WHITBY LOBSTER HATCHERY

ESK AND COAST WATER QUALITY

SCOPING REPORT

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Background

This report has been commissioned by the Nix Water Action Collective, which is an informal group set up in July 2023 in response to the continuing issue of sewage pollution affecting Whitby's bathing waters. The purpose of the group was to:

- Bring attention to water quality and pollution issues for our local community
- Enable action to improve our river (Esk) and sea
- Work with like-minded people to restore and protect our waters and the creatures within it

A small group of around 28 members (swimmers, businesses, concerned community members from across genders and age ranges) focussed on understanding and building the evidence base, with research and analysis into the specific issues that impact on the water quality in and around Whitby (as far as Sandsend, but very specifically localised to town).

Approximately 180 hours of volunteer work in advance of this report focussed primarily on data, but included practical action such as meeting with Yorkshire Water representatives, beach sweeps and a Calla Beck clear up to remove a shopping trolley and other items of pollution.

The group identified the potential for further action, but lacked the capacity to take the work forward, or the knowledge of what already exists to avoid duplication. The hope was then to build on current initiatives, or explore what type of work can make the biggest impact to ensure cleaner rivers and seas. An original tender exercise in late 2023 for both a report and community engagement activities failed to identify an appropriate individual or organisation to conduct the wide-ranging work. Therefore, the North Sea Conservation Charity, based in Whitby, agreed to support and allocate experienced staff time to prepare a scaled back report, conducted as a 'desktop exercise' from available data and reports. Some limited engagement with key groups in town was undertaken to clarify specific pieces of information.

We recognise the limitations on this report and hope it will be used in a spirit of exploring the situation that has generated such concern from affected members of the community. This report is a partial perspective on a complex issue and is intended to provide a springboard into wider discussion and clearer, holistic actions that create better accountability for the protection and improvement of the health of our river and sea.

CHAPTER 1

Introduction

The River Esk flows 28 miles through Yorkshire, starting near Westerdale in the North York Moors and flows eastward, ending in Whitby where it flows out into the North Sea. It is the only major river in Yorkshire to flow directly into the North Sea, and not via the River Humber or River Tees. The river contains both commercially and ecologically important species, such as the salt-to-freshwater migrating salmon and sea trout; and the endangered freshwater pearl mussel. Its coastal waters are abundant with local speciess, including the European lobster *(Homarus gammarus)* and edible/brown crab *(Cancer pagurus)* – two species which support the commercial fishing fleet that operate out of Whitby harbour.

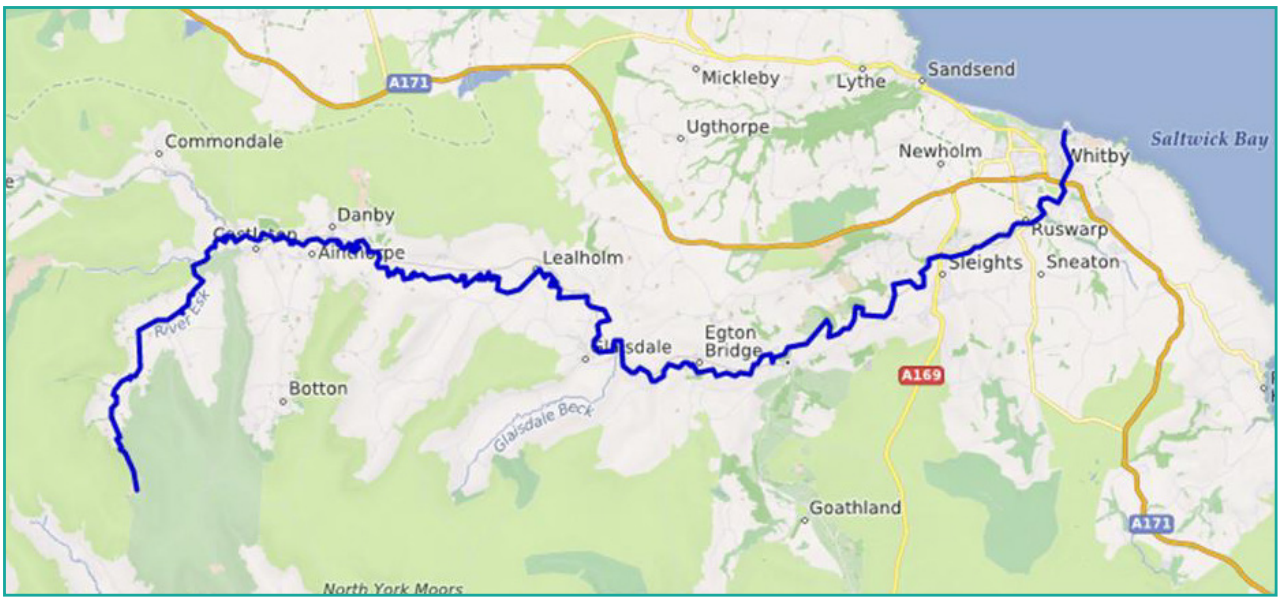

Figure 1: A map showing the course of the River Esk, from source to Sea (without tributaries).

