# Trout in the Trym Phase 1:
# Assessing Pollution Levels in the Trym and its Suitability for Fish

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## Executive Summary

In partnership with Sustainable Westbury On Trym, this study was designed to investigate potential local sources of pollution to the River Trym and subsequently assess the potential of introducing brown trout into the ecosystem. Between Sea Mills and Westbury On Trym, a total of 10 sites were established; at each site various water quality parameters were measurement to explore three main areas of investigation:

**Considerable urbanisation in the area has raised questions surrounding the role of infrastructure in river pollution, particularly roads.** Zinc, cadmium, copper and nickel are commonly found in road runoff, deposited by the tyres and brake pads of vehicles. Heavy metal analysis has therefore been conducted to determine the content of these metals in samples taken from each site. If road runoff is a significant pollutant, it would be expected that heavy metal content would be higher in samples taken directly after major roads – Site 2 after Shirehampton Road, and Site 9 after Falcondale Road.

**Hazel Brook is suspected to be more polluted and therefore having a negative impact on the water quality of the River Trym.** Multiple sites have been selected surrounding the confluence of the River Trym and Hazel Brook; water quality data taken from each of these sites will allow a comparison of the water quality of Hazel Brook with the water quality in the Trym both before and after the confluence.

**Will the River Trym be suitable for the introduction of brown trout in the future?** The ecosystem of the River Trym has been significantly reduced since the 2013 pollution incident, but, with the help of SusWoT, has since begun to recover. Heavy metal analysis, alongside general water quality testing, will help to determine if the river lies within tolerable threshold for optimum living condition, and may therefore be capable of supporting brown trout.

## Our Findings

**Heavy metal analysis does not show any cause for concern from road runoff pollution.** No significant differences in the heavy metal concentrations before and after Shirehampton Road or Falcondale Road were determined. This suggests that road runoff is not a major concern, as it does not appear to be having a long-term effect on the Water Quality of the River Trym. However, time and resources restricted the size of the dataset used for this analysis.

**Hazel Brook does not appear to be decreasing the water quality in the River Trym.** The confluence did not consistently influence any measurements taken: downstream measurements of oxygen content and pH were largely unaffected. Although conductivity increased downstream, this was not necessarily as a result of the confluence but is more likely related to the mixing of the River Trym with brackish water from the River Avon. Furthermore, Hazel Brook itself did not show signs of significant pollution, with a high oxygen content making it tolerable for aquatic life.

**Water quality of the River Trym is within the tolerable thresholds for brown trout.** Our probe measurements show that the water quality in the River Trym is in line with brown trout living conditions: our readings for oxygen, pH, temperature, conductivity, as well as heavy metal and turbidity analysis, all lay within the tolerable levels for brown trout, with some in the optimum level. It is therefore possible that it is the physical properties of the River Trym preventing brown trout from living there: these factors could include the depth of the river, grainsize and the position of weirs up the river.

**While water quality of the River Trym is good for brown trout, we found physical factors which restrict fish migration**. From background research we found that brown trout require access to different habitats for the three key stages of its lifecycle (spawning, juvenile and adult). Weirs can lead fish to repeatedly throw themselves against stonework and cause injury which stops them from reaching habitats for spawning. During sampling we found weirs present in the River Trym which could be the reason for a lack of brown trout in the river.

## Future Work

### Monitor river depth:

Measure how the depth of the River Trym changes throughout the year to assess whether the river is capable of sustaining brown trout perennially. This could be measured during the monthly litter pick and after a prolonged period of rainfall.

### Research fish passes:

Exploring the feasibility of a weir fish pass construction project between sites 6 and 7 and also at site 1 to allow the free movement of fish could also be advisable, particularly if the idea of introducing larger fish such as brown trout to the river is being considered.

### Reintroduction of smaller fish:

Consider the reintroduction of smaller fish present in the river prior to the pollution event in 2013. Alternatively, attempt to identify fish currently present in the River Trym and introduce larger quantities of those species. This would increase the diversity in the brown trout food web should they be introduced and act as an indicator of whether conditions are suitable for larger fish.

### Map point sources of pollution:

Locate pipes along the River Trym so that future projects can focus on the effects those pipes may be having on water quality.

### Map physical obstructions:

Locate each weir and bridge along the River Trym so that future projects can determine the possible effects those factors might have on water quality and fish migration.

### Continuation of current work:

Continuing the removal of Himalayan Balsam and consistent litter picking event will help to reduce riverbank erosion and improve biodiversity, benefitting the overall quality of the ecosystem as a whole.