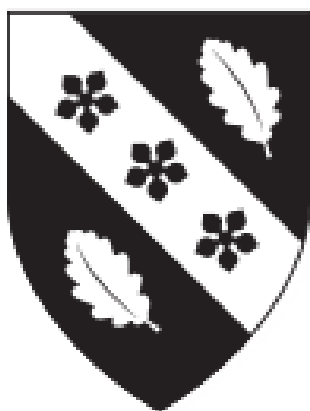




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ASSIGNMENT 1 – RESEARCH PROPOSAL

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1 Title

An investigation into the seasonal Diet of Eurasian Otters *Lutra lutra* – River Usk, Western Monmouthshire.

2 Introduction

This research study will aim to identify the seasonal diet of the Eurasian otter through the process of spraint analysis, specifically focussing on the river Usk catchment area near the town of Abergavenny in Monmouthshire. There have been several similar historical studies carried out throughout the UK. The Eurasian otter is one of the UK's European Protected Species and therefore any research study into how these key animals are doing in the UK is deemed to be important for their conservation. In addition, with all the current environmental issues that the world is facing such as climate change and the fight against water pollution in our rivers, further research into how these key issues are impacting UK otters is vital to also be researched into. Moreover, it could be argued that understanding how the UK's wildlife is coping with these drastic changes is of the utmost importance for their conservation.

2.1 Aim and Objectives

The aim of this research study is:

- To investigate the seasonal Diet of Eurasian otters– River Usk, Western Monmouthshire.

The objectives that will be implemented in order to achieve the research study aim are:

1. To critically analyse current, relevant, and up-to-date literature in relation to the study of the seasonal diet of an Eurasian otter.
2. To collect and analyse spraint samples from the river Usk, Abergavenny, over a 12-month period.
3. To conduct a comparative analysis between the primary data collected in this study to secondary data collected in a similar research study conducted by Suffolk Otters Group (2019).
4. To propose an insight into how the data collated from this study could show how sewage and pollution may be impacting the diet of an otter.

3 Literature Review

The UK is home to only one species of otter, that is the Eurasian otter (Woodland Trust, 2021). The Eurasian otter has been described as an '*elusive top predator*' (O'Rourke, 2022), that lives a secret and mainly solitary life. Therefore, it could be suggested that any research on this elusive animal allows us to understand just a little bit more about how this key species lives its life. It is believed that Eurasian otters

were once widespread throughout the UK's waterways but were subject to a major population decline in the late 1950s, and early 1960s, which was believed to as a result of habitat destruction and water pollution (Mammal Society, 2023). Nowadays, otters are classed as a European Protected Species and protected under Schedule 2 of the *Conservation of Habitat and Species Regulations 2010*. Additionally, otters are further protected under Schedule 5 of the *Wildlife and Countryside Act 1981*. Furthermore, this has resulted in an increase in otter populations year on year and this has been the case up until the most recent Otter Survey Wales was conducted, where a 22% decline in otter signs was recorded throughout Wales, and more specifically, a 26% decline in otter field signs were recorded solely along the river Usk (Kean & Chadwick, 2021). Kean & Chadwick (2021) state that the reason for the decline in populations is unknown and that further surveys and studies would need to be undertaken to try and understand the sudden change. Moreover, to back up these results, the Mammal Society (2020) express that otters are classed as vulnerable on the International Union for Conservation of Nature (IUCN) Red List in Wales, but in England, otters are classed as least concern on the IUCN Red List. This data suggests that otter populations in Wales are struggling when compared to the population in England for unknown reasons.

The Joint Nature Conservation Committee (JNCC) (2019) states that the river Usk is a designated Special Area of Conservation (SAC). Furthermore, the Welsh Government (2023) suggests that Welsh rivers support some of the most precious biodiversity and that protection and enhancement of the designated areas should be of utmost importance. Moreover, the Welsh Government (2023) expressed that phosphorus pollution is a considerable issue for Welsh rivers with more than 60% of the SAC rivers in Wales failing phosphate targets.