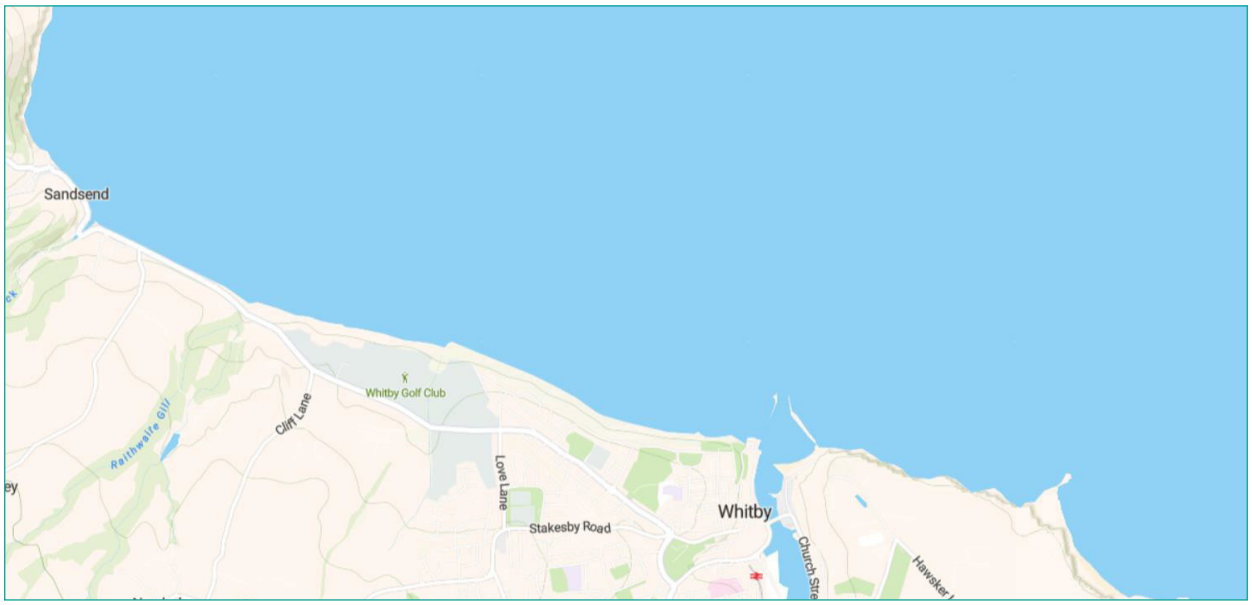

Figure 2: A map showing the mouth of the Esk and surrounding coastline. [umap.openstreetmap.fr]

In Whitby, much of the town's water is tidal and, therefore, a mobile, rather than a static entity. This proves problematic for authorities who divide responsibility on geographical and 'fixed asset' bases.

For this, and other reasons, the idea for this project came about. The goal being to look at other projects, data, and policies currently observed on the river, and bring them all together in one place – giving us an overview of water quality in the Esk and surrounding coastal waters.

CHAPTER 02

Ownership & Regulation

The River Esk, as with most rivers, is not owned entirely by a single body. Ownership is often dependent on the aspect in question.

North Yorkshire council is the local authority responsible for the entirety of the River Esk. However, due to its size, North Yorkshire council is split into six area committees. The earlier course of the river falls into the Richmondshire area, but the majority of its length lies in the Scarborough and Whitby area. The shift to North Yorkshire Council (NYC) as one body provides an opportunity to more effectively act as a key stakeholder by NYC (including its new structures and plans around ecology and climate).

The Environment Agency is the regulatory body in charge of input and output to and from the Esk, including the harbour and beaches. Actions like discharge of sewage water or storm overflow must be licensed by them before they can legally take place. They are also responsible for monitoring and disciplinary action related to industrial pollution, like diesel spillages from boat owners refuelling.

The banks and surrounding land of the Esk is mostly under private ownership (e.g. farms or estates). Owners of the land adjacent to the river also own the riverbed itself, up until the riverbed's midpoint. Angling rights are often granted by these land owners. If not, this falls to dedicated angling associations.

North Yorkshire Council is currently in ownership of the Port of Whitby. The seabed is owned by the Crown Estate, except for Whitby Beach North.

A significant portion of the River Esk flows through the North York Moors, which the National Park Authority is keen to monitor and protect. The heather moorland surrounding the river is a globally rare habitat. The health of the river, therefore, is not only important to the ecosystem within, but for the environment that surrounds it, too. Other groups, like the North York Moors Trust and their 'River Esk and Coastal Streams Partnership' project, also work to protect the river's natural environment, but hold no ownership rights.

