

Citizen Science Monitoring Data

How your data has supported our investigation work

25th January 2016

The Environment Agency has been working with the River Thames Conservation Trust to identify suitable locations for volunteers to monitor river chemistry. The monitoring network now numbers over 70 sites across the Thames catchment, presented in the map at the end of this document. The sites are monitored for phosphate, nitrate and turbidity. Many sites have been monitored monthly since late 2014, and these data are proving very useful in supporting our investigations in to why water bodies are failing to meet the standard required to meet Good Ecological Status under the Water Framework Directive (WFD). The following case study highlights how your data can support our work.

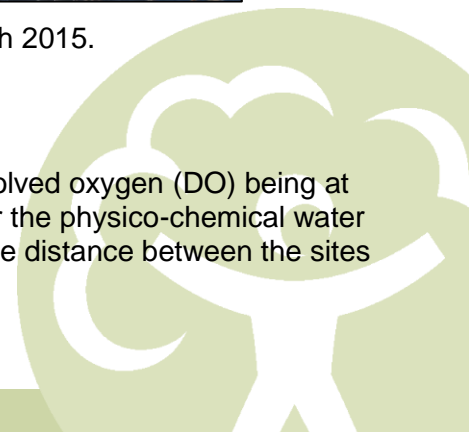
Cuttle Brook south of Thame

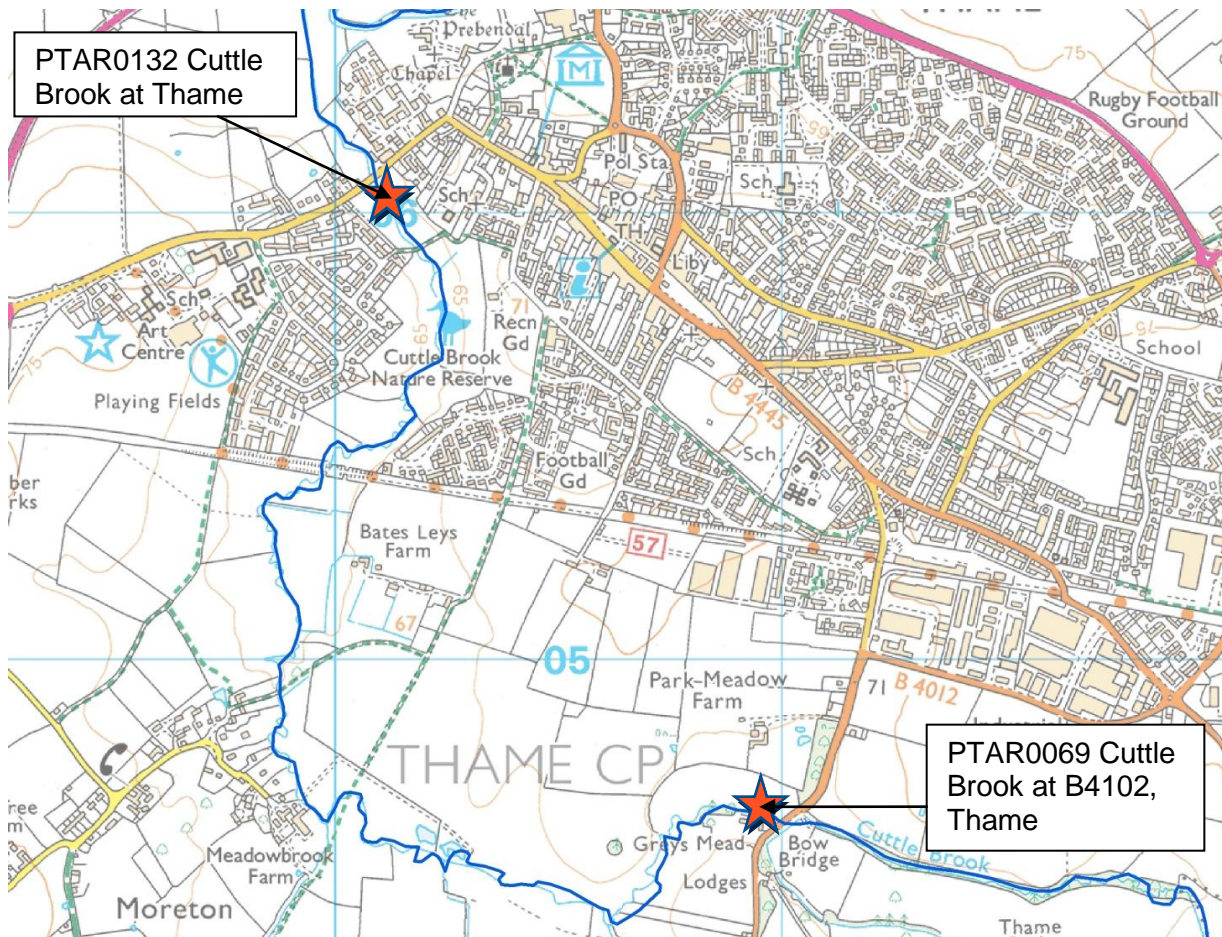


Photos of Cuttle Brook taken at Cuttle Brook Nature Reserve on the 25th March 2015.

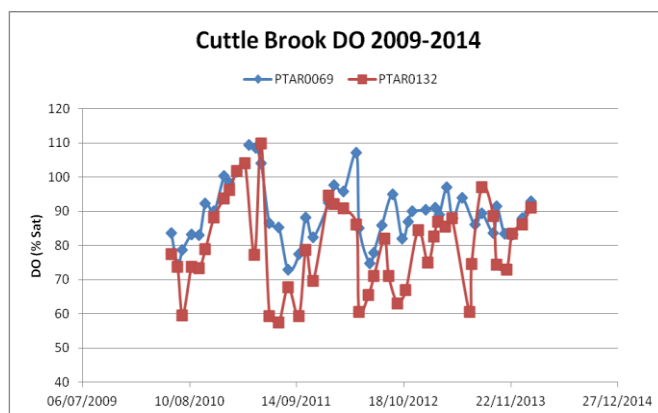
Environment Agency investigation

In 2014 a WFD investigation was carried out to determine the reasons for dissolved oxygen (DO) being at less than Good status in the Cuttle Brook. Two monitoring points were used for the physico-chemical water quality classification. The monitoring locations are shown in the map below. The distance between the sites is about 3.5km.

