REConnect: Research Evaluation Report 2025

Authors: Dr Jen Hall, Dr Sophie Brigstocke, Fran Mahon, Wenna Potter

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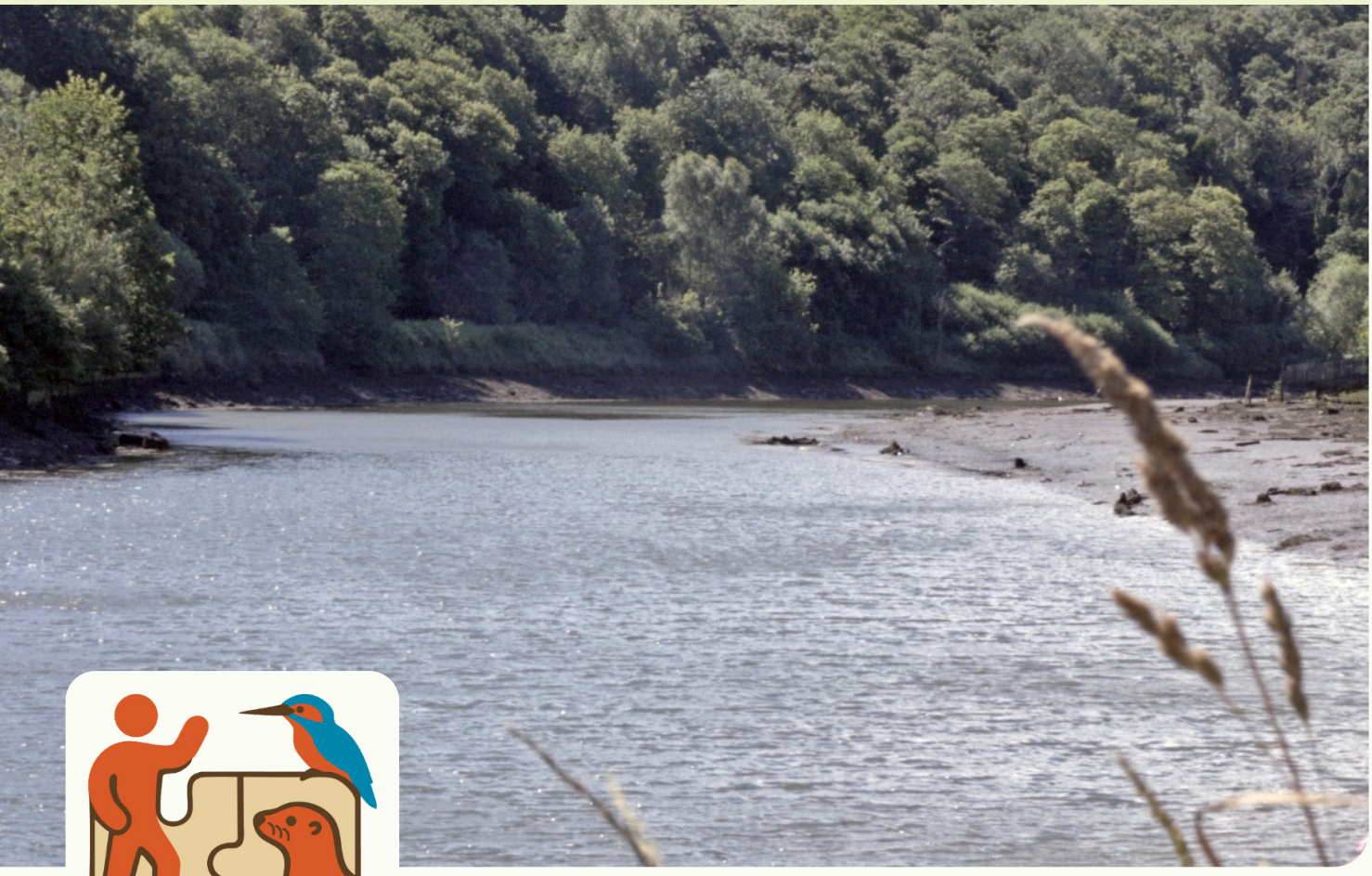

Figure 1 River Esk, Credit: Burns (2025)

REConnect

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Yorkshire Marine Nature Partnership

Yorkshire Wildlife Trust

Groundwork NE & Cumbria

North York Moors National Park

Whitby Scarborough & Ryedale DAG Disability Action Group

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Introduction and context

The River Esk Connect ('REConnect') project is funded by the National Lottery Community Fund and led by the North York Moors National Park Authority (NYMNPA), serving as the lead partner and accountable body, alongside five core partner organisations. What follows is a summary of the project aims and objectives, as articulated in the REConnect bid.

Core partners	Steering Group
North York Moors National Park Authority (NYMNPA)	Esk Valley Farmers
Groundwork North East & Cumbria	Egton Parish Council
Yorkshire Wildlife Trust	NYMNPA (Arts & Culture)
Yorkshire Marine Nature Partnership	NYMNPA (Outdoor Learning)
Whitby, Scarborough and Ryedale Disability Action Group (Whitby DAG)	NYMNPA (Regen Tourism)
York St. John University	NYMNPA (Youth Voice)
	North Yorkshire Libraries
	Goathland Nature Group
	Community Earth Project
	Sylvan Lore
	St. Peter's Centre (Staithes)
	Castleton & Glaisdale Primary Schools
	WHISH
	Whitby School
	Camphill Village Trust

Table 1 REConnect Delivery Partners, NYMNPA

Problem statement

According to the 2021 YouGov poll, 88% agreed that freshwater habitats are a "national treasure", 73% believed that having access to waterways for recreation is vital to them, and 72% expressed concern about how climate change and extreme weather are affecting our waters (up from 58% in 2015). The Esk and Coastal Streams Catchment (ECSC) is home to nationally significant and at-risk species, whose current decline suggests that populations could disappear from the Esk within our lifetime. REConnect aims to be a demonstration project to help stem this decline. To do so, REConnect seeks to raise people's awareness of climate change and the collective and individual actions they can take to support wildlife, improve water quality, and enhance the natural environment.

Geographical reach

Figure 2 River Esk Catchment, NYMPA

Figure 3 National Park Area, NYMPA

The ECSC encompasses 1,436 km^2, including 42km of coastline, and is internationally important as a habitat for a diverse range of species. The River Esk flows through 45km of the National Park and is the only river to flow from Yorkshire into the North Sea at Whitby (Figure 2).

The ECSC is adjacent to the major conurbations of Teesside and the coastal town of Whitby, which are encompassed within the broader project area (see Figure 3).

Stakeholders

The project engages with a broad range of stakeholders, including local communities that reside, work, and participate in leisure activities within the catchment, as well as visitors. One key group the partnership considers an 'influencer' are those with direct control over the river and its surrounding environment. In the first year, the research evaluation focused on community residents and influencers.

Integrating with local and regional plans

The following strategic plans and policies are foundational to ECSC and the delivery of REConnect.

- **Esk and Coastal Streams Catchment Partnership (ECSCP) –** One core objective is to 'REConnect people' with the river catchment.