Figure 1 (below) is a map illustrating Aberbaiden Wastewater Treatment Works, Abergavenny (Dŵr Cymru, 2023). The map identifies the amount of raw sewage that was released into the river Usk in 2022. The number of times sewage was released during 2022 was 51, which is far more than the claimed average by Dŵr Cymru which is 38.3 (Dŵr Cymru, 2023). This could suggest that Aberbaiden Wastewater Treatment Works is one of the top treatment sites for releasing sewage into its nearest waterway. Moreover, Aberbaiden Treatment Works is only a few hundred metres upriver from the spraint sample collection point 'A' as shown in Figure 2 (below). In addition, Kersley (2020) states that otters are an environmental indicator, which means that otters require fresh clean water to live and feed in. Therefore, data collected from this study in conjunction with yearly data that is released from Dŵr Cymru could be used in the future in order to assess how raw sewage releases affect the presence and the diet of otters along the river Usk near Abergavenny.

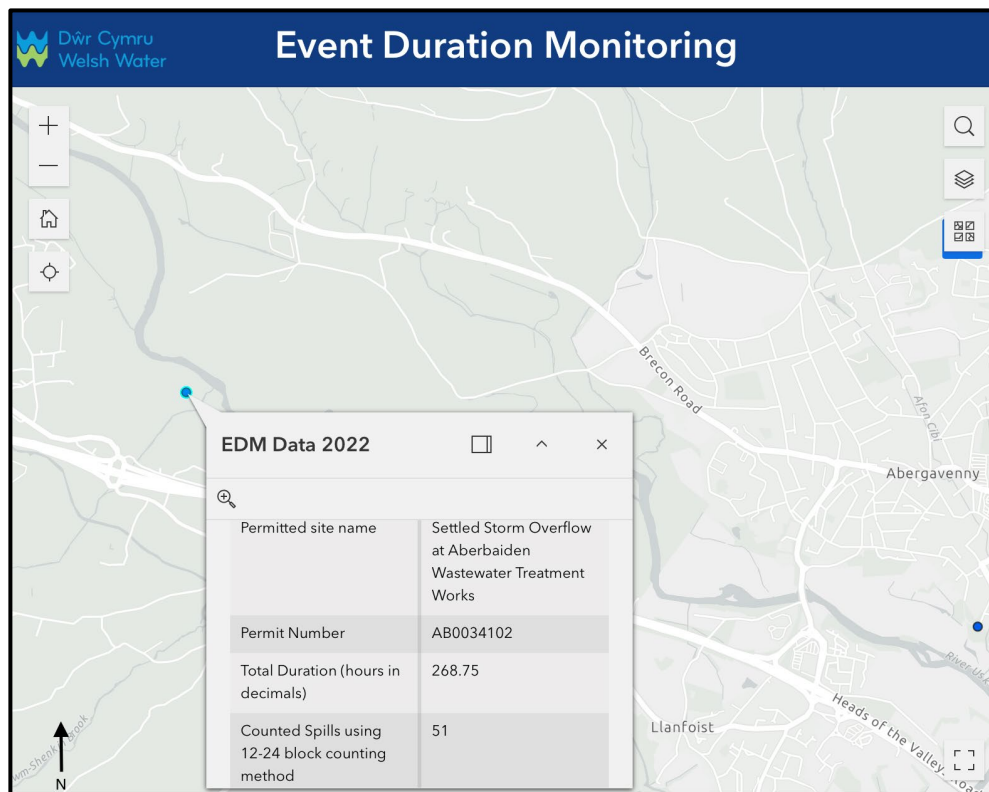


Figure 1 - Aberbaiden Wastewater Treatment Works storm overflow data. (Dŵr Cymru, 2023).

4 Methodology

There have been several studies into the diet of otters through spraint analysis, all with similar methodologies. The primary data collected in this research study will be strictly quantitative. Moreover, the primary data collated from this experiment will be compared to secondary data taken from a research paper by the Suffolk Otters Group, where the group carried out similar research with spraint samples being collected from the river Blyth in Suffolk (Suffolk Otters Group, 2019). Comparing the primary data from this study with the data from the River Blyth study may give an indication as to why otter populations are doing better in England when compared to the population in Wales. Adopting the same research methods will also aid standardisation and consistency when comparing both studies.

4.1 Identifying and Collecting Spraint

This section will explain how the otter spraint will be identified, collected, and prepared for analysis.

4.2 Identification

4.2.1 Location

Craft (2016) describes that otter spraint is often deposited on top of prominent features that are close to the water's edge. Some of these features can include:

- Rocks.
- Fallen trees.
- Bridge supports.
- Storm drainpipes.

4.2.2 Smell

Craft (2016) further explains that otters use their spraint as a scent marker, to leave messages for other otters that may be in the area. This smell is unique and different from other mustelids and can be used to identify an otter spraint.

