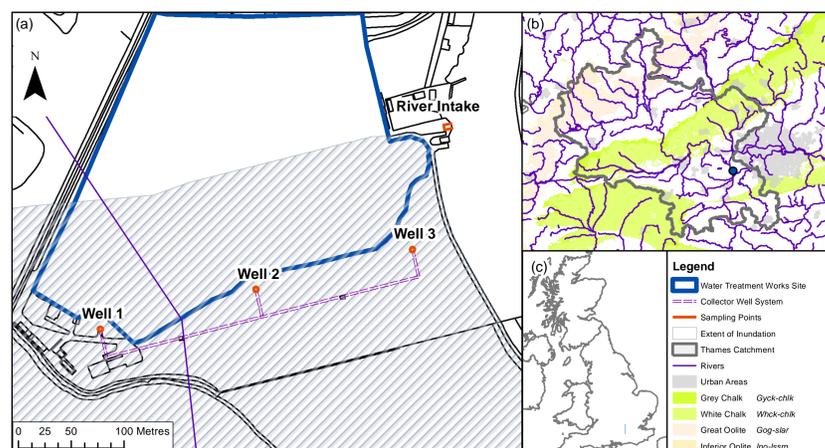


Introduction

Riverbank filtration (RBF) is a water treatment methodology where river water infiltrates through an alluvial aquifer to collector wells. The objective of this study was to characterise the water quality impacts of inundation of RBF systems by extreme fluvial flooding and the controls on recovery in groundwater quality following such an event.

Study Site

The study site was located on the River Thames in West London, England on the Shepparton Gravels. The site consists of a groundwater collector system of 3 wells and a horizontal adit perpendicular to the river.

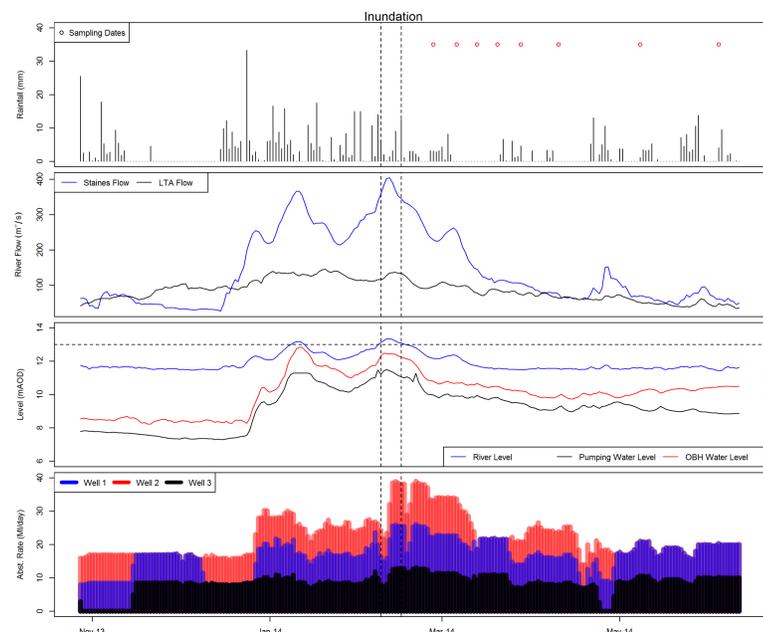


The extensive surface water flooding that occurred in West London during January and February 2014 was used to determine the impacts of inundation on the abstracted groundwater quality. Spot water quality samples were taken during and following the flooding event and 15 minute telemetry data was used to characterise rapid responses to flooding.

Flood Hydrogeology

2014 flood event at the site characterised by:

- Heavy rainfall up to 30 mm/day
- River flows up to 320% LTA values
- Increases in groundwater levels
- Continuous flux from river to collector wells under pumping conditions
- Unsaturated zone in the gravels – flood water draining into groundwater system under gravity
- Increased abstraction during flooding



Water Quality Impacts

Rapid recovery :

- Turbidity and microbiology
- Increased abstraction can dilute any flood water impacts with gravel groundwater

Slower recovery :

- During flooding, high DOC, micro-organic contaminants and DO, low SEC relative to normal conditions
- Fraction of surface water (Fsw) decreases
- Recovery over 5 weeks to steady state conditions. Bank filtrate WQ dominates at Well 3 and gravel GW dominates at Well 1
- Recovery constrained by WQ changes at site boundaries, influence of flood water infiltration and rapid recharge, transmissivity and abstraction rate

Implications for RBF Sites

- Operational flexibility critical to mitigate impacts of surface inundation on shallow BF systems
- Conceptual understanding of site hydrogeology and changes in hydrochemistry of boundaries essential for future RBF systems. This should be developed through monitoring.