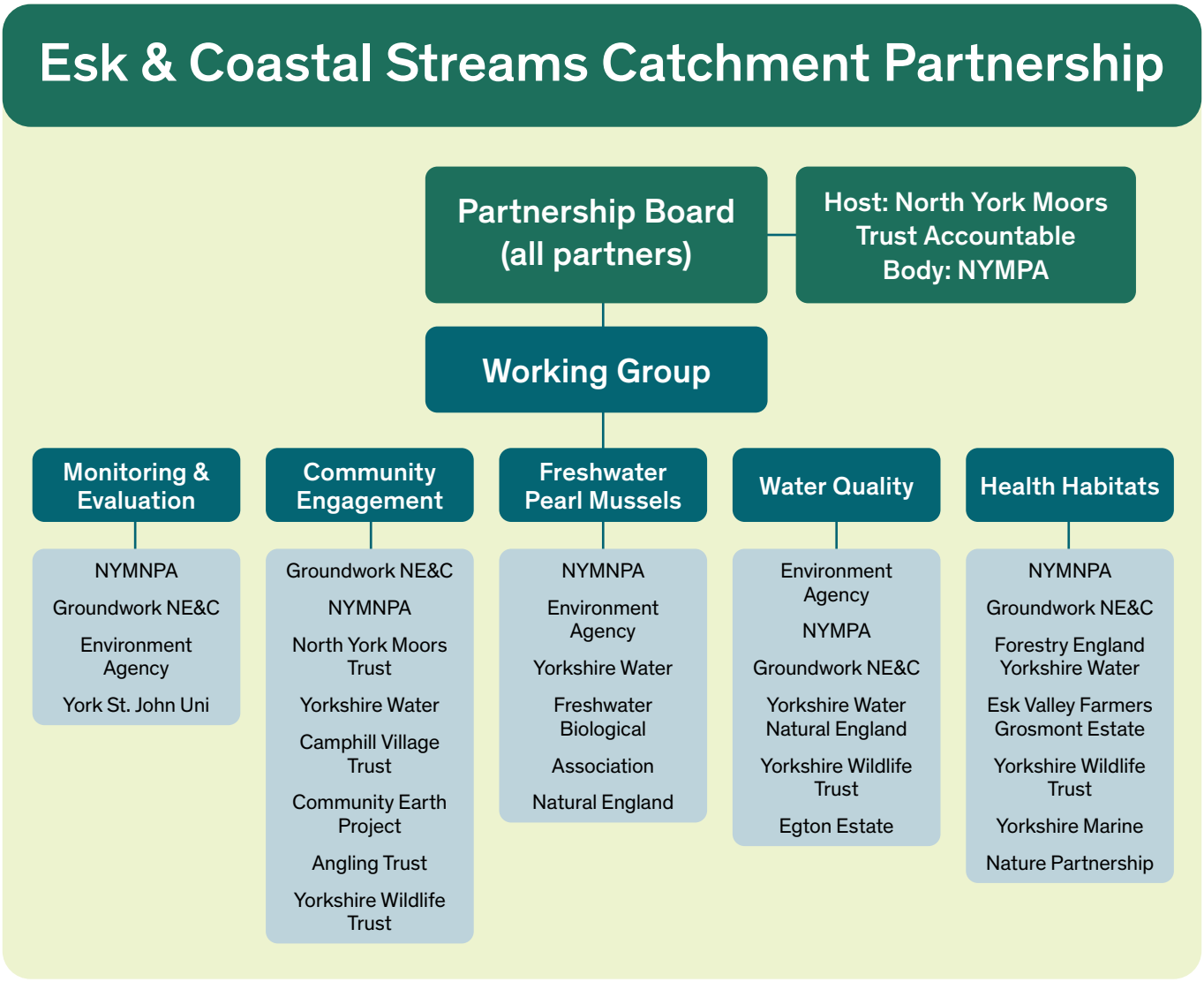

Figure 4 Esk and Coastal Streams Catchment Partnership (ECSCP).

- **North York Moors National Park Management Plan** - prioritises a 'resilient landscape at the forefront of addressing climate change and nature recovery' and for opportunities to be created which 'improve mental and physical health and well-being by connecting people with nature'
- **Natural England's** – Nature Recovery Network UN COP15 – protect 30% of the planet's land and water by 2030.
- **State of Nature Report 2023**
- **DEFRA's Environmental Improvement Plan**

What does REConnect aim to achieve?

REConnect utilises this biodiverse landscape to deliver the following objectives: 1) deepen people's connection to nature, 2) raise awareness of climate impacts, and 3) highlight the importance of river catchments. It offers a journey to engage with the landscape and turn awareness into action by completing tasks that 4) boost resilience and biodiversity and combat climate threats.

The partnership is delivering nature-based activities like citizen science, community engagement, outreach, advice, and joint science and art projects.

REConnect provides tools to engage, educate, inspire, empower, and mobilise generations, fostering awareness, action, and renewal along the Esk and Coastal Streams Catchment.

The approach is grounded in evidence that stronger nature connectedness fosters pro-environmental behaviour, particularly when emotionally and psychologically linked to the environment. ECSC is also the closest part of the national park to the UK's most deprived communities in Teesside. A central objective of REConnect is to connect urban and coastal communities with rural ones in the NYMNPA.

In summary, REConnect aims to inspire behavioural change through nature-based solutions, boost skills, and improve the health and well-being of all living entities in the National Park.

Transformative action

It is well documented that genuine sustainability stems from community-led nature recovery, where stakeholders decide what is important. The NYMPA's experience with the project 'Ryevitalise', a landscape-scale river restoration project for the River Rye, underscores the community's deep connection to the river and its surrounding landscape. Through landscape interventions, citizen science, events, and the arts, the project engaged people of all ages to foster understanding and appreciation, demonstrating that community engagement can lead to sustainable outcomes.

REConnect adopts a similar community-driven approach, linking the Moors and coastal landscapes through nature, encouraging behaviour change and attitude shifts to restore nature affected by human impact. It is helping communities build resilience to climate change. As part of a broader National Park Management Plan, REConnect will meet local stakeholder goals and integrate with other projects to enhance nature recovery on a greater scale.

The project aims to change behaviour in the catchment and serve as a national model for connecting diverse communities. It will educate visitors on the importance of connecting with nature, and act as a demonstration for other nature restoration initiatives.

What is being delivered

1. **Community Engagement and Outreach** [discovery action days, nature walks, species survey training, education sessions]
2. **Citizen Science/Stewardship** [monitoring, iNaturalist]
3. **Green Jobs – Volunteering and Traineeships** [100s of volunteers, River and Coastal Rangers, River Guardians, volunteer leaders, river ecology learning days, practical conservation, walk leaders, mental health training, first aid training, water and health safety]. The project aims to engage 4800 individuals over 5 years.
4. **Regenerative Tourism** [micro-volunteering, local tourism businesses "doing less harm" carbon reduction, biodiversity, vitality of communities]
5. **Traineeships** [young people and under-represented groups]
6. **Advice and Best Practice Campaigns** [farming communities for long-term restoration, regenerative farming methods, joint agreements and action plans]
7. **Science and Art** [art installations, interactive displays, with existing venues and festivals]
8. **Corporate Engagement** [Esk Valley Rail, Community Adoption scheme at stations, corporate volunteering]

How impact is evaluated: Researching behavioural change

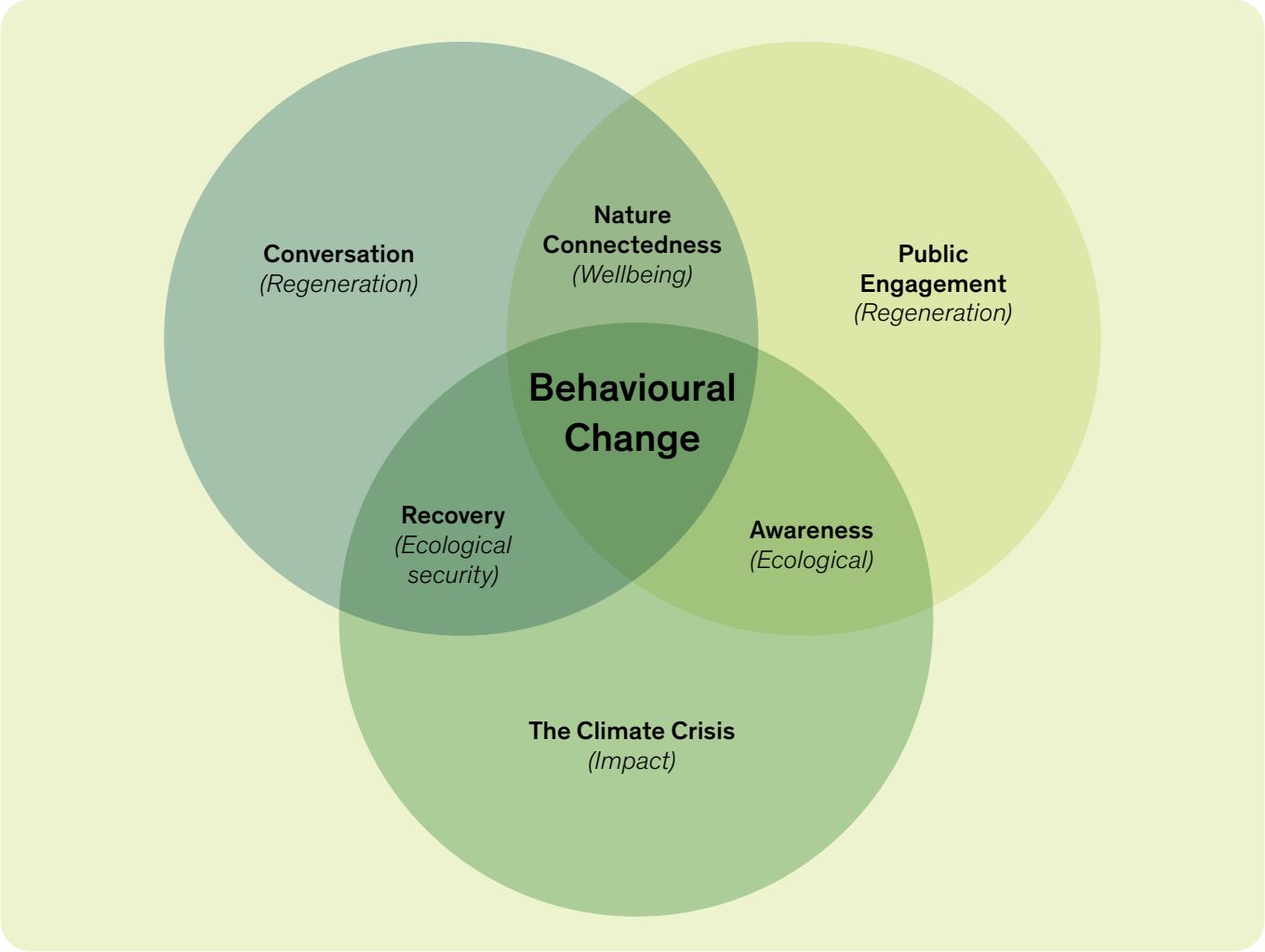

Figure 5 Behavioural Change Model, Hall, (2025)

By adopting critical evaluative tools, such as Richardson's 'Pathways to Nature', the evaluation team will explore how the partnership is delivering behavioural change, focusing on outcome 5:

Outcome 1: Climate Change Awareness
Outcome 2: Landscape Connectiveness
Outcome 3: Community and nature connectiveness
Outcome 4: Nature-based solutions
Outcome 5: Behavioural change
Outcome 6: Upskilling
Outcome 7: Health and Well-being

The research evaluation aims to understand how stakeholders connect to nature and if this leads to **pro-environmental behavioural change** through public engagement in the National Park.