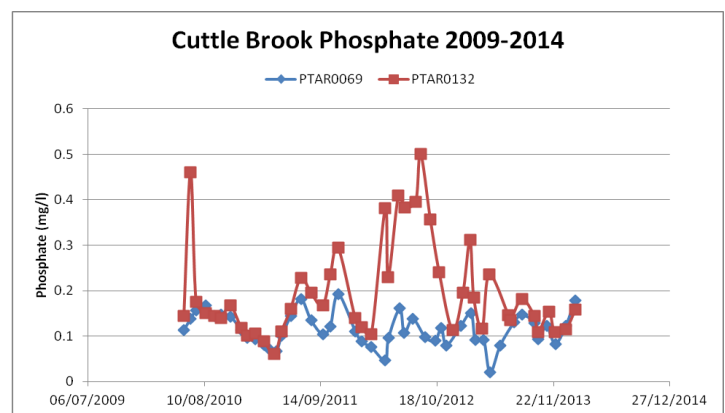




The DO and phosphate data collected at the two sites between 2009 and 2014 is presented below. The graphs show that the DO concentration recorded has been generally lower and the phosphate concentration higher at the most downstream site, PTAR0132. It was not clear from our investigation why water quality appeared to deteriorate over such a short stretch of river, particularly in the absence of any major inputs (i.e. consented discharges) between the two sites. Although our phosphate modelling suggests the majority of phosphate at both sites is derived from a combination of livestock farming, arable farming and urban pollution, it was not clear why these diffuse sources of phosphate are so much higher at site PTAR0132. As such it was difficult to establish the exact sources that were causing the failure to meet Good status at the downstream site. This issue was raised at a Catchment Delivery Team meeting, attended by Andrew Callender from the River Thames Conservation Trust. He suggested that the volunteer monitoring programme, which was already underway, may help shed some light on the problem.