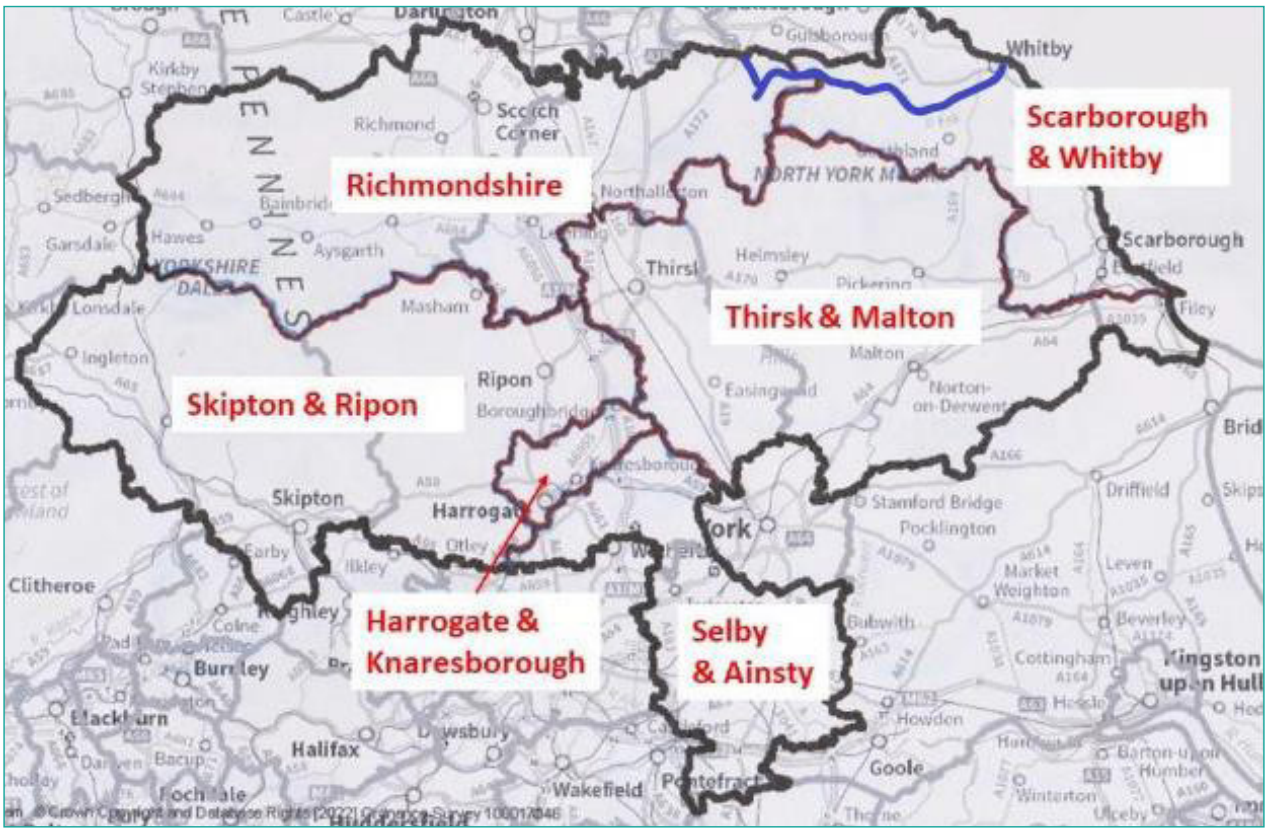

Figure 2: A map showing the six area committees of Yorkshire and the course of the River Esk Running through it, shown in blue. [Whitby Community Network]

The River Esk's ownership and regulation is shared among multiple stakeholders. The North Yorkshire Council oversees the river, which spans several area committees, primarily in Scarborough and Whitby. The mix of ownership and regulatory bodies means collaboration and co-ordination is often necessary for changes in policy.

CHAPTER 03

Policies

In an attempt to improve water quality, the Environment Agency (EA) has worked with local farmers to reduce agricultural runoff, one of the more problematic pollutants in the Esk. The fertilisers and manure spread over the fields would throw the nutrient balance off if they were to enter the river. The farm stewardship schemes promoted the creation of environmental barriers between fields and the river, known as buffer strips, to reduce both nutrient and sediment runoff.

Aquatic invertebrate surveys have shown positive population trends. An increase in these indicator species is a sign of improvement, but many of the significant pollutant events in the Esk are still a result of agricultural runoff, particularly after heavy rainfall.