The original definition of behavioural change articulated in the CAF bid set out a vision for REConnect:

"People will be equipped and supported to acquire pro-environmental behaviours, develop a sense of responsibility for their local environment, and take collective action to combat the impacts of the climate crisis. They will instinctively use these in everyday actions they undertake at home, even in the middle of the most urban of environments. They will share with their communities, demonstrating how to connect with nature on their doorstep, turning social action into a regular lifelong habit. They will make a positive difference in their communities and the natural environment for years to come."

The Community Action Fund's definition of behavioural change provides a broader vision:

"Engaged in climate action may include (but is not limited to) seeking changes in people's awareness, understanding, feeling hopeful that change is possible, new skills, or climate-positive behaviour change, decisions, or social norms."

The overall outcome will therefore be to engage diverse communities that are enthused and empowered to collectively lead on taking active responsibility and social action for the benefit of their local environment.

What follows is a review of relevant literature that grounds the research in scientific evidence, which supports the methodological approach and analysis of the findings.

Literature review

The World Health Organisation (2012) attributes human behaviour as a crucial determinant of the future of the planet and biodiversity. Understanding the relationship people have with the natural world is therefore critical to the restoration and conservation of nature (Restall et al., 2021). Exploring the bonds between humans, non-humans, and protected places can help to identify how mechanisms of engagement facilitate meaningful sensations of connectedness. These sensations are often bound with feeling good and functioning well (Pritchard et al., 2019).

Wilson (1984) identified an innate human need for contact with nature that has developed over millennia and described this as 'biophilia', or the value we assign to other organisms and ourselves. In conservation psychology, biophilia is defined as the experience of connecting with nature that elicits feelings of empathy, compassion, and love for the natural world (Kirkey, 2024). An increasing body of research has highlighted a positive link between nature connectedness and pathways to human and planetary well-being (Richardson et al., 2021). Nature connection is subjective and originates from the sensations individuals experience with nature (Liu et al., 2022; Schultz, 2002). Evoking sensations of biophilia has gained increasing influence on public policy, with environmental policy documents explicitly referencing nature-connectedness, for example, Natural England and DEFRA (Ives, 2017). Furthermore, enhanced well-being has been linked to connecting with nature and engaging in pro-environmental behaviours. Research by Redondo et al. (2022) has shown that nature connection can predict pro-environmental actions and promote regenerative behaviours or giving back more than we take away. Natural connection can also encourage people to adopt more environmentally conscious actions through sustainable consumption, citizen science, and recycling (Galvin, 2024)

The REConnect research evaluation is grounded in a body of literature on nature connectedness and is novel in this field of scholarship because it employs a longitudinal mixed-methods approach spanning five years in one National Park River Catchment.

Conservation and Nature Recovery UK

National Biodiversity and Nature Recovery Policies

The UK's conservation agenda is guided by the Environment Act (2021) and implemented through the Environmental Improvement Plan 2025, which aims to create or restore 250,000 hectares of habitat-rich wildlife and to advance the commitment to protect 30% of UK land and seas for nature by 2030. The strategic plan is guided by the Nature Recovery Network (NRN), which aims to address three key challenges: biodiversity loss, climate change, and public health and well-being. These frameworks incorporate the 25-Year Environment Plan, focusing on biodiversity net gain, species recovery, and habitat connectivity (DEFRA, 2025). The Environmental Improvement Plan has driven the development of local nature recovery strategies, which strengthen the biodiversity duty on public bodies in the Natural Environment and Rural Communities Act (Natural England, 2024).

In response to the National Environmental Improvement Plan, each region has been tasked with creating a local nature recovery strategy (LNRS). In Yorkshire and North Yorkshire, the LNRS aims to reverse the decline in nature. For example, in Yorkshire, 25% of species have declined over the last 30 years, with 800 species considered endangered or vulnerable to extinction, including the adder, curlew, European eel, water vole, and burnt orchid. Only 15% of Sites of Special Scientific Interest (SSSI) are in 'favourable' condition, with 71% assessed

as 'unfavourable – recovering'. Less than 20% of rivers in North Yorkshire and York are deemed to have good ecological status, with the River Esk among them. One of the LNRS core principles is to *'connect people to nature by helping people become more aware of it, our responsibility to it and the health and wellbeing benefits it can provide'*. This provides the strategic remit for the REConnect project.

Marine Conservation and Blue Spaces

The River Esk is the only river to meet the North Sea in Yorkshire. The marine environment, therefore, plays a key role in the engagement remit for REConnect. The UK's *Marine Strategy Part Three* (DEFRA, 2025; DEFRA 2023) outlines the restoration of marine ecosystems and the designation of Highly Protected Marine Areas (HPMA), ensuring sustainable fisheries and carbon sequestration in coastal habitats. Coastal rivers, like the River Esk, are important ecological features and actors within their environments, connecting coastal habitats and ecologies to inland ecosystems and species. Source-to-sea conservation, protection, and management of coastal rivers like the Esk are tantamount to ensuring a healthier ecosystem for both human and non-human inhabitants of the region (Noble et al., 2014).

Framed by the term 'blue spaces', public engagement with coastal river systems has been shown to promote physical activity and mental wellbeing among communities around them and among visitors (Georgiou et al., 2021; Olive & Wheaton, 2020; Ebi & Bowen, 2023). Through a systemic approach to current policy on blue spaces, Leese and Al-Zubaidi (2023) argue that, in the UK, public demand for access to natural river and coastal systems has accelerated over the past five years, due partly to the COVID-19 pandemic. This access, they argue, has the potential to improve physical and mental well-being, mitigate disease, and combat climate change by prioritising biodiversity (Leese and Al-Zubaidi, 2023).

Likewise, reflected in the literature surrounding marine conservation and blue spaces is the idea of 'hydrophilicity' or our human affinity for bodies of water (Zhang et.al., 2025). Like Kirkey's (2024) definition of biophilia, hydrophilicity is associated with nature-connectedness and our relationships towards rivers, lakes, and oceans. Britton et al., (2020), alongside Stehl et.al. (2024), Afentou et.al. (2024), and Gawrych and Romaniuk (2025) have all found that human relationships with rivers and lakes have produced higher levels of wellbeing and, notably for the REConnect project, increased social connectedness between individuals and groups who swim, walk, surf, or run within blue spaces. Activity on and between rivers, and the people who interact with them, have been shown to bring communities together and strengthen a sense of local identity among regular 'users' of blue spaces (Afentou et al., 2024). One method of blue space community inclusion and social connectedness has been through freshwater citizen science projects.

Freshwater Citizen Science in the UK

Over the last ten years, citizen science has become increasingly popular for managing natural environments, fostering social connectedness among local communities, and expanding biodiversity across multiple regions. Although debates persist over who and what define a citizen science project, most broad definitions centre on a group of local volunteers coming together to collect scientific data, often about their local environment and typically tied to environmental policy (Vohland et al., 2021). Significantly, citizen science 'adds value to many scientific activities and links epistemic outputs with societal values...ranging from personal growth and learning to social innovation and policy impact' (Vohland et al., 2021, p.10).

Citizen science programmes and projects in the UK, particularly those related to marine and riparian habitats, are most often concerned with the health of rivers and riparian ecosystems. These programmes can focus specifically on managerial relationships between local communities, councils, and water companies (Benson et al., 2013) to understand the complex, entangled social networks of human actors within a catchment area (Ball et al., 2022).

Scholarship on freshwater, UK-based citizen science projects typically examine the impact, effectiveness, and success rates of different programmes on the health and well-being of surrounding human populations and their rivers. These studies, such as Benson et. al. (2013), Cook, Benson, and Couldrick (2016), Gurnell et al. (2019), Ball et al. (2022), and Collins et al. (2023), establish several different frameworks and structures to research and analyse the effects of citizen science on policy, natural environments, and community identity. For most, the focus is on developing and implementing research surveys at the project scale.

Gurnell et al. (2019, p. 137), for instance, analysed the implementation of the Modular River Survey throughout citizen science programmes in southern and eastern England, finding that the survey, 'provides an example of a new generation of citizen science tools, which supports integrated, multi-scale [environmental] monitoring to ensure that citizen science endeavours deliver maximum value'. Likewise, Ball et al. (2022) found that implementing a short survey and mapping activity in their analysis of English chalk stream citizen science programmes,

enabled them to identify key players in the management and policing of natural environments, ranging from the Environment Agency to local actors and residents.

Most of these studies find that there are several ways to research and analyse public engagement with citizen science programmes. Importantly, successful programmes typically respond to the local environment and values of catchment residents and managers (Collins et. al., 2023). Successful examples exemplify nature connectedness and hydrophilic research that is concerned with local access, use, and connections people have with their neighbouring or community blue spaces.

The climate crisis and national parks

UK National Parks are vital to the nation's response to climate change, aligning with the Climate Change Act 2008 and the third National Adaptation Programme (NAP3) to safeguard the natural environment. The National Parks England Climate Action Programme outlines a collective plan to reach net zero, wherever feasible, by 2030. Key priorities include peatland restoration, renewable energy adoption, habitat resilience, and sustainable visitor management (National Parks England, n.d.). One key approach is to raise awareness and understanding of the impacts of climate change, a goal shared by the REConnect project.

