

# Thames Water Catchment Management

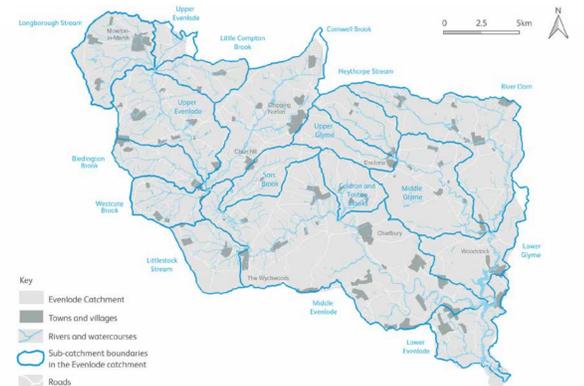


## The Evenlode Pilot Project

In rural areas, run-off from agricultural land and discharge from sewage treatment works can be significant sources of nutrients in freshwaters; in particular, phosphorus (P) which can cause excess algae and weed growth (eutrophication). Thames Water is exploring new, potentially more cost-effective ways to achieve target river standards by implementing land management measures in the catchment as part of a pilot programme.

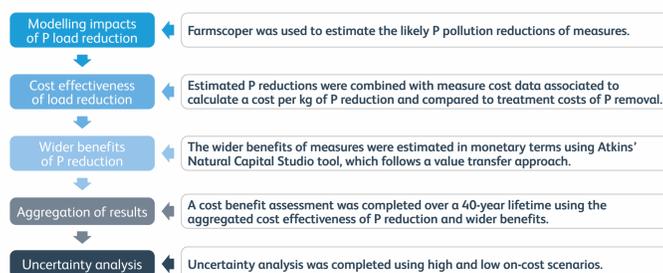
The River Evenlode, a tributary of the River Thames, was the focus of this pilot programme. The catchment management trial has been running since 2016 and is now being evaluated to inform future investment planning by Thames Water, focusing on the following key questions:

- How cost-effective are catchment P reduction measures?
- How does this cost-effectiveness compare with end of pipe treatment approaches at Sewage Treatment Works (STWs)?
- What are the wider benefits of the trial and can these be quantified using a natural capital approach?



## Economic Assessment of Catchment Management Measures

Theoretical P losses from farms were estimated using the Farmscoper model. An initial cost-effectiveness analysis was then performed comparing the cost of removing P through catchment management against the end-of-pipe STW costs. The cost-effectiveness analysis was then updated considering the projects actual costs and the observed improvements yielded to date. Costs consider the on-costs associated with project management, monitoring and farm advice of a mature scheme. Therefore, our cost-effectiveness values are representative estimate.

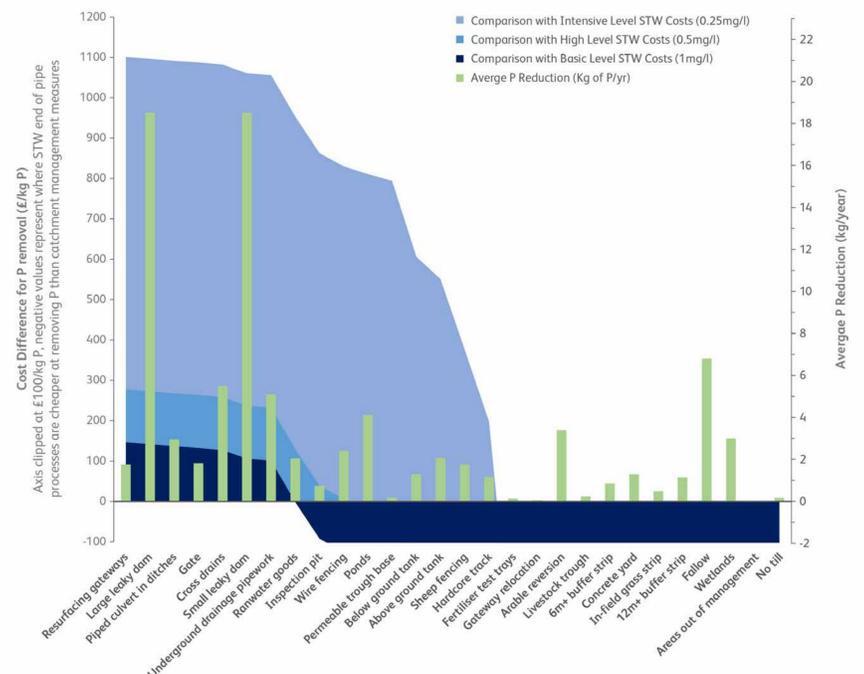


## Value of Catchment Management

### Cost effectiveness

Our analysis found capital measures are typically more cost-effective than operational measures at face-value, although adding wider benefits associated with operation measures makes these measures more competitive.

The cost of P removal at STWs varies significantly depending on the level of P removal and the size of the STW. Therefore, catchment measures are typically more cost-effective in areas where STW unit-costs are high.



## Additional Benefits

The quantification and monetisation of additional benefits were evaluated at farm sale and at catchment scale. Overall erosion regulation, climate regulation and water quality experienced the greatest benefits from the measures implemented across the catchment.

The monetized benefits were assessed against the trial costs for a 40-year period following the Environment Agency's Water Appraisal Guidance general standard (2017). Overall, the total additional benefits over a 40-year period are estimated between £2.8m to £5.4m, delivering between £0.17 to £0.32 additional benefits for every £1 spent. Under the assumption that technical studies and management costs could reduce, the scheme delivers additional benefits ranging from £0.38 to £0.74 for every £1 spent (table below).

### Summary cost benefit analysis of additional benefits provided by the scheme over 40 years

40-Year Costs		Lower Additional Benefit Value	Upper Additional Benefit Value	Lower Benefit: Cost Ratio	Upper Benefit: Cost Ratio
£16,731,520	Trial cost**	£2,791,253	£5,433,943	0.17	0.32
£7,340,698	Post-trial cost***			0.38	0.74

\* Note all costs and benefits are over a 40-year life time and based on 2018 values  
 \*\* Including technical studies and management of trial, water quality monitoring, farm advice and farmer payments over 40 years  
 \*\*\* Reduced to 50% technical studies and management of trial and 50% of water quality monitoring costs over 40 years

## Summary

- Cost-effectiveness varies significantly across measures, farms and water bodies.
- There is some uncertainty surrounding estimation of P load reduction and these results did not consider any time lag's associated with P reductions.
- Capital catchment measures were found to be more cost effective than more operational catchment measures.
- The spatial differences in cost-effectiveness emphasises the need for measures to be selected and targeted based on a sound understanding of the catchment.
- In rural catchments with small STW, catchment management can be cost competitive on a per kilogramme basis compared to end of pipe treatment.
- Magnitude of potential savings from catchment management schemes play an important role when assessing catchment plans for controlling phosphorus
- It is important to consider the wider benefits provided by measures, particularly where the costs of catchment management are comparable to the cost of traditional P removal.
- A balance between cost-effectiveness and magnitude of P removal is likely to deliver the best scheme outcome.

£ Total direct payment to farmers: <b>£424k</b>	∩ No. of measures applied: <b>67</b>	🚗 No. of farms involved: <b>23</b>	📈 Total P reduction: <b>165kg/yr</b>	£ Cost effectiveness of P reduction: <b>£2.5k per kg P load reduction</b>	🐟 Additional benefits: <b>£70k - £136k per year</b>
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