As mentioned above, the River Esk is home to important fish species such as the Atlantic salmon *(Salmo salar)* and sea trout *(Salmo trutta)*. Both of these species are anadromous, meaning they migrate from salt to fresh bodies of water. The Environment Agency, in collaboration with the Esk Fishery Association, installed a fish pass at the Ruswarp Weir. Despite an increase in salmon numbers, Esk Fishery Association believes there is still much more that needs to be done to make the river more fish-friendly. The increase in salmon numbers could be due to a separate EA policy: the Salmon Action Plan – a monitoring and reintroduction effort for the Atlantic salmon to bolster the population numbers.

Attempts have been made to restore and improve the riparian (riverbank) habitats. This includes planting native trees and vegetation along the banks to stabilise them (reducing sediment runoff), reduce erosion, and provide habitat for wildlife. Efforts to remove invasive species, such as Japanese knotweed, have also taken place. Some areas, particularly in the upper course, can be difficult to reach, however. It is these areas that still need attention.

The Environment Agency has collaborated with local farmers to reduce agricultural runoff into the River Esk by promoting buffer strips, which help mitigate nutrient and sediment pollution. While aquatic invertebrate surveys indicate positive trends, significant pollutant events persist, particularly after heavy rainfall. Efforts to enhance riparian habitats, such as planting native vegetation and removing invasive species, are ongoing, but some challenging areas still require further attention to fully support important fish species like Atlantic salmon and sea trout.

CHAPTER 04

Combined Sewer Overflows & Water Quality Monitoring

Combined sewer overflows (CSOs) are designed to prevent sewage systems from becoming overwhelmed during heavy rainfall by allowing a mixture of rainwater and untreated sewage to overflow into rivers. While these systems are meant to be used only in exceptional circumstances, they sometimes discharge more frequently, particularly during periods of heavy or prolonged rain. When CSOs discharge into the River Esk, they can release pollutants, including human waste, chemicals, and pathogens, which reduces water quality and can harm aquatic life. This is particularly problematic during the salmon spawning season, as it can affect fish eggs and juvenile fish; as well as closer to the mouth, where many use the water for recreation and bathing. Increasing nutrient levels, particularly nitrogen and phosphorus, in the river can lead to eutrophication (excessive algae growth), which can deplete oxygen levels in the water.

The UK government's Storm Overflow Discharge Reduction Plan aims to reduce storm overflows by improving water quality and upgrading infrastructure. There are targets set for 2035 and 2050:

2035	Improve all storm overflows near bathing waters and 75% of overflows near high priority sites.
2050	Upgrade all remaining overflows, including coastal and estuary waters.

The Environment Agency is in charge of monitoring water quality in the River Esk and licensing and reporting incidents of sewage discharge. They carry out regular testing in designated bathing waters, looking for pollutants and contaminants, such as bacteria (*E. coli* and intestinal *Enterococci*), and issue advisories if water quality does not meet health guidelines. They are also responsible for enforcement action against companies who fail to meet required standards. The waters along Whitby sands are usual classified as 'excellent', however only 20 samples are taken per year (between May and September).

Map figures 4a, 4b and 4c show combined sewage releases for the last three years (2023, 2022 and 2021 respectively). It is difficult to pull actual values from the data, but the distribution is helpful to us too. The Esk's upper tributaries, shown on the west of the map, contain multiple large circles (larger circles means more consistent sewage release). As mentioned above, these areas can be the most difficult to survey and carry out preventative actions, due to their challenging environment and remoteness.

