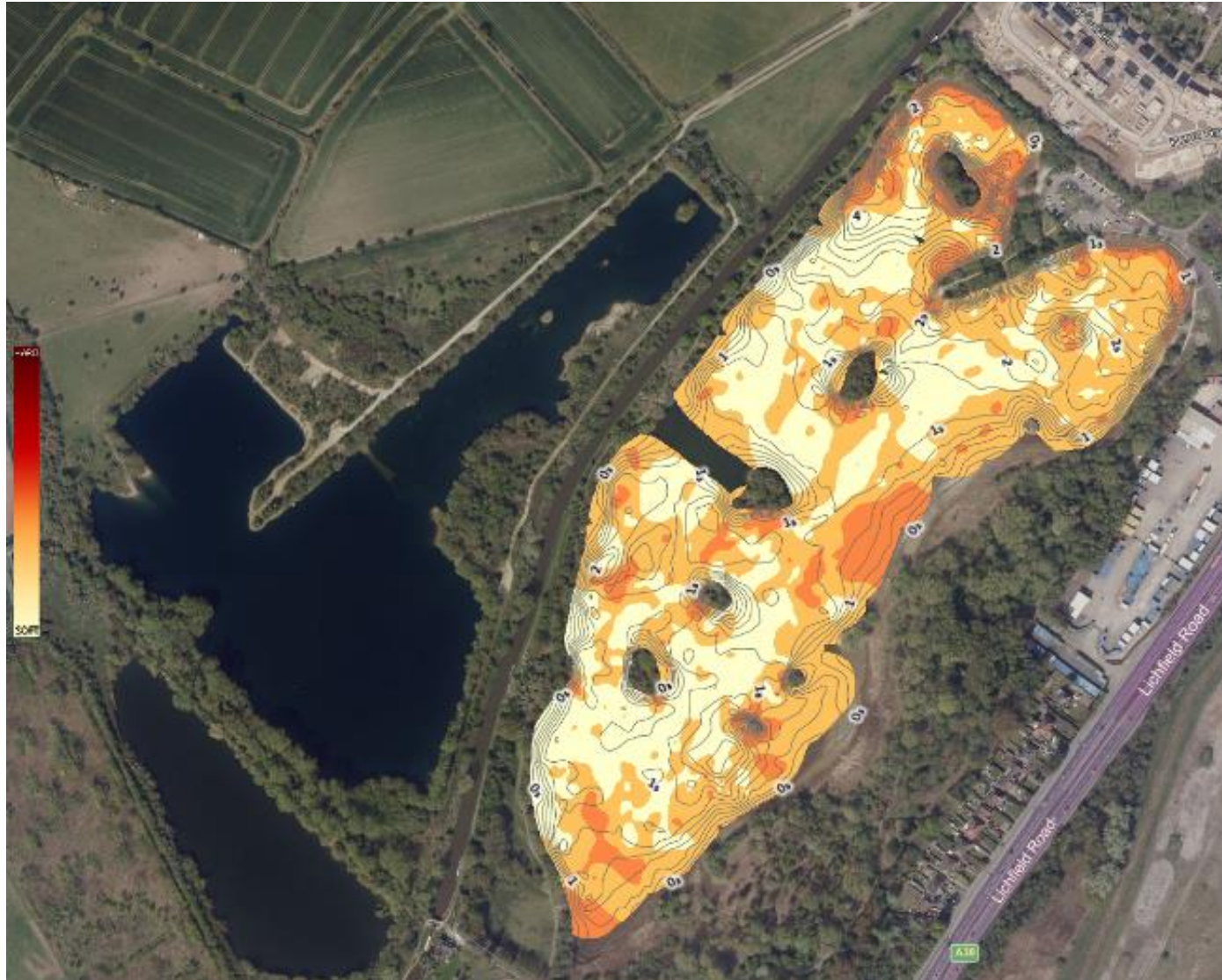
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Vegetation map of lake and detailed view of maximum submerged vegetation abundance (percent biovolume: 0-100)⁴



Bed hardness map of lake and detailed view of deepest water location (relative hardness: soft – v. hard)⁵



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Summary

Parallel transects were spaced at 20m with variable speed of data collection. Occasional wider spacing resulted in an analysis buffer spacing of 25m to prevent data gaps in the report maps. Coverage was as complete as possible, with some marginal areas missed due to overhanging vegetation or to avoid shallow water to prevent outboard or transducer damage. The presence of angler fishing lines also prevented coverage in some locations. Although all effort was made to achieve constant data collection, individual point data created some irregular spaced data with overlaps and/or gaps resulting in an increased potential for error. Bathymetry, vegetation and bed composition analysis therefore used grid data.

Bathymetry data (point) shows a maximum recorded depth of 4.09m. The deepest water was recorded at the north western end of the lake, adjacent to the main car park. Further deep water was found in the north eastern arm, close to the survey launch point. Average depth (grid) of the lake is 1.63m. Shallow (<1m) water is mostly confined to the lake margins with additional locations close to the islands. For the lake margins, the eastern and southern shores have the greatest extent of shallow water.

Submerged vegetation covers nearly three-quarter (73%) of the lake bed. Survey timing (May) will likely underestimate the amount of submerged vegetation growth present during the late summer months. Vegetation was recorded at all depths in the lake. An association between water depth and vegetation growth is apparent from the bathymetry and biovolume heat maps. This association results in greatest submerged vegetation close to the water margins along the eastern side of the lake. In contrast, the deep water at the northern end of lake has low or absent vegetation presence.

Surface bed composition data indicates a mosaic of types with soft bed hardness most prevalent (72%). Soft substrate are typified by silt deposits and other fine material. The greatest extent of fine material is located away from the margins. This bed type is dominant throughout the central parts of the lake and extends outwards with a bias towards western side of the lake. Some 28% of the bed was characterised as medium hardness. This bed type is typically represented by coarser silts and sands, these providing a stronger reflected echo than soft substrates. Hard bed type, for example coarse gravels, is sparse and covers less than 1% of the total lake bed. This is largely confined to the northern and eastern margins of the lake. Accurate assessment of the exact bed type would require the collection of samples to ground-truth the acoustic data. Bed composition data is based on the reflective nature of the surface material. No information on sub-surface bed material type or strata depth is provided.

Further information

The following link provides a full analysis of the vegetation composition for this survey reach:

<https://noxreportprod.s3.amazonaws.com/62d8e35c-c1c4-4d9f-b98a-d20de8b122d8/Report.html>

If you would like to discuss the information presented in this report, please contact:

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