NYMNPA has adopted a comprehensive Management Plan (2022–2027) with a vision to 'be a resilient landscape at the forefront of addressing climate change and nature recovery' by 2040. Key outcomes include,

1) supporting a resilient landscape at the forefront of addressing climate change and nature recovery;
2) A nature-rich, more biodiverse landscape;
3) A landscape rich in heritage and highly valued for its sense of remoteness and tranquillity;
4) A place that lifts the nation's health and well-being;
5) A place that supports a diverse and innovative low-carbon economy;
6) A place of great beauty where local communities thrive.

In January 2024, the Government announced that National Park Management plans were required to incorporate ten standard targets and indicators for environmental improvements and access. NYMPA were locally apportioned three targets:

Target 1 - Restore or create more than 250,000 hectares of a range of wildlife-rich habitats within Protected Landscapes, outside protected sites by 2042 (from a 2022 baseline).

Target 7 - Restore approximately 130,000 hectares of peat in Protected Landscapes by 2050.

Target 8 - Increase tree canopy and woodland cover (combined) by 3% of total land area in Protected Landscapes by 2050 (from 2022 baseline).

However, NYMNPA appreciate that achieving these targets and its management plan conservation goals is a behavioural challenge, that requires a behaviourally informed approach (Park and Reiner, 2019). The scale of the challenge to engage stakeholders in delivering the plan is illustrated by research showing that the UK populations connection to nature has declined significantly since the 1950s (Kesebir and Kesebir, 2017). In 2017, the Wildlife Trust reported that 70% of adults in their study felt they had "lost touch with nature," and 37% of parents possessed little knowledge and were unable to teach their children about it. The National Trust (2020) conducted a survey that found that 80% of respondents seldom watched or listened to birds or smelled flowers. Being disconnected from nature has become normalised alongside the acceptance of degraded environments (Richardson et al., 2021).

Scholars have argued that we have reached a critical point at which the anthropogenic climate crisis threatens the functioning of ecological systems, and that (ecological) justice is deeply connected to the condition of our nonhuman world (Schlosberg, 2014). Notably, Schlosberg (2014) suggests that the ethics and practice of justice should go beyond human-centred ideas, to include nonhuman animals and ecosystems and supports broadening receptivity from animal ethics to animal and ecological politics. Early pioneering scholars such as Nussbaum (2006) moved away from anthropocentric theories of justice by calling 'to secure a dignified life for many different kinds of beings' (Nussbaum, 2006, p. 350), arguing that all nonhuman beings should have the opportunity to flourish with dignity according to their species.

Nussbaum (2006) asserted that living in harmony with nature is essential for a meaningful life. Furthermore, scholars have called for a new relationship with nature involving tuning in and observing, which could help sustain and restore the environment we still have (Richardson et al., 2021). The link between experiencing nature connectedness and well-being has been demonstrated as critical for building supportive value systems that lead to pro-environmental behaviour change.

Well-being and nature connection

The World Health Organisation (WHO) defines well-being as encompassing a 'quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose' (World Health Organisation, n.d.). One key aspect of well-being is the relationship between humans and nature; those who maintain a connection to nature tend to experience greater well-being (Lui et al., 2022; Pritchard et al., 2020). The Geneva Charter for Wellbeing (WHO, 2021) states that "a healthy planet is essential for the health and well-being of future generations".

The relationship between humans and nature impacts well-being and happiness, with a strong link between connection to nature and overall happiness. (Mayer et al., 2009; Howell et al., 2011; Capaldi et al., 2014; Nisbet and Zelenski, 2012; Cleary et al., 2017; Liu et al., 2022). Richardson et al., (2021) research on the psychological/ emotional bond people experience in nature, identified five related factors that promote engagement with nature: (1) nature connectedness, (2) time spent in nature, (3) engagement with nature through everyday activities, (4) indirect engagement with nature, and (5) knowledge and study of nature. However, Richardson et al. (2021) concluded that time in nature does not necessarily imply a close connection to nature or heightened feelings of well-being; what matters, however, is how that time is spent. Simple engagement activities, such as smelling flowers or listening to bird song, play a significant role in building a closer connection to nature (Richardson et al., 2021).

Significantly, the research emphasises the importance of feelings of well-being, achieved through nature connectedness programmes, for fostering meaningful relationships that promote pro-environmental behaviour. The practical and policy implications of this research suggest creating engagement spaces beyond 'remote' protected landscapes to foster meaningful connections to everyday nature, for example initiatives related to domestic gardening and the establishment of urban greenways between schools, shopping areas, and verges (Richardson et al., 2021).

Restall et al. (2021) noted that urban sites can generate a sense of connectedness to nature and advocated the use of protected landscape approaches that contextualise daily life. Investing in transferring knowledge and conservation practices from protected areas to urban spaces that influence urban planning and design is a route to promoting the greening of urban environments, which encourages engagement in protecting and restoring nature (Richardson et al., 2021). Urban greening projects, such as *London's Urban Forest Plan* and *Greater Manchester's Nature Recovery Strategy*, emphasise pollinator pathways, green corridors, and citizen engagement (Green Infrastructure Partnership, 2024). Community engagement programmes like REConnect provide a conduit to foster everyday nature-connectedness that visitors, residents and those living adjacent to the national park can action in support of a holistic approach to conserving NYMPA.

Nature connectedness and pro-environmental behaviours

Mayer and Frantz (2004) found a positive link between sustained nature connection and pro-environmental actions. Activism and political efforts to address the climate crisis also promote pro-environmental behaviour (Mackay et al., 2021). Participating in climate activism shapes a political identity rooted in environmental concerns and a sense of caring for nature. When individuals share an environmental identity that politicises environmental issues, they see themselves as part of a political movement aimed at protecting the environment (Mackay et al., 2021). For example, Burke and Running (2019) have demonstrated how farmers' collective identity influences attitudes and behaviours, including the adoption of conservation practices on their land, such as soil- and water-related practices, and how they see themselves as environmental stewards.

Developing biophilic feelings of love, passion, intimacy and commitment to nature have been shown to build positive relationships to sustainable consumption (Lui et al., 2022). The diagram below shows the relationships between nature connection, nature contact, wellbeing, and pro-environmental behaviour.

Research in the UK by Martin et al. (2020) demonstrated that the positive association between nature connection, wellbeing, and pro-environmental behaviours persisted after the experience. Moreover, it has been shown that connectedness to nature directly influences pro-environmental behaviours through place attachment and values that visitors develop during nature-based events (Zhang et al., 2023).

Conceptually, nature connection has been explored as a potential mechanism for enhancing nature's positive influence on mental well-being, with nature connection, or nature-relatedness, described as 'related but distinct' (Capaldi et al., 2015). Nature connection is not a simple construct (Hague et al., 2024), but multidimensional, and defined by an individual's 'emotional bond with nature' (Richardson, 2023). Despite this complexity, the multidimensional properties of nature connectedness have been extensively researched. For example, Mayer and Frantz (2004) developed the Connectedness to Nature Scale (CNS) to gauge how people feel 'connected to the natural world'. Subsequently, a burgeoning body of research has developed questionnaires and measures, such as the NR-6 (Nisbet and Zelenski, 2013), the NCI (Natural England, 2017), and the NEQ (Hague et al., 2024; Tiscareno-Osorno et al., 2023). Such studies have provided a foundation for developing a definition of nature connectedness, a set of measures and an overall framework for the REConnect project.

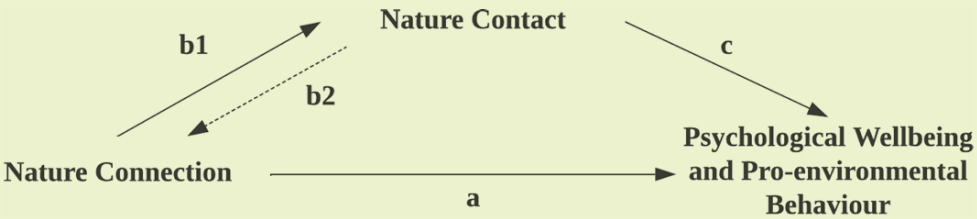

Fig. 1. Relationships between nature connection, nature contact and wellbeing and pro-environmental behaviour. Note: Pathway a shows the direct effect (not through nature contact) of nature connection on wellbeing and pro-environmental behaviour. Pathway b1 shows the impact of nature connection on nature contact. Pathway c shows the impact of nature contact on wellbeing and pro-environmental behaviour. Pathways b1 and c show the research hypothesis that nature contact mediates the impact of nature connection on wellbeing and pro-environmental behaviour. Pathway b2 shows the potential influence of nature contact on nature connection.

Figure 6 Relationship Between Nature Connection, nature contact and well-being and pro-environmental behaviour, (Lui et al. 2022).

Nature connectedness research and public engagement

Access to green space and time in nature benefits mental and physical health in many ways (Richardson et al., 2021). However, these benefits are not universally experienced and vary across populations due to cultural, ethnic, socioeconomic, and age differences (Hartig et al., 2014). Globally, access to urban green space varies in both amount and quality, with those in socioeconomically deprived areas tending to have less access to green spaces (Ngan et al., 2025). Living in the most deprived areas of England more than doubles the risk of significant illness compared to the least deprived areas (Raymond et al., 2024). This highlights health inequality as an urgent global public health issue, with England being no exception.

Contact with nature and green spaces benefits different groups, especially in deprived areas. For example, a 1% increase in grassland can reduce preventable deaths by 37% (Ngan et al., 2025). Rigolon et al. (2021) found disadvantaged groups benefit more from green spaces, with parks providing greater physical health benefits to those from economically deprived backgrounds and ethnic minorities, particularly in urban areas (Browning et al., 2022).