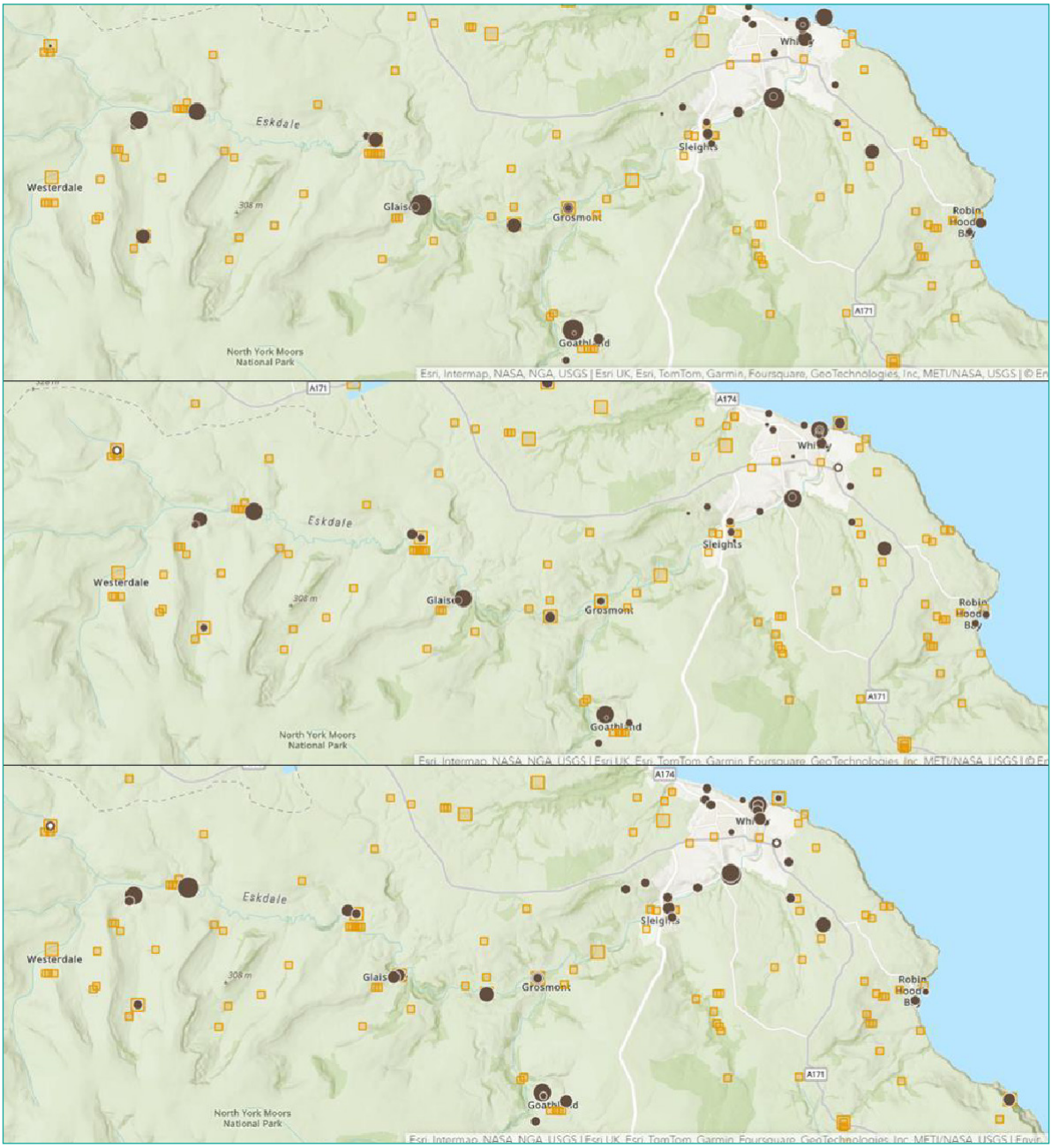

Figure 4a, 4b & 4c. Maps showing the distribution of combined sewage releases along the course of the River Esk over the last 3 years. [River's Trust]

CHAPTER 05

Reports and Projects

A. BEACH Esk

The BEACH Esk project (Better Estuaries and Coastal Habitats) was an initiative aimed at improving the health of the River Esk and its surrounding environment. The project focused on protecting the river's biodiversity, particularly endangered species like the freshwater pearl mussel and Atlantic salmon, while engaging local communities in conservation efforts. It was a collaboration between Yorkshire Wildlife Trust, Groundworks and the Environment Agency as well as local authorities, land owners and volunteers.

AVERAGE BANKSIDE VEGETATION OF 7 RIVER ESK TRIBUTATIES

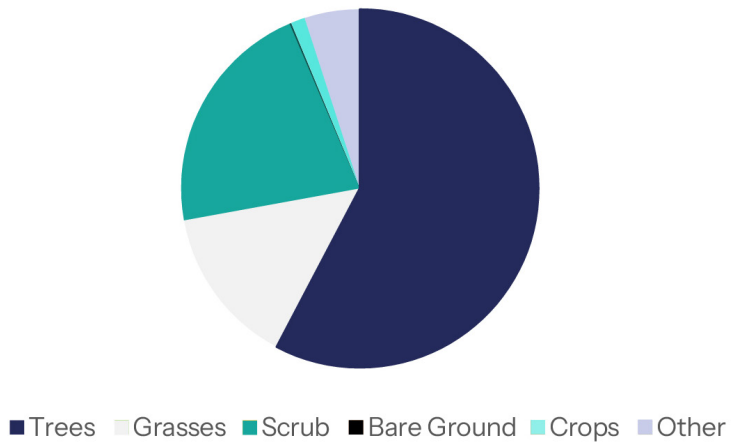

Figure 5 : A chart showing the average bankside vegetation across 7 tributaries of the River Esk.

