

Recovery from Detrimental pH Troughs in a Moorland River Using Monitored Calcium Carbonate Introductions

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Abstract : The West Dart River is underperforming for Salmon (*Salmo salar*) survival rates due to acidified pH troughs under the European Water Framework Directive (2000/60/EC). These troughs have been identified as being caused by historic acid rain pollution which is being held in situ by peat bog presence at site and released during flushing events. Natural recovery has been deemed unlikely by the year 2020 using steady state water chemistry models and therefore a program of monitored calcium carbonate (CaCO_3) introductions are being conducted to eliminate these troughs, which can drop to pH 2.93 (salmon survival - pH 5.5). The river should be naturally acidic (pH 5.5-6) due to the granite geology of Dartmoor and therefore the CaCO_3 introductions are under new methodology (the encasing of the CaCO_3 in permeable sacks) to ensure removal should the water pH rise above neutral levels. The water chemistry and ecology are undergoing comprehensive monitoring, including pH and turbidity levels, dissolved organic carbon and aluminum concentration and speciation, while the aquatic biota is being used to assess the potential water chemistry changes. While this project is ongoing, results from the preliminary field trial show only a temporary, localized increase in pH following CaCO_3 introductions into the water column. However, changes to the water chemistry have only been identified in the West Dart after methodology adjustments to account for flow rates and spate-dissolution, though no long-term changes have so far been found in the ecology of the river. However, this is not necessarily a negative factor, as the aim of the study is to protect the current ecological communities and the natural pH of the river while remediating only the detrimental pH troughs.

Keywords : anthropogenic acidification recovery, calcium carbonate introductions, ecology monitoring, water chemistry monitoring

Conference Title : ICB 2018 : International Conference on Biogeochemistry

Conference Location : Rome, Italy

Conference Dates : July 23-24, 2018