Scholars such as Pritchard et al. (2025) claim that green spaces can have an 'equigenic' effect, defined as breaking the link between socioeconomic inequalities and health disparities. Access to green space, therefore, is a matter of social justice. This is especially relevant for communities in and adjacent to NYMNPA, where the REConnect project is ongoing. This is important considering a general decline in overall wellbeing and self-rated health across the country; with Yorkshire and the Humber having experienced a statistically significant drop in life satisfaction (ONS, 2023).

Nature connectedness and access to protected areas

It is evident that access to green space plays a significant role in who benefits from, and who does not benefit from, contact with nature. This question of access extends to national parks and protected landscapes within the UK.

DEFRA's 2019 'Landscapes Review' found that lower socio-economic groups, people from deprived areas, and ethnic minorities are least likely to visit protected landscapes (Glover, 2019). Barriers to access included a lack of awareness, knowledge, transport, cultural understanding, and a lack of asense of belonging (National Centre for Social Research, 2024). Issues related to safety and discrimination against marginalised groups were also highlighted as serious barriers, evidenced by less than 1% of visitors to England's countryside being from non-white backgrounds (CPRE, 2021).

Public authorities, including national parks, are working to improve access, as shown in 'The Great National Parks Plan', which links access and health (National Parks England, 2024). The 'Landscapes for Everyone' project also aims to develop programmes for underrepresented park users through collaboration with partners, including National Parks England (2025). REConnect is strategically placed to implement outreach that offers opportunities to marginalised communities.

Conclusion

The literature reviewed highlights the essential role of human–nature connectedness in addressing biodiversity loss and climate change. Research consistently shows that fostering emotional and psychological bonds with nature through concepts such as biophilia and nature connectedness can lead to pro-environmental behaviours and improved well-being (Wilson, 1984; Richardson et al., 2021). These findings provide a strong theoretical foundation for the REConnect project, which seeks to apply these principles within ECSC.

Evidence from conservation psychology and environmental behaviour studies demonstrates that nature connection is not simply about time spent outdoors but about meaningful engagement that evokes empathy, compassion, and responsibility toward the natural world (Lumber et al., 2017; Mayer & Frantz, 2004). Everyday activities such as listening to birdsong or smelling flowers have been shown to strengthen these bonds, which in turn predict sustainable behaviours such as recycling, regenerative consumption, and participation in citizen science initiatives (Redondo et al., 2022; Galvin, 2024). Importantly, these behaviours persist beyond the initial experience, suggesting long-term benefits for both individuals and ecosystems (Martin et al., 2020).

The literature also situates nature connectedness within broader frameworks of social justice and health equity. Access to green spaces is unevenly distributed, with socioeconomically deprived communities facing significant barriers (Glover, 2019; CPRE, 2021). Studies reveal that these groups derive disproportionate health benefits from contact with nature, reinforcing the need for inclusive programmes like REConnect that bridge rural, urban, and coastal communities (Rigolon et al., 2021; Browning et al., 2022). By addressing these disparities, the project aligns with national strategies such as the Environmental Improvement Plan and Local Nature Recovery Strategies, which highlight connecting people to nature as a pathway to resilience and well-being (DEFRA, 2025; Natural England, 2024).

Furthermore, the review identifies the multidimensional nature of connectedness, encompassing emotional, cognitive, and behavioural components. Instruments such as the Connectedness to Nature Scale and Nature Relatedness Scale provide robust measures for evaluating these dimensions (Mayer & Frantz, 2004; Nisbet and Zelenski, 2013), offering valuable tools for REConnect's longitudinal assessment of behavioural change. The integration of arts, citizen science, and community-led initiatives reflects best practice in fostering engagement and sustaining pro-environmental norms.

In summary, the literature affirms that enhancing nature connectedness is a powerful lever for behavioural change, ecological restoration, and human well-being. By embedding these insights into its design, REConnect is well-positioned to deliver transformative outcomes that extend beyond RECSC, serving as a model for nature recovery and climate resilience across protected landscapes and beyond.

Methodology: developing a behavioural change evaluation framework

York St John University have been commissioned for five years to provide a 'story of change' through evaluative research that will explore the impact of REConnect on stakeholder behaviours. Drawing on a growing body of research, such as Lumber, Richardson & Sheffield's (2017) *Pathways to Nature Connectedness*, a longitudinal, mixed-methods, study will investigate how visitors and residents in protected areas experience leisure-based engagement programmes aimed at conserving and protecting biodiversity. The study will explore how nature connectedness leads to behavioural change, as defined by the project partners. The evaluative study examines how REConnect contributes to social well-being and perceptions of environmental health through public engagement and citizen science programmes.

The aim is to explore how public engagement in nature-based activities and conservation can lead to behavioural change in ECSC.

The findings and analysis from this research will inform policy for sustaining public engagement in conservation within protected zones.

The objectives are to:

- Research how public engagement impacts the behaviour of residents and visitors, and the types of conservation activities they engage in.
- Evaluate why research participants engage in conservation activities and how this contributes to their leisure, values and well-being and leads to positive outcomes for the environment.

In March 2025, the REConnect project was launched. The delivery initially began with two partners, Groundwork Northeast and NYMNPA late spring 2025. The project was officially launched in Whitby, North Yorkshire, on 28th June 2025, which included the launch of the evaluation research data collection. YWT and YNMP faced recruitment challenges, with YNMP initiating recruitment for a project officer position in the Autumn of 2025. Despite this uneven start, the project has since delivered a significant programme of public engagement activities and consultation.

Qualitative methodology

Traditionally, ethnography involves extensive fieldwork, using methods such as participant observation, interviews, co-production, and visual techniques such as film and photography (Howes, 2005). Contemporary ethnography emphasises experiential, co-created, and reflexive approaches, providing both theory and practice insights (Pink, 2009). This entails immersive engagement in daily life and the capture of detailed sensory data (Ingold, 2000). Reflexive analysis considers social, political, environmental, and historical factors to deepen understanding of human-environment interactions (Ingold & Vergunst, 2008).

In the context of REConnect, an ethnographic methodology offered an opportunity to capture in-depth, rich experiential and sensory data. Ethnographic pilot field research conducted in the summer of 2025 used visual methods, walking interviews, participant observation and film data capture, using a professional filmmaker and GoPro Hero9 body-mounted cameras, along with semi-structured interviews. One objective is to capture fifty resident case studies over five years. The sample will be drawn from individuals engaged in public engagement activities and will concentrate on those living within the catchment, [75%] and [25%] from areas of social deprivation adjacent to NYMNPA.

To evaluate progress so far and to challenge the assumptions made within the original bid, the core delivery partners participated in a Theory of Change workshop to review and refine the evaluative framework going forward.

Qualitative data collection: year one

During the first year, YSJU conducted:

- Attended five public engagement workshops: 1 x school workshop (22 participants), 1 x beach clean (5 participants), 1x ecological river walk (10 participants), 1x children crafting workshop (12 participants), and Egton Parish Meeting (25 participants), involving a total of 74 participants.
- Conducted 7 semi-structured interviews with residents/influencers between 60 - 90 minutes
- Designed and conducted 3 x group professionally filmed walking interviews involving 19 residents and visitors (Whitby, Grosmont and Westerdale).
- Conducted 6 x semi-structured interviews with core partners (3 recorded)
- Conducted a core partner research evaluation workshop to co-create a behavioural change methodological framework, core themes and quantitative measures.

The following table represents a sample of those we interviewed both individually and whilst participating in workshops led by delivery partners, and those we conducted as a research team. Not all participants are represented in the table.

Table 2 Research Participants Roles, Hall, (2026)

Pseudonymised code	Participant role
RPD1	Resident
RPD2	Resident
RPD3	Resident
RPD4	Resident
RPD5	Resident
RPD6	Resident
RPD7	Resident
RPD8	Resident
RPD9	Resident
RPD10	Resident
RPD11	Resident
RPD12	Resident
RPD13	Resident

Pseudonymised code	Participant role
RPD14	Resident
RPD15	Resident
RPD16	Resident
RPD17	Resident
RPD18	Resident
RPD19	Resident
RPD20	Resident
PTN1	Project partner
PTN2	Project partner
PTN3	Project partner
PTN4	Project partner
PTN5	Project partner
PTN6	Project partner

Qualitative pilot data collection

Interview participants were self-identified individuals with existing ties to the Esk and Coastal Streams Catchment who engaged in recreational, conservation, or outreach activities, with often multiple points of engagement. Some had formal links to the River Esk and Coastal Streams through voluntary or paid roles with the NYMPA volunteer rangers, Whitby Esk Energy, or East Barnby Outdoor Education Centre. Others were interviewed as members of the Esk communities and interested stakeholders in their local area. These interviews aimed to explore experiences of the River Esk. The research objectives were:

- To identify what aspects of the River Esk and its coastal streams are valued.
- To explore what awareness stakeholders have of the climate crisis and its impact on the river catchment.
- To explore how stakeholders engage with the river catchment
- To explore how engagement with nature impacts awareness, action and fosters pro-environmental behaviours
- To understand perceptions of the current and future for biodiversity restoration
- To identify barriers to engagement and nature connection

Interviews were carried out in various settings. Three film research group walks, which included a section of the River Esk, were organised by YSJU and used as opportunities for walking interviews; audio and video recordings were made for each. Five workshop activities led by the partners provided a chance to meet participants involved in Spring and Summer 2025. Seven semi-structured interviews were recorded with some participants who could not attend a walk but wished to contribute to the project, including on-site visits to East Barnby Outdoor Education Centre and Whitby Esk Energy. The different interview methods enabled the capture of a range of voices, as interviews were held on both weekdays and weekends and scheduled to accommodate individual needs when necessary.