4.2.3 Visual Features

An otter's diet mainly consists of fish; therefore, spraint samples usually contain small fish bones and scales (Craft, 2016). Additionally, Craft (2016) believes that otter spraint remains can include crayfish remains, amphibian bones, bird feathers, fur, and insect remains as these are all prey of an otter. All the remains, such as bones and fur will be stuck together with a black tar-like substance.

Furthermore, Craft (2016) explains the unmistakable anal jelly that otters produce, which Craft describes as a clear jelly mucus that is believed to be some sort of stomach lining. The otter sheds this stomach lining when digesting small sharp fish bones so that they do not become stuck when the otter is passing the spraint through its digestive system. This anal jelly is another key sign when identifying otter spraint.

All of the above features will be adopted when collecting the spraint samples for this research study.

4.3 Sampling

Trites & Joy (2005) suggest that a sample amount of 94 spraint samples is required in order to identify the variation in diet over the duration of this study. That equates to an average of nearly 8 spraint samples to be collected per month. Therefore, the sample size of this research study will aim to be circa 94 samples as suggested by Trites & Joy (2005).

4.4 Collection

Figure 2 (below) is a map of the river Usk near Abergavenny. Two sample collection points are identified on the map. Sample collection area 'A' is 5 kilometres West of Abergavenny, whilst collection area 'B' is in between Abergavenny and Llanfoist. These 2 sample collection points have been chosen due to them being recommended by South Wales Otter Trust (2023).

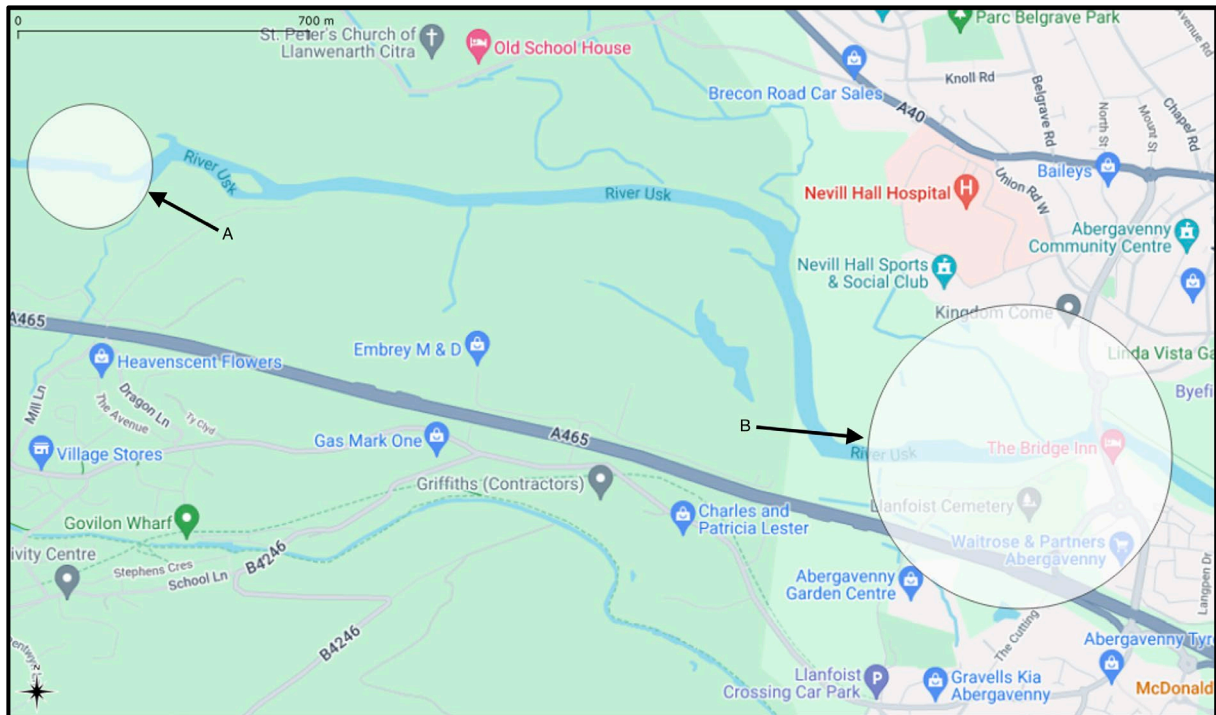


Figure 2 - Two sample collection points (A&B) (Google Maps, 2024).

