# Ash and Martock Nature - Phosphate Survey

**Report 5**

# Where does the phosphate come from?

**Martock small tributary survey, 2023**

## 1 Parrett phosphate flow rates

The Environment Agency measures and publishes the Parrett flow rate every 15 minutes at a main road bridge near Chiselborough. The table below shows how the mass of phosphate flowing down the Parrett increases 4to5-fold over the flooding period, even though the concentration halves. Where is it all coming from? Is it being washed off farmland as many suggest? This study suggests not. It is most likely to be legacy phosphate in the Parrett sediments that is being mobilised by the turbulent flood flows.

**Phosphate and flow data, Parrett, Chiselborough bridge[1]**

| Date | $PO_4$ (ppm) | River flow rate ($m^3/s$) | Phosphate flow rate (kg/day) |
|---|---|---|---|
| 22/9/22 | 2.82 | 0.17 | 42 |
| 14/10/22 | 3.60 | 0.27 | 85 |
| 29/10/22 | 1.58 | 0.42 | 57 |
| 10/11/22 | 0.48 | 3.88 | 161 |
| 24/11/22 | 0.47 | 6.71 | 272 |
| 13/12/22 | 1.18 | 0.59 | 60 |
| 22/12/22 | 0.45 | 4.79 | 186 |
| 18/1/23 | 0.49 | 4.39 | 186 |

## 2 Phosphate in the Parrett small tributaries

This survey is designed to throw light on the flow of phosphate from streams, ditches and standing floodwaters into the Parrett around Martock. The Upper Parrett survey of 2022 showed that the flow of phosphate in the main river appeared vastly greater than the flow in the feeding streams. This survey conforms this.

The resullts of the survey are shown in diagrammatic form on the next page

## 3 Emerging conclusions

1 There is a natural background phosphate level of around 2ppm in the flood season. (Green in the diagram)

2 Some tributaries show run-off from agriculture resulting in levels around 0.3 ppm (Blue in the diagram). This is often tracable back to specific crops.

3 Some larger watercourses carry outflow from sewage works. These are consistently over 0.4 ppm (Red in the diagram)

4 The river Parrett has a phosphate level of around 0.4-0.5 ppm at this time of the year. This is significantly lower than summer levels, but the flow rate is typically an order of magnitude greater giving a phosphate flow down the river that is typically 4 to 5 times the summer flow.

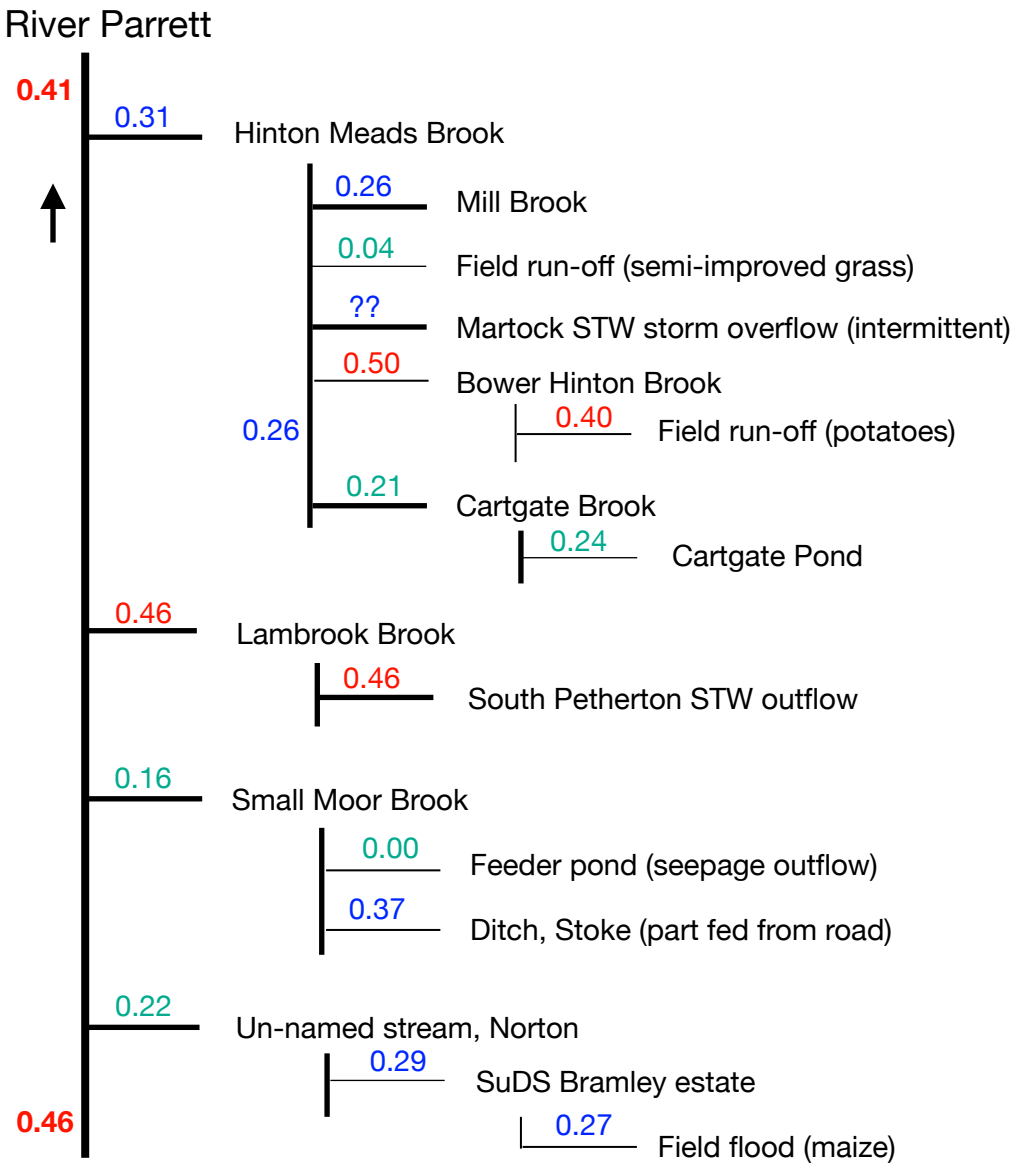
5 The main source of the high river Parrett phosphate level is most likely to be mobilised phosphate from the river sediment[2] and not run-off in the tributaries.

1 http://environment.data.gov.uk/hydrology/explore

2 This conclusion is supported by work done by the University of Lancaster team studying sedimentay phosphate and by papers they have provided.

## Diagrammatic representation of the phosphate flow in Parrett tributaries around Martock

A results map and data can be found here[1]




The thickness of the line gives a sense of flow rates and hence the contribution of phosphate to the main river.

| | |
|---|---|
| Green | Probably little excess phosphate above the natural level |
| **Blue** | Some contribution from sewage or farming |
| Red | Significant anthropogenic phosphate. |

1 https://shared.xmap.cloud?map=e71461d1-c445-4085-a3c3-45ed4765de36