Graph showing the dissolved oxygen percentage saturation recorded on two sites on Cuttle Brook, PTAR0069 and PTAR0132, from 2009 to 2014.

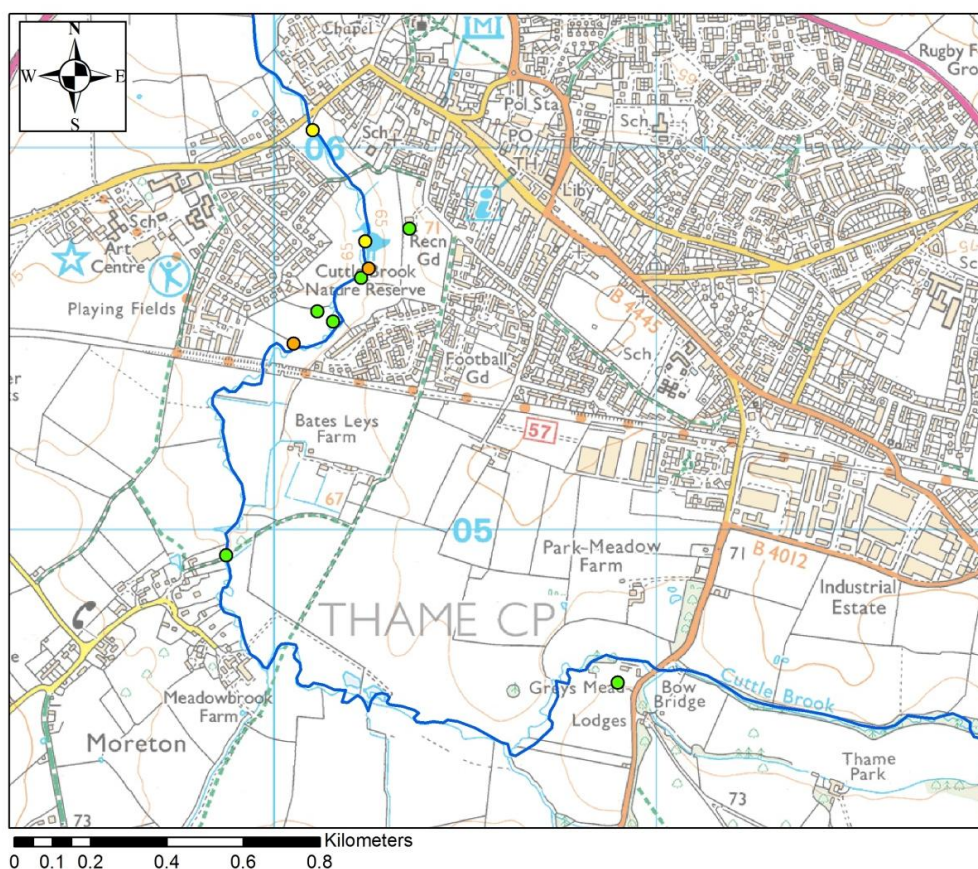


Graph showing the concentration of phosphate recorded on two sites on Cuttle Brook, PTAR0069 and PTAR0132, from 2009 to 2014.

Volunteer monitoring data

Monitoring data was collected by volunteers at the Cuttle Brook Nature Reserve at 10 sites on the reserve and upstream of the reserve. The phosphate data collected between October 2014 and December 2015 is presented in the map below. Each sampling location is marked with a coloured dot. The colour of the dot indicates the average phosphate concentration for each site. For example, a green dot refers to a phosphate concentration of between 0.05 and 0.1mg/L, which is roughly equivalent to Good status under WFD. The legend on the map shows which range of phosphate concentration is represented by which colour.