Interview transcripts were analysed using Braun and Clark's (2006) thematic analysis, which offers a flexible yet structured approach to qualitative data analysis. Braun and Clark (2006) describe six steps for conducting thematic analysis.

1. *Familiarising yourself with the data*
2. *Generating initial codes*
3. *Searching for themes*
4. *Reviewing themes*
5. *Defining and naming themes*
6. *Producing the report*

Familiarity with the data was gained through the conduction, transcription, and review of the semi-structured interviews, with initial coding ideas reviewed by the research team. Interview transcripts were uploaded into NVivo 15, and the data was coded and analysed. The codes were then examined to identify central themes, and assessed in relation to the complete interview data set.

Reviewing and refining the methodology

Whilst the research team applied nature connectedness theory, a theoretical framework and methodological approach were required to analyse the impact of REConnect. To achieve this, a core delivery partner workshop involving NYMNPA, YWT, YNMP and GNEC was convened on 26 November 2025. This workshop established the thematic framework for methodological design and analysis.

The first part of the partner workshop aimed to review and co-evaluate the original bid definition of behavioural change, revise it, and to create a set of behavioural change themes that would overarch the mixed-methods approach to establish a baseline for the research evaluation (results discussed below).

The workshop also aimed to establish quantitative measures for application through a stakeholder survey; 55 measures were selected to create a bespoke REConnect Pro-environmental Behaviour Scale. It is intended that evaluative research will include a sample of between 100 - 200 residents and visitors (18 to 100 years) per year.

Delivery partner behavioural change workshop

The delivery partners challenged the assumptions made in the original bid and therefore established a set of shared partnership goals (Appendix 1), a revised definition of behavioural change and overarching themes in the context of ECSC, and a set of quantitative behavioural change measures (Appendix 2).

During the workshop, the partners examined the Logic Models developed by the Evidence-Based Practice Unit (UCL, 2026). The purpose was to clarify thinking on the mechanisms of change that connect the various activities carried out by different partners in the REConnect project. The second part of the workshop involved reviewing the research evaluation strategy to assess the project's efficacy over its five-year period. Finally, the partners evaluated the original definition of behavioural change and suggested an amendment to broaden the remit to encompass **'the journey to behavioural change'.**

Logic models – mechanisms of change

Logic models are visual, theory-driven frameworks used to represent how a programme, intervention, or service is expected to work by mapping relationships among resources, activities, mechanisms, and outcomes. They make explicit the "theory of change" underlying an intervention, which are the causal assumptions linking what is done to what is achieved (De Silva et al., 2014; Doick and Wilson, 2015). Logic models developed by the Evidence-Based Practice Unit (UCL, 2026) are structured, visual frameworks that illustrate how an intervention, programme, or service is expected to work, based on evidence and theory (Aarons, 2006; Senn et al., 2013). They map the relationships between:

- Inputs (resources, people, activities)
- Outputs (what is delivered)
- Mechanisms of change (how the activities lead to change)
- Outcomes (short-, medium-, and long-term effects)

The logic model exercise highlighted key themes that underpin partners' diverse efforts. The process of completing the logic models led to a helpful discussion about the concept of behavioural change as a 'journey', from awareness to skill acquisition to behavioural change, and eventually to stewardship.

The partnership workshop identified four core themes that aim to evidence the project's journey towards achieving behavioural change. The themes identified pathways to nature-connectedness and to the development/enhancement of pro-environmental behaviours. These core themes and cross-cutting themes refine the four original bid themes (see p. 4). Figure 6 details the four core themes and pathways for encouraging pro-environmental behaviours and thus, behavioural change.

Overarching partnership workshop themes:

1. Awareness and understanding
2. Emotional connection and sense of place
3. Shared responsibility and social reinforcement
4. Applied knowledge and skills

The cross-cutting themes overarch the six behavioural change domains:

1. Everyday sustainable actions
2. Wildlife and habitat support
3. Community and collective action
4. Citizen science and monitoring
5. Source-to-sea behaviours
6. Behaviour change attributable to reconnect

The flow diagram illustrates the pro-environmental pathways the delivery partners identified that lead to a Journey of Behavioural Change.

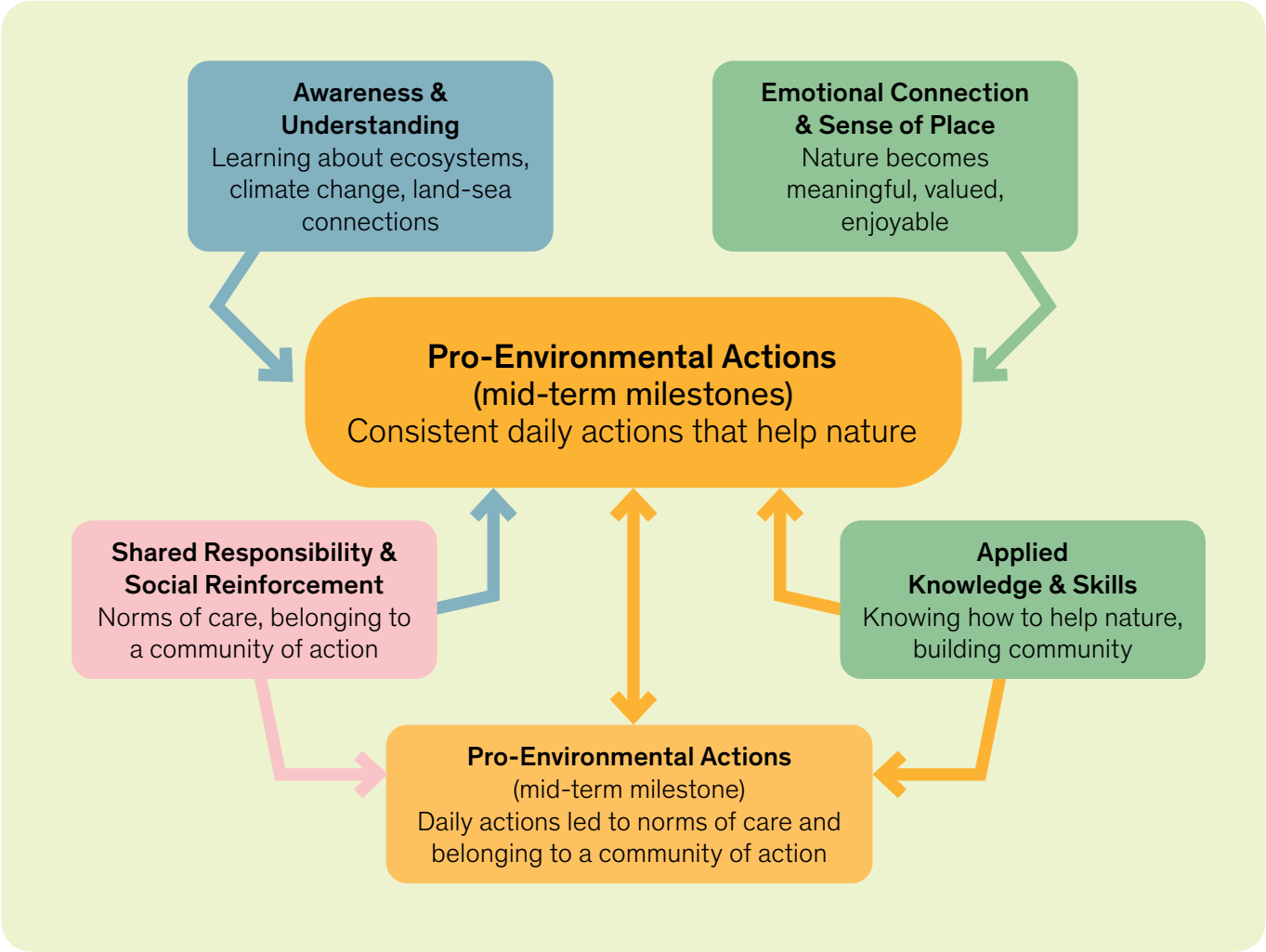

Figure 7 REConnect Pro-Environmental Behavioural Change Framework, Hall et al. (2026)

Evaluation strategy and quantitative measurement tools

The partnership agreed that developing an effective evaluation strategy that documents all stages of this journey of change was important, rather than focusing solely on the end goal of behavioural change, especially considering the longitudinal nature of this five-year project and the challenge of influencing behaviour changes.

To begin this process, the partners reviewed a range of standardised and bespoke measures used in previous research in related fields and discussed them. A Padlet was shared for partners to add comments on each scale. Partners appreciated the idea of combining standardised measures, which can be helpful in future funding applications. However, they believed it was necessary to include bespoke measures to capture the unique aspects of the REConnect project, such as the 'source to sea' initiative and their contributions to broader scientific efforts through data collection on species and marine life.

Behavioural change definition

The work on the logic model, mechanisms of change, and the evaluation of behavioural change across the five years of the REConnect project led the partners to review the original CAF bid definition of behavioural change. Partners reflected that the original definition focused on end outcomes and expected behaviours rather than on the 'journey' of change outlined in the Logic Model.