Once the spraint has been identified, it will be collected in a sealable sample pot and labelled and recorded with the date, time, grid reference of where it was found, and a unique identification number, as advised by Suffolk Otters Group (2017). The sample pots will be stored in a freezer until they are ready for analysis.

4.5 Sample Collection Limitations

There are predicted limitations with the collection of the spraint samples, one of which mainly being the weather. The river Usk is known to flood in the selected spraint sample collection areas, which is a problem due to spraint being washed away by the fast-flowing flood waters. Flood water also brings with it a safety concern as the high level, fast-flowing water can be dangerous for the person collecting the spraint samples. A recommendation of safety equipment such as good footwear, a personal flotation device (PFD) and regular contact with another person in order to update them on the collector's location will be advised. Additionally, time could be considered another limitation as searching for spraint samples during the summer can be challenging due to the growth of riparian vegetation, making it more difficult to spot any fresh spraint along the river's edge.

4.6 Analysis

Following the Suffolk Otters Group (2017) methodology, when the spraint is ready for analysis, each sample will be soaked for 24 hours in water together with a teaspoon of washing detergent. Mahon *et al* (2021) state that the enzymes found in washing detergent can help dissolve any residual tissue that is left on the bone and essentially cleaning it ready for examination. Furthermore, once the spraint has soaked for 24 hours, the sample will then be cleaned with the use of a sieve and running water

through the sieve to separate the tar-like substance away from the bones and other solid prey remains. The next process will be to dry the bones and other solid matter which is left over after the cleaning process. This will be done by placing the cleaned prey remains on a newspaper and leaving them at room temperature for 24 hours. Once dried, the bones and other remains will be placed back into the same sample pots until they are ready to be identified which will be done by using a microscope (Suffolk Otters Group, 2017).

5 Predicted Results and Evaluation

The result of this research will be presented similarly to the results from the river Blyth experiment (Suffolk Otters Group, 2017). Initially, the results will be divided into these individual species:

- Fish
- Bird
- Insect
- Amphibian
- Crustacean
- Mammal

Following the same format that the river Blyth research set out its results, this investigation will also identify each species of fish that is found in the spraint samples as fish is the predominant prey of an otter (Suffolk Otters Group, 2019).

The results from this experiment should show the prey availability in and around the river Usk. In addition, as the common prey for an otter is mainly fish, the results may highlight what species of fish inhabit the selected study area of the river Usk throughout the different seasons of the year. Furthermore, the number of spraint samples collected may indicate the presence of otters and how regularly they use the sample collecting area of the river Usk that is being studied. This, in turn, could give the chance for the experiment to critique the most recent Otter Survey Wales (Kean & Chadwick, 2021). If the number of spraint samples collected is high, which therefore could indicate that otter populations may not be struggling as suggested by the Otter Survey Wales (Kean & Chadwick, 2021).

5.1 Study Limitations

Parry (2008) believes that one limitation of the research on the otter diet through spraint analysis is that the method can overestimate the amount of prey due to the regular occurrence of hard prey parts such as bones. Moreover, Parry (2008) suggests that this method can also underestimate the amount of soft-bodied prey present in the spraint samples due to the difficulty of identification.

Another possible limitation of this research is that many other similar studies have included a group of people to collect spraint samples, whereas a single person will be collecting the spraint samples for this study.

As identified above, spraint analysis does come with its limitations for discovering seasonal otter diets when compared to how Cardiff University conducts their studies into the diet of an otter. They use a process of internal gut inspections with the use of otter roadkill which gets collected by Natural Resources Wales (NRW) and delivered to Cardiff University's laboratory ready for post-mortem examination (Cardiff University, 2024).

6 Conclusion

To conclude, the conservation of the Eurasian otter is key, and therefore any information on how these European protected species are coping in the wild could help to protect this environmentally important and iconic animal. Additionally, the results from this research study could hold vital information about the presence and dietary variations of otters along the River Usk in Abergavenny. Furthermore, as identified above, there are believed to be limitations with the method of understanding the seasonal diet of otters through spraint analysis. Despite this, the methodology used for this study will still provide key information that will be compared with data from other studies that have been conducted using the same methodology. Moreover, the data that this study will achieve could be used in future studies to compare how otters on the River Usk adapt to sewage pollution entering the river via storm overflow from the Aberbaiden Wastewater Treatment Works, who are regarded as one of the major contributors of sewage pollution in Wales.

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