The map below shows that upstream of the Nature Reserve the average phosphate concentration is low (as illustrated by green dots). However there are two sampling sites that stand out as having high phosphate concentrations, marked with orange dots on the map. These two sites are not actually on the brook itself, but are taken from discharge pipes that enter the Cuttle Brook. Downstream of these two pipes there are two sites on the Cuttle Brook, marked with yellow dots indicating higher average phosphate concentrations than the sites on the Cuttle Brook upstream of both pipes. These data suggests that the discharge from the two pipes is likely to be contributing to the phosphate load on Cuttle Brook. Further investigation showed that the two pipes are surface water drains which discharge urban run-off when it rains.



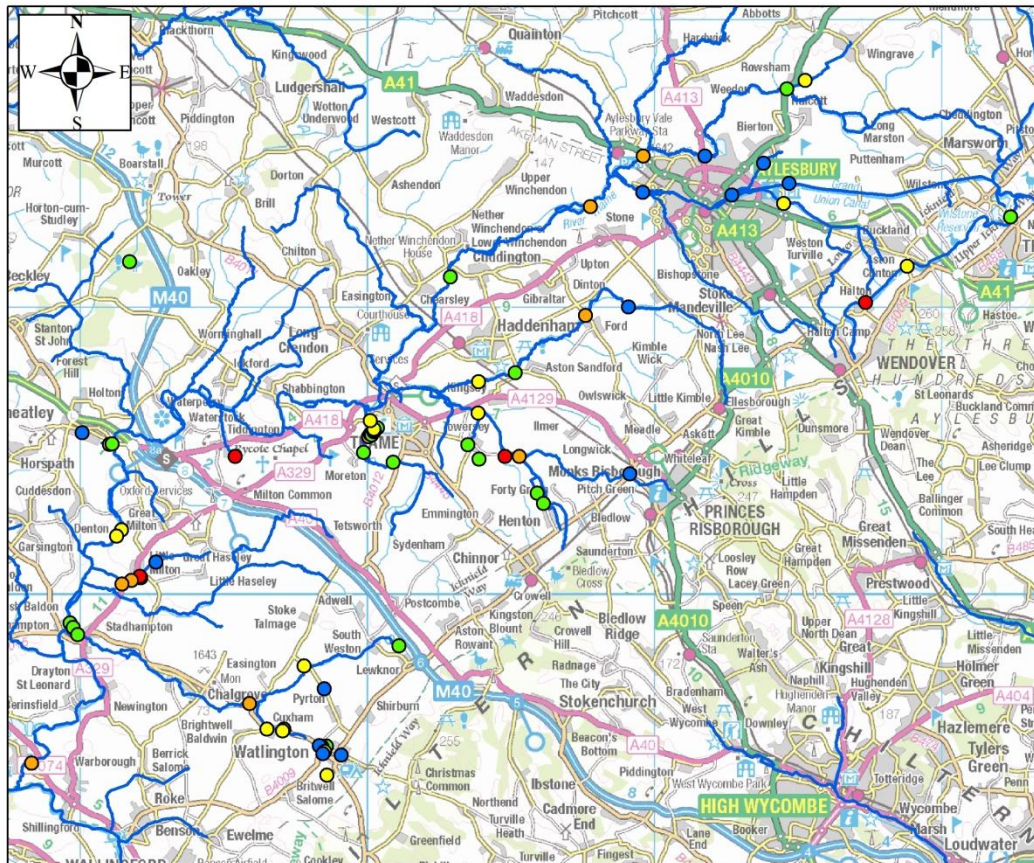
**Phosphate monitoring
on Cuttle Brook
October 2014 to
December 2015**

Legend
P_monitoring
Average_P

- 0 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1

Conclusion

The monitoring data collected by the Environment Agency showed there was an increase in phosphate between the two sites monitored on Cuttle Brook. It was however difficult to determine why this was the case because there were no obvious point sources of pollution. Volunteers at the Cuttle Brook Nature Reserve carried out phosphate monitoring and were able to sample many more sites between the two sites monitored by the Environment Agency. This helped pinpoint where on the brook the phosphate load increased. The information can now be used in our investigation to increase our confidence that urban pollution is a significant problem. This will help focus our efforts on measures to reduce the phosphate load of the water body.



**Phosphate monitoring
in the Thames
catchment October
2014 to December 2015**

Legend

P_monitoring

Average_P

- 0 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1