Co-Created revised definition of behavioural change:

In REConnect, behavioural change is a collaborative journey that begins with building environmental awareness and emotional connection to the River Esk and Coastal Streams. It strengthens community capacity, skills, and confidence to act as stewards of nature, fostering pride and shared responsibility. Over time, this leads to everyday pro-environmental habits - applied at home, in communities, and beyond the catchment - and empowers collective action to protect and enhance nature whilst helping to mitigate climate change

To support the development of a quantitative survey, the research team assembled a large pool of 90 questions for the partners to review and refine. The aim was for the partners to collaboratively create a survey; 55 measures were selected, see Appendix 1. The proposed survey will be conducted annually (from year two) on a large sample of individuals to monitor the progress of change throughout the project. The measures are based on a combination of standardised scales that reflect the unique aspects of the REConnect project. To underpin the project's primary focus on demonstrating behavioural change, an **Expanded Pro-Environmental Behaviour Scale** was co-created, covering six behavioural domains: everyday sustainable actions; wildlife and habitat support; community and collective action; citizen science and monitoring; source-to-sea behaviours; and behaviour change attributable to REConnect.

Uniting the methodology

This dual methodology was chosen because it enables the integration of community perspectives into the framework for assessing the REConnect project. The codes identified from the interviews reflect stakeholders' current experiences, and discussions of perceived issues provide rich insight into what they hope the REConnect project can achieve. The participant interviews have enhanced understanding of why they engaged in conservation activities, which can help inform how the project can deliver its aim of achieving behavioural change.

The partner workshop aimed to foster collaborative discussion of behavioural change and to establish a single, unified definition applicable to the project, along with themes and a set of measures to quantify behaviours and potential change. The workshop provided a baseline for the research evaluation from year two onwards.

Analysis

Quantitative survey data will be analysed using descriptive statistics in SPSS. Frequencies, percentages, means, medians, modes, ranges, and standard deviations will be used to provide an overview of sample characteristics, central tendency, and variability, to detect errors or outliers, and to support clear interpretation before inferential analyses are conducted to inform reporting and guide further decisions concerning the approach to collecting qualitative data. 55 measures were co-created to develop the REConnect pro-environmental behaviour scale.

The qualitative pilot data from year 1 have been analysed using Braun and Clark's (2006) thematic analysis. Thematic analysis, using the partnership workshop themes, provided a flexible qualitative method for systematically identifying, analysing, and reporting patterns or themes within the data (Braun and Clarke, 2006). Emphasis was placed on researcher reflexivity, clear analytic phases, and accessibility, making it suitable across theoretical frameworks and research questions while maintaining rigour and transparency in qualitative analysis. Pilot qualitative data were analysed in NVivo 15, yielding 22 codes and sub-codes.

This mixed-methods approach will aim to identify a rich story of the journey to change, with the reflexivity to evaluate and adjust as evidence emerges.

Ethics

University ethics approval was sought and obtained to conduct the research. Ethics application number ETH2425-0039. All participants were informed of their rights under the GDPR, and informed consent was obtained.

Reporting

Year 1 – Baseline methodology developed, including analytical themes. Qualitative pilot research completed. A partnership evaluative review workshop completed. Quantitative survey measures established. Creative output – *Fifty Voices Film* developed.

Year 2 – First year quantitative survey results, 10 x qualitative case studies (semi-structured interviews), 1 x partnership review workshop (1 x creative output tbc), interim report.

Year 3 – Second year quantitative survey results, 10 x qualitative case studies (semi-structured interviews), 1 x partnership reflexive workshop (creative output tbc), interim report.

Year 4 – Third year quantitative survey results,10 x qualitative case studies (semi-structured interviews), 1 x partnership reflexive workshop (creative output tbc), interim report.

Year 5 – 1 x partnership reflexive workshop, final report (creative output tbc).

Project Plan: Year 1

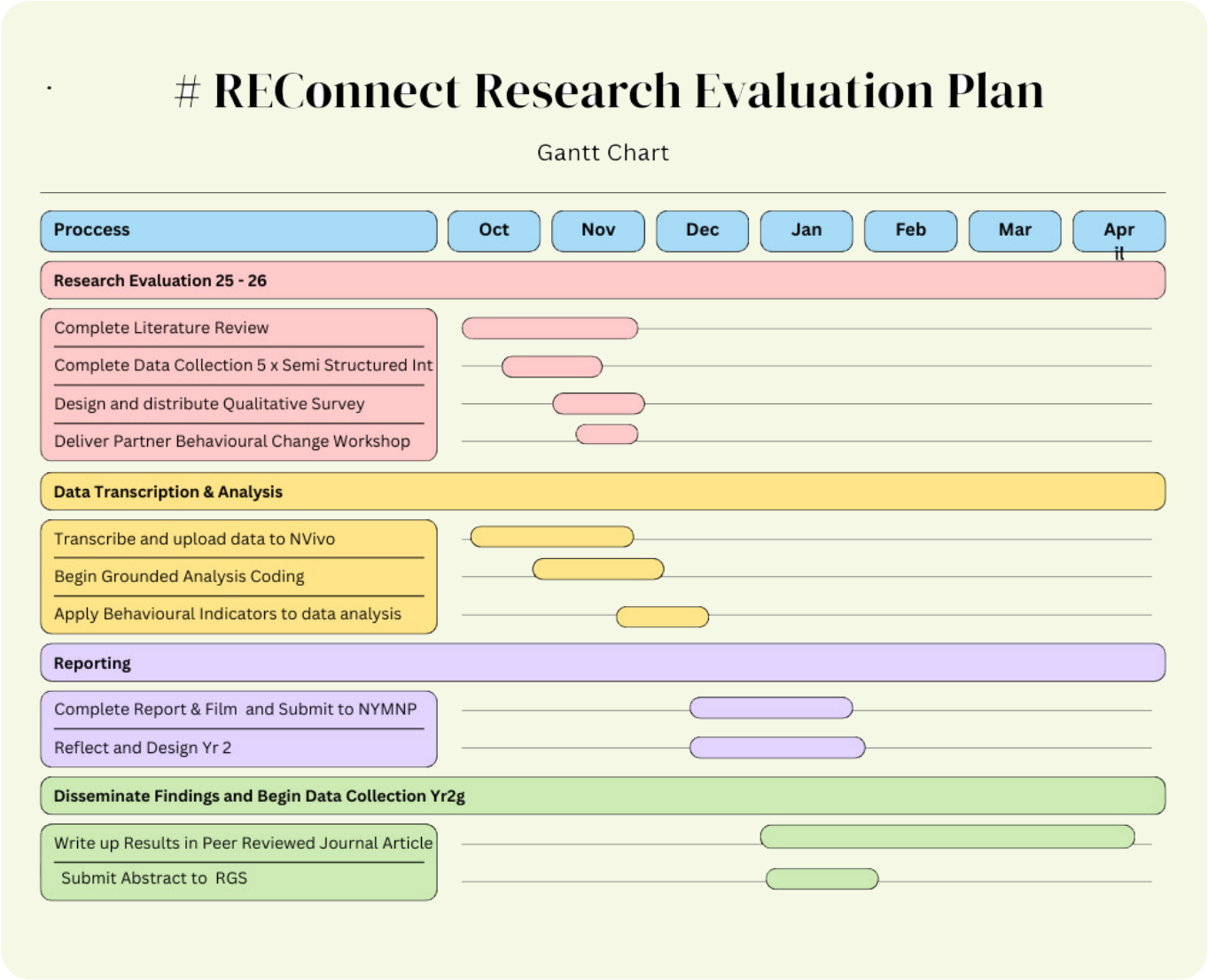

Figure 8 REConnect Research Evaluation Yr 1 Project Plan, Hall, (2025)

Research findings: applying the REConnect pro-environmental framework

The following provides an analysis of the pilot qualitative evaluative research findings and offers rich evidence of the potential impact of REConnect. The REConnect pro-environmental framework has been applied using the overarching themes and cross-cutting themes. Nature connectedness theory underpins the analysis (Richardson and Lumber, 2021), but not exclusively, as other theories concerning well-being are applied.

Figure 9 River Esk Research Walk 2, Credit: Burns (2025)

Awareness and understanding

Appreciating the level and depth of residents' and visitors' understanding and awareness of how the climate crisis affects the river catchment's ecology is critical to designing future interventions through the REConnect programme and beyond. Eight sub-themes emerged:

1. **Education, awareness, and reconnection with nature**

Many of the respondents' accounts reflected awareness through learning, personal experience and observation, and sensory engagement with nature, which demonstrates the cross-cutting theme of **wildlife and habitat support.** For example, respondents expressed:

"The thing that's really hit us is how much we thought we knew about the National Park, but how little we actually knew" (RPD11).

Respondents had a clear appreciation of biodiversity and its importance to human environmental health. These connections were demonstrated through comments such as

"*When I'm out today, I'm going to just really focus on what I can hear. Or I'm just really going to focus today on things that I can touch. And it gave me this real focus for the walk and sort of opened stuff up for me really" (RPD20).*

Awareness of the REConnect project was also expressed in positive terms.

"The title is brilliant, […] because to me it's all about connections […]. Bridges, literally bridges rather than walls, […] there's a sort of metaphor, if you like, for what life should be about" (RPD11).