AVERAGE RIVERBED MATERIAL OF 7 RIVER ESK TRIBUTARIES

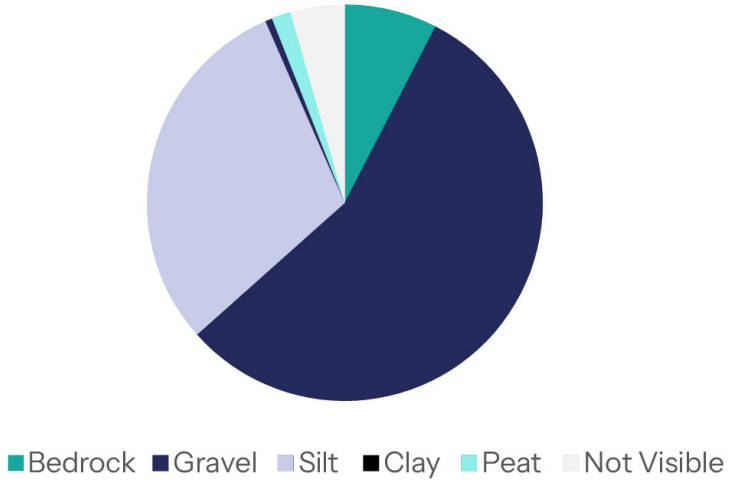

Figure 6: A chart showing the average riverbed material across 7 tributaries of the River Esk.

The project focussed on revitalising the River Esk throughout its course, taking a 'source-to-sea' approach to data collection. Before surveying in the upper course, land use had to be assessed as no previous data existed. Figures 5 and 6 show a summary of this data.

The lack of this data prior to the project emphasises the need to find sustainable and consistent monitoring methods for the difficult to reach, upstream tributaries.

One thing the project highlighted was the importance of collaboration. Not just between the organisations – sharing resources and expertise - but with local land owners and volunteers. The level of engagement between landowners and farmers was very positive, with active participation in the project. The project also relied heavily on voluntary man hours.

Though the initial BEACH project is now complete, new plans have been put forward to be carried out with the remaining, and new, funding. In the harder to reach upper course tributaries, probes will be used that test parameters regularly. This not only negates the issue of getting volunteers (especially with the majority being older) to those upper courses to carry out tests, but it also means that changes with the temporal data can be observed. The current water test kits give only a "snapshot" of the river in the moment the sample is collected.

There will also be a focus on citizen science. They hope to create a volunteer network of people who are available to help with projects local to them.

B. CaBA

The Catchment Based Approach (CaBA) – lead by The North York Moors National Park Trust and the North York Moors National Park Authority, is a framework for managing the water environment in a collaborative way. It aims to bring together stakeholders from various sectors, including government agencies, local communities, businesses, and environmental organisations, to work together improving and maintaining the health of river catchments. The framework is active across the country and has worked on the River Esk.

The aspects the catchment-based approach focuses on are:

Collaboration and Stakeholder Engagement - The CaBA encourages the involvement of stakeholders. This included: The Environment Agency, Esk Valley Farmers, Forestry England, Freshwater Biological Association, Natural England, Scarborough Borough Council, Yorkshire Esk Fisheries Group, Yorkshire Water and Yorkshire Wildlife Trust.

Catchment Partnerships - The River Esk is part of the Esk and Coastal Streams Catchment Partnership, which is a key element of the CaBA. This partnership includes organisations such as the North York Moors National Park Authority, the Environment Agency, Yorkshire Wildlife Trust, and others.

Integrated Management - The approach emphasises integrated management of land and water resources. This means considering how activities in the catchment area, such as agriculture, urban development, and recreation, affect the health of the river and its ecosystems.

Focus on Water Quality and Biodiversity - One of the primary goals of the CaBA in the River Esk catchment is to improve water quality and protect biodiversity. Including: reducing pollution from agricultural runoff, managing sewage discharge, and conserving habitats for species such as the endangered freshwater pearl mussel and migratory fish, like salmon and trout.

Community Involvement and Education - The CaBA promotes community involvement through volunteer programs, educational initiatives, and citizen science projects. Local residents can participate in activities like river monitoring, habitat restoration, and awareness campaigns.

Evidence-Based Decision Making - Data collection and monitoring are essential components of the CaBA. Information gathered through water quality tests, ecological surveys, and other methods helps inform management decisions and track the effectiveness of interventions.

Sustainable Land Management - The CaBA encourages sustainable land management practices to reduce pollution and improve the natural resilience of the catchment. This includes promoting best practices in agriculture, managing woodlands, and restoring wetlands.

Balancing interests in the River Esk catchment area requires ongoing dialogue, negotiation, and compromise among stakeholders. The Catchment Based Approach (CaBA) provides a structured framework for addressing these competing demands by promoting collaboration, encouraging sustainable practices, and integrating economic, social, and environmental considerations. Through careful planning and adaptive management, the CaBA aims to achieve outcomes that are beneficial for both people and the environment.

