

Committee(s):	Date(s):	Item no.
Hampstead Heath Consultative Committee		
Subject: Dissolved oxygen in Hampstead Heath's ponds	Public	
Report of: Simon Lee	For Discussion	
<p><u>Summary</u></p> <p>This report reviews four years of dissolved oxygen recording on Hampstead Heath ponds, and recommends practical habitat management which would benefit the ponds' water quality. Some of the recommended actions are already being implemented or are planned as part of the Heath's current annual work plan.</p> <p><u>Recommendations</u></p> <p>That the Committee provides its views on the actions and implications arising from this report.</p>		

Main Report

Background

1. An Overriding Objective in Hampstead Heath's Management Plan Part I is to 'Manage the Heath's ponds and watercourses to enhance their nature conservation value, reduce flood risk and address water quality problems' (HY1). An essential action of this objective is to 'Undertake detailed surveys and further data collection and develop an overall strategy for the ponds on the Heath and their associated watercourses' (HY2). Dissolved oxygen recording is one such form of data collection and gives an indication of a pond's water quality and allows for pre-emptive management to prevent loss of aquatic life.

2. Dissolved oxygen recording has been taking place systematically on the Heath since 2007, although a few records were made in 2006. The aims of the scheme were to:
 - Provide data to contribute towards analysis of pond water quality.
 - Provide baseline data to aid with pond management planning
 - Act as an early warning system to prevent potential fish death, through the installation of emergency aeration equipment.

Current Position

3. The scheme takes the form of recording dissolved oxygen from fixed points on 13 main Heath ponds using a hand held electronic meter. Weekly readings are taken in the early morning through the 'summer' months June, July and August, and monthly readings taken in the 'winter' months October through to March. In the intervening period fortnightly readings are taken.
4. Dissolved oxygen levels are considered to be an important parameter when considering the ecological wellbeing of aquatic systems. Oxygen is required for almost all aquatic life and for many chemical reactions that are important for lake functioning. The level of dissolved oxygen can fluctuate greatly over a 24 hour period and at different depths of the pond. Generally however dissolved oxygen levels should be at their lowest at dawn when plants and animals have been respiring all night.
5. Dissolved oxygen levels throughout the water body play an important role in the availability of nutrients and therefore the biological diversity of the pond system. In general a low dissolved oxygen level at the bottom of the pond results in the release of nutrients such as phosphorus into the water body. According to a 2006 hydrology report by Haycock Associates a significant cause of phosphorus inputs on the Heath is from dog faeces.
6. This nutrient release can cause problems with algal blooms, in particular blooms of the potentially toxic blue-green algae. Algal blooms amongst other things will affect water clarity, which can result in the decline of aquatic plant species. Dying algae can also cause a drastic drop in dissolved oxygen levels through bacterial decomposition.
7. Dissolved oxygen level have been categorised into three different bands based on the relative health of the pond in terms of this oxygen level (see Appendix 1).

- Ponds with good dissolved oxygen levels are the Boating, Men's, Highgate No.1, Hampstead No.1, Hampstead No.2, Mixed and Vale of Health.
- Ponds with satisfactory dissolved oxygen levels are the Bird Sanctuary, Viaduct and Leg of Mutton.
- Ponds with low dissolved oxygen levels are the Stock, Ladies and Swan.

Recommendations

8. Although some recommendations are made below and in further detail in the Appendix, the report is also intended to be informative and provide data for future considerations of water quality and management issues. The report is also primarily concerned with dissolved oxygen records and although some other factors are considered it is beyond the scope of this report to cover other water quality issues.

9. Specific recommendations include:

- The installation of the Aqua 4D electromagnetic device has been suggested for use on the bathing ponds. No costing is available at this time, but the device is designed to increase and stabilise oxygen levels at the sediment's surface.
- In general terms any increase in the levels of oxygenating vegetation in the ponds would be beneficial.
- The management of the Stock Pond requires particular consideration, due to its high silt levels and heavy shading. As this pond is upstream of the Ladies Pond and Bird Sanctuary, its low dissolved oxygen levels are likely to have an influence on those ponds. Possible management remedies would be the removal of silt or reduction of tree cover.
- Filamentous algae on Hampstead No.1 and Highgate No.1 Ponds should not be removed unless surface cover reaches levels over 50%. Then consideration should be made to reduce total cover.
- Hampstead No.2 Pond and the Viaduct Pond should be kept clear of duckweed cover or this should at least be kept to a minimum.
- The Swan Pond is thought to need emergency aeration to maintain dissolved oxygen levels. The large number of large fish in the pond may

be suffering from stress. Consideration should be given to removing the fish or greatly enhancing the habitat, which may be difficult with the fish present. Fish removal would require consultation and licensing from the Environment Agency.

- Finding suitable locations to plant emergent and submerged vegetation would greatly enhance the ponds' overall water quality. Selective lifting or coppicing of overhanging vegetation would provide good pond enhancement opportunities.
- Recording dissolved oxygen should continue.

Financial and Risk Implications

10. The cost installing the electromagnetic systems in the bathing facilities is likely to form part of any future hydrological improvement works that may be required on the Heath.
11. Any other works recommended can be carried out as part of the Heath's local risk budget.

Legal Implications

12. The Heath has a legal duty to ensure that the public are informed of any risks associated with coming into contact with the Heath's water bodies. This is particularly important when related to bathing in the Heath's ponds.
13. The City has a legal duty under the Hampstead Heath Act 1871 to maintain the natural aspect of the Heath.

Property Implications

14. There are no property implications of this report.

HR Implications

15. There are no HR implications of this report.

Strategic Implications

16. The proposals link to the theme in the Community Strategy to protect, promote and enhance our environment.

17. They also link to the Open Spaces Department Plan through the Strategic Aim to ‘adopt sustainable working practices, promote the variety of life (biodiversity) and protect the Open Spaces for the enjoyment of future generations’, and the Improvement Objective to ‘ensure that measures to promote sustainability and biodiversity are embedded in the Department’s work’.
18. These works also help fulfil an Essential Actions in the Part 1 Management Plan, namely:

“To manage the Heath’s ponds to enhance their nature conservation value.”

Conclusion

19. The Heath’s ponds are complex and evolving environments and will require careful monitoring to ensure the safety of both human and aquatic fauna alike. Dissolved oxygen levels will continue to be monitored. A number of management practices are proposed which will enhance the ponds in terms of water quality and dissolved oxygen levels. Substantial financial resources are likely to be required in the future to maintain the ponds in a safe and sustainable manner.

Appendices

Appendix 1: *Dissolved Oxygen in Hampstead Heath’s Ponds*

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