NUI Galway
OÉ Gaillimh

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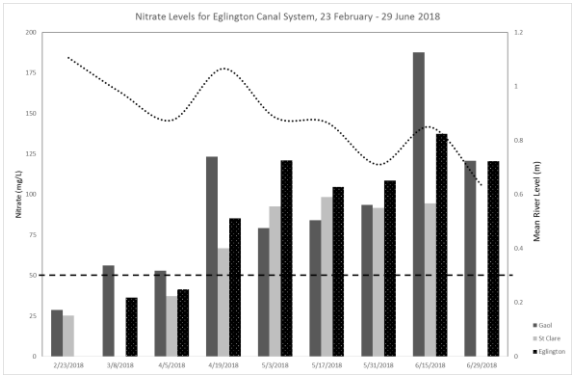
Nitrate Loading in Galway Canals: Challenges in Meeting Water Framework Directive Standards

As the planet changes to a more urbanised landscape, it is predicted that 60% of the world's population will reside within cities by the year 2030. With the increase of urbanisation, also comes a greater risk of pollution entering urban waterways. Surface waters such as rivers, canals and lakes are considered productive ecosystems with unique communities of species which are imperative for biodiversity and conservation. Seasonal and anthropogenic processes on aquatic environments impact the ecological function of surface waters, as classified by the 'Good Ecological Status' system enacted through the EU Water Framework Directive (2000/60/EC).

Research Findings

This research monitored surface water conditions within the Eglington Canal system in Galway City, from February through June 2018. Using standards set by EPA Ireland, water quality was sampled *in situ* at 13 permanent stations along the length of the Eglington Canal system, including 3 stations within the St Clare River, and 2 stations within the Gaol River, both offshoots of the canal and heavily urbanised. Expected seasonal signals in water temperature, dissolved oxygen, and nitrate and phosphate concentrations were seen. While dissolved oxygen (DO) numbers failed to meet EPA Class A Waters standards (60% DO) in June within the Gaol River, nitrate standard levels in all three water bodies (50 mg/L for Class A Waters) were exceeded by late April. Of the three, the Gaol River exceeded standards for nitrate from March onward, with a peak of 187 mg/L in June 2018.



Policy Implications

Galway City contains an extensive system of canals and rivers that feed off the River Corrib, providing a unique aquatic ecosystems within an urbanised environment. These water bodies are popular for recreation, and represent a historic connection to Galway's industrial past. Changes in water conditions are brought on both by seasonality and human activities. Warmer, dryer conditions experienced in Galway during the Spring and Summer of 2018 elevated nitrate conditions and decreased dissolved oxygen past standards for Class A surface waters within the canal network. Looking into the future, Galway's water bodies will be more at risk of exceeding water quality standards. This in turn leads to an increased public health risk for those who enjoy those waters for fishing and water sport, as well as negatively impacting the associated ecosystems. Necessary policy reviews focusing on minimum safe water flow, as well as the role of human activities in impairing urban waterways, is warranted. Included in this review should be efforts that improve and maintain the status of waterways through local community outreach and involvement.

Cluster: Environment, Development, and Sustainability

Theme: Sustainable and Inclusive Societies

Further Reading:
Daly, K., Breuil, M., Buckley, C., O'Donoghue, C., Ryan, M., & Seale, C. (2017). A review of water quality policies in relation to public good benefits and community engagement in rural Ireland. *European Countryside*, 1(2017), pp. 99-115.

Miller, J.D. & Hutchins, M. (2017). The impacts of urbanisation and climate change on urban flooding and urban water quality: a review of the evidence concerning the United Kingdom. *Journal of Hydrology: Regional Studies,* 12(2017), pp. 345-362.

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