C. HIFI

The Hull International Fisheries Institute (HIFI) focused on sustainable fisheries management and the conservation of aquatic ecosystems. It addresses the challenges facing fish populations, including overfishing, habitat degradation, and climate change. The report emphasises the importance of collaboration among stakeholders, including government bodies, researchers, and industry representatives, to implement effective management strategies. It also highlights the need for continued research and monitoring to support the recovery of fish stocks and the health of aquatic environments.

The data collection used a technique called electrofishing. Electrofishing is a survey technique used to sample fish populations in freshwater environments. It involves the use of a portable electrical device that emits a low-voltage current into the water, temporarily stunning fish within a specific area. This allows researchers to capture and identify fish species easily.

The report compared the contemporary data, collected by North York Moors National Park volunteers, to historical data from the Environment Agency. This caused some difficulty when comparing data collected in different ways, with varying degrees of repetition and, therefore, accuracy.

The report showed a decline in native species, such as the Atlantic salmon – a trend apparent in most UK rivers. It highlighted the middle course of the Esk as the most abundant breeding ground for the salmon. Traditionally, this is true of the upper course and tributaries.

Though not directly focussed on water quality, the fish population numbers can be a good indicator of river health. The data can also inform 'hotspots' – areas that may need more regular observation, such as the Murk Esk – a lower major tributary of the Esk. It is an important spawning and nursery habitat.

Conclusion

A. Key Learnings

Though both the key learnings and next steps were limited from the original intention to engage a wider range of stakeholders, these points can be used to gather further feedback from interested parties and develop a fuller suite of feasible actions that all stakeholders can "get behind" and deliver on.

1. **Collaborative Efforts are Crucial:** Throughout various projects, including the BEACH Esk, CaBA, and HIFI initiatives, the importance of collaboration between multiple stakeholders such as local authorities, farmers, environmental groups, and the community has been consistently highlighted. Shared responsibility in managing the River Esk has proven essential to making meaningful improvements in water quality and biodiversity. However, limitations to these collective efforts have existed due to the physical, policy and conceptual boundaries of institutions.
2. **Water Quality Challenges:** Agricultural runoff and sewage discharge are the primary pollutants affecting the River Esk, particularly during heavy rainfall. Initiatives like farm stewardship schemes and the installation of buffer strips have shown some success, but further interventions are needed, particularly in remote and hard-to-reach areas of the river. Human and marine health is impacted, both by the presence of pollution and the restriction on water-based activities when pollution incidents that are known about occur. Testing related to potential impacts on human health is limited to one designated bathing water site (West beach) with no monitoring of the popular town beach at Tate Hill sands.
3. **Impact of Climate Change:** Increased rainfall and changing weather patterns exacerbate the challenges of water management, particularly in relation to runoff (from roads and agriculture) and combined sewage overflows. More extreme weather events are increasing pollutant loads in the river, threatening aquatic ecosystems and water quality.
4. **Innovative Monitoring is Effective:** Projects such as HIFI, which utilised high-frequency monitoring, provided real-time data that helped identify pollution hotspots and enabled more precise, data-driven interventions. Similarly, plans for the use of monitoring probes in the upper tributaries demonstrate the importance of leveraging technology to improve long- term water quality management. The variety, concentration, and frequency of pollution at present is not clear, with inconsistent and non-standardised testing where it is occurring in a limited way.
5. **A Truly 'Source to Sea' Approach is Required:** One gap in the research seems to be the direct effect that the Esk has on the North Sea beyond the harbour. BEACH Esk plans to carry out seabird surveys, and have created habitat in the estuary for nursery fish, but it is an aspect that needs more focus when looking at the Esk as a whole.
6. **Community Engagement is a Strong Asset:** Efforts to involve local residents, landowners, and volunteers have enhanced both the scope and success of conservation projects. For example, the BEACH Esk initiative showed how vital community involvement is, both for data collection and for fostering long-term stewardship of the river. Community initiatives to help local residents to understand human impacts on our water systems are limited, with little in the way of wider community involvement. However, the success of the BEACH project's River Esk Day in Whitby evidenced a high level of interest and potential to build on the community's care for its river.

B. Suggestions and Next Steps

STANDARDISED WATER TESTING

There are a variety of parameters that can indicate a river's health.

- Nutrients (mainly nitrogen and phosphorous)
- DO (Dissolved oxygen)
- Heavy metals
- Biological indicators (macroinvertebrate counts, fish counts)
- pH
- Microbial contamination
- Large debris – both organic (e.g. terrestrial driftwood) and inorganic (e.g. fishing gear)

Besides the Environment Agency, other private and voluntary groups, carry out water tests. Testing certain parameters that are relevant to that group and how they intend to use the river. This results in data gaps.

Upper tributaries can be difficult to reach. The lack of accessibility, paired with the fact that the upper course tends to be cleaner, means that testing in these areas is often neglected. The same is true for private land. This can lead to localised pollution events being missed.