The impact of the project on one participant was demonstrated by *"I've only got a very general knowledge of the flora and fauna and so on. Just from my own experience around here, […] today I've seen a whole variety of bird life, for example" (RPD11).*

For some participants, their connectedness to nature had increased due to reduced time pressures: *"But since I've been an adult, if you like, and more so since retiring, I've become much more interested in and aware of why the area is as it is" (RPD03).*

There was a perception that the river catchment was in better health than in previous decades, *"It seems a relatively clean river" (RPD11).* However, this view did not extend to the coastal environment:

"I mean, some of the beaches, […] are failing, basic health tests up and down this coast" (RPD11).

It was recognised how vulnerable the river catchment was to pollution: *"if you've got any sort of pollution in your rivers, you're going […] to destroy the food chain" (RPD4).* This demonstrates the desire to **support wildlife and habitats**.

Discussed later, it was, however, felt that education was critical to appreciating the value of what we have: *"so many of our wildflowers, they're not showy and exotic […], which of course means you do have to look" (RPD2).*

2. Awareness of the interconnectedness of ecosystems ("Source to Sea")

Respondents referenced the general public's limited understanding that environmental impacts are interconnected across river, coastal, and marine systems, and that these impacts are marginalised in public perception (Hansen et al., 2022; Tocco et al., 2024). There was a strong view that raising the profile to protect the river "***from source to sea***" (RPD4) was fundamental to the project. Strengthening the journey to **behavioural change** was considered a priority for the partnership. Community capacity building through collective action and citizen science was deemed necessary.

East Barnby Outdoor Centre had a consistent programme of engaging children and young people with a source to sea experience:

"I find that most kids are […] really apprehensive when you start because sea creatures are weird, often spiky and try and nip you with pincers or bite you […]. But once they understand that we're big and scary and they're small and not scary, and then we've had a bit of an interaction, […] kids then gain confidence, and they'll go out and find stuff themselves" (RPD15).

Building partnerships with such organisations is critical to expanding outreach capacity to reach children and young people in areas adjacent to the river catchment, particularly from areas of social deprivation, to build awareness of **source-to-sea behaviours** and mobilise **community and collective action**.

3. Awareness of natural processes

Respondents reported limited recognition that natural dynamic processes shape the river catchment and that the landscape is not fixed but naturally mobile, which created tensions rooted in static understandings of place, for example:

"You often talk to people who say the river is eroding my land. What can I do about it? It was always here and now it's moving" […] it's just constantly moved around and people just see it within their lifetime when they remember that's where the river should be" and *"what, […] can we do about putting the river back where it's supposed to be?"* and *"you know that's not the case and we would really like to be working with natural processes […] it's just a bit futile trying to fight nature constantly" (RPD1).*

This demonstrated a disconnect between landowners' perceptions and the river's dynamic nature. This indicates a need to raise awareness of the river's natural processes and the **sustainable actions** that support **wildlife and habitats**.

Moreover, tensions emerged between human use and ecological limits. The conflicts identified concerned farming regulation and the need to achieve ecological sustainability. For example, the increased frequency of extreme weather events, such as the long, hot, dry summer of 2025, in contrast to the drive to protect riverbanks through riparian tree planting and fencing, had put pressure on some farmers who had previously been allowed to let their cattle drink from the river, as one respondent expressed:

"One of my neighbouring farms has had a real shortage of water. We get our water from the springs and the tanks fill up but then the cows come in for milking and they drink a lot of water and the parlours need to be washed down and then there's not, well the water actually is running out at the moment. It fills up again and it's fine, but a lot of the water has to go into the troughs to feed, to give the cattle something to drink during the day when they're in the fields because they can't access the beck in the way that they used to. […] Yeah, livestock farming is not part of the natural ecology. But I actually do think maybe this coming year should... relax some of the regulations to allow the cattle to drink from the becks" (RPD4).

This led to a perception that farmers would disengage with conservation initiatives:

"because you're not allowed to let your animals [go] down to the beck […] to protect the riverbanks […] [rivers] become less useful to farmers […] and […] [farmers] have less interest in protecting them" (RPD4).

The challenge is to support farmers facing water shortages and to manage competing demands between **wildlife, habitat support**, restoration, and watering livestock, to prevent farmers' disengagement from **sustainable action**.

4. Awareness of the climate crisis and biodiversity loss

Respondents did associate the climate crisis with more frequent and extreme environmental disruption in the river catchment:

"Since there's been more extreme weather events in the last few years, the changes in the geography of that middle part of the river have been quite drastic […] the flow rate of the river has changed, the beds changed a bit" (RPD15), and in an informal way were **monitoring** the changing nature of the river.

This was coupled with awareness of declining species, an increase in invasive non-native species, and an evident ecological imbalance. As one respondent asserted, "*What I'd like to see is a lot more control of the invasive, non-native species"* (RPD10). The urgency and to some extent the anxiety concerning the critical status of some species was evident:

"*The Atlantic salmon got categorised as […] critically endangered nationally, internationally last year. It's something that we have in the River Esk*" (RPD10).

Challenges concerning species such as mink and crayfish were also recognised:

"So we're noticing a bit of destabilisation at the banks, since they've [Crayfish] been more prevalent in the river, we've noticed that more banks are collapsing, more trees are falling into the river" (RPD15).

Residents also have significant amateur expertise, with one botanist stating that 97% of wet meadows had been lost in her lifetime. As a highly accomplished amateur botanist, RPD2 expressed profound sadness at the loss but recognised that successful wildflower recovery programmes had been implemented. She was engaged in mapping the migration north of flowering species as temperatures had risen, for example, through:

"Mapping the flowering season, and that's extending, what we're finding is that things are staying in flower longer, and of course, the concern about that is, for instance, that the trees aren't getting as much rest" (RPD2).

Another respondent described using specialist equipment such as camera traps to monitor nocturnal species such as otter and water voles to capture *"the footprints of species"* (RDP10).

Climate anxiety was palpable, and the need for **citizen science, monitoring**, **and collective action** was demonstrated.

NYMPA has a significant partnership programme, working with stakeholders with expertise. However, REConnect has demonstrated an untapped informal network of local knowledge and **citizen science and monitoring** that could be a powerful way to **build capacity** to **monitor** biodiversity changes in the river catchment.

5. Valuing what remains and adaptive conservation

"*Every form of life needs water."* (RPD10).

Rather than restoring an imagined past, participants emphasised the need to protect existing ecosystems and adapt conservation approaches. One respondent expressed that we must:

"appreciate what we have got, a lot of people don't realise some of the species we've got here are absolutely fantastic and internationally important" (RPD10) and prioritise existing species and *"look after what we've got rather than what we would like"* (RPD10).

For example, it was felt that rather than using terms like 'rewilding', *"wildflower restoration […] is actually better because it is recouping things"* (RPD2).

A key point was made by one respondent that we needed to reconnect species that have become isolated, such as the water vole, which now exists in only a limited number of places: *"if we can increase the corridor itself that they get from one isolated place to the next isolated place"* (RDP10), and protect them from invasive predators such as mink.

However, there was an acknowledgement that *"We often miss the opportunity of seeing what wildlife we have on our rivers"* (RPD10). Education was considered crucial for raising awareness and achieving **behavioural change**.

6. Emotional responses and climate anxiety

The climate crisis and an associated sense of anxiety concerning the state of our planet was palpable, producing emotional responses, such as fear, sadness and anxiety about the future:

"I was thinking about it this morning. I'm thinking of a word that is just like... apocalyptic really. I think it's absolutely dire" (RPD4).

This was attributed to "*our out-of-touchness with nature […] the lack of understanding and the fear*" (R6).

The sense of loss was profound: "*I can't imagine it not being, yeah, my life would […] be considerably impoverished if it weren't there*" (RPD4). The need to improve **awareness** and **connection to nature** was considered critical to biodiversity restoration.

7. Awareness of human timeframes

Participants recognise that perceptions of environmental 'normality' are shaped by individual lifetimes rather than long-term ecological histories:

"You can't look back with rose-tinted spectacles… some of what happened in the past was bloomin awful. I mean, I remember […] when otters and all sorts of things were practically extinct in this country because of all the pesticides, particularly […] herbicides that were being put on the land (RPD4).

8. Nature's resilience and positive futures

Despite concerns about the climate crisis, some respondents expressed cautious optimism about nature's capacity to recover if pressures are reduced. Given the industrial heritage associated with the river catchment, it has, through time, recovered from periods of intense industrialisation, but it was understood that *"Industrial environments that have been reclaimed by nature… actually quite heartwarming"* (RPD4). This evidences how **collective action** has positively changed the river catchment over time.

Emotional connection and sense of place

"I just love water. I just love the sound of moving water" (RPD3).

The emotional connection to the river catchment was marked by a strong sense of place attachment and identity. Four sub-themes emerged from the data collected.

Figure 10 River Esk Research Walk 1, Credit: Burns, (2025)

1. Place-based identity, attachment and heritage

Early-life experiences and local heritage strongly shape emotional attachment to the river and landscape. Respondents expressed how:

"We grew up playing in the river… swimming and then it became […] polluted […] probably in the early 80s maybe. Nobody really cared much before then" (RPD3), and *"I'm from Middlesbrough and we used to quite often come to Whitby as a child, and the Esk, … that was really nice for me" (RPD1).*

This was informed by a sense of loss of certain industries: "*there used to be a good salmon fishery in the Esk"* (RPD18), and access to the river and how this had changed through conservation processes. For example: "*Now, no fishermen get a license, and they can't transfer them. So, when the chap who owns the license, […] retires or dies or whatever, he cannot pass it on. So, there's virtually nobody who can fish for salmon commercially now*" (RPD18).

A strong, ongoing emotional attachment to the river and valley is evident in how participants