Volunteer tests are likely to suffer from biases. Bad weather can influence when tests are carried out, with testers favouring nice weather to go out. This bias is also present in Environment Agency testing to some extent, as bathing waters are only tested at certain times of the year. Urban areas are also tested more frequently than rural areas, simply because more people live there. They are also considered areas of higher priority by regulatory bodies like the Environment Agency. Different parameters are also more difficult to test then others, leading to possible data errors and omissions.

All of the afore mentioned issues can lead to gaps in data. With multiple groups testing water quality, we put forward a standardised test kit and process. This would mean data can be used, wherever it is collected in the catchment area. The newly funded River Esk Connect (REConnect) should help with this. This initiative aims to build a network of volunteers trained in a variety of conservation activities, such as: wildlife surveys, invasive species control, river monitoring and hedge laying.

There are a wide variety of groups that use the Esk, particularly the estuary, that would benefit from regularly having the water tested. Committing to making Tate Hill Sands a designated bathing area will create a safe bathing and recreational environment for those who use it. These groups include:

- Boating and sailing groups (e.g., Whitby Yacht Club)
- Canoeing, kayaking, and small boat enthusiasts
- Anglers and fishing clubs
- Wild swimmers
- School, youth, and educational groups
- General tourists and visitors

This site has been used by residents and visitors for many years and seems neglected in terms of the need to ensure water that is not harmful to human health. Given its position as a protected area within the harbour walls (in contrast to the exposed west beach designated bathing waters), the use of this site year-round for safety requires further investigation in terms of pollutants.

INCREASE FOCUS ON POLLUTION HOTSPOTS

Targeted interventions in areas with higher pollution levels should be prioritised. This includes installing additional buffer strips, improving manure management practices, and addressing agricultural runoff in intensive farming regions. Protecting the Esk through sustainable management will ensure the ecological health and safeguard its commercial importance for future generations, and reduce pollution entering our seas from this source.

POLICIES FOR SEWAGE MANAGEMENT

To address the issue of frequent combined sewage overflows, it is critical that the Environment Agency work with water companies to ensure more robust infrastructure and enforcement of existing regulations. This is proposed at a governmental level with the Water (Special Measures) Bill.

ADAPT TO CLIMATE CHANGE

Climate resilience should be integrated into all future projects by incorporating adaptive measures, that reduce runoff and protect aquatic ecosystems from the increased frequency of storm events. Engagement with the newly formed NYC department can ensure that holistic planning (including developments in town and engagement with communities) protects current greenspace.

ENHANCE COMMUNITY ENGAGEMENT

Building on the success of citizen science initiatives like BEACH Esk, expanding volunteer networks and educational campaigns will ensure continued local involvement. Community engagement may focus on water quality monitoring and celebrating improvements. Annual events, educational workshops, and celebrations around milestones, such as achieving clean water standards, could foster a greater sense of ownership among residents. Community events such as The Regatta and Fish and Ships Festival (pictured below), could include educational and celebratory opportunities, encouraging active participation from all age groups. The ability to identify key actions to take forward can be informed by this report and key learnings. Critical to this is work within and across local groups and communities to build on, expand and agree actions that meet the needs of water users and the aquatic environment.

By integrating these actions and expanding successful collaborations, stakeholders can work together to ensure holistic and coherent plans that harmonise the efforts to continue restoration and sustainable management of the River Esk, protecting its ecological and commercial importance for future generations. The active role of the community, will be key in sustaining long-term river and coastal health, as well as better protecting both human and marine health.

Resource List

REPORTS AND PROJECTS:

- Better Estuaries & Coastal Habitats (BEACH Esk) – River Survey Report, Yorkshire Wildlife Trust (2022)
- River Esk and Coastal Streams Partnership - Catchment Based Approach (CaBA), North York Moors National Park Trust and North York Moors National Park Authority (2020-2022)
- Hull International Fisheries Institute, Hull University – North York Moors National Park - Rivers Rye and Esk Fish Monitoring (2021-2022)

FIGURES AND DATA

- Figure 1 & 2: uMap - https://umap.openstreetmap.fr/en/
- Figure 3: Whitby Community Network - https://www.whitbycommunitynetwork.org/local- governance/
- Figure 4a, 4b, 4c: River's Trust - https://theriverstrust.org/sewage-map
- Figure 5 & 6: BEACH Esk River Survey Report, Yorkshire Wildlife Trust (2021-2022)

OTHER USEFUL RESOURCES

- Whitby Naturalists' Records - https://www.whitbynaturalists.co.uk/index.php
- Groundwork - https://www.groundwork.org.uk/hubs/north-east-and- yorkshire/projects/revitalising-our-estuaries/
- Blue Corridors -North York Moors National Park - https://www.northyorkmoors.org.uk/nature-recovery/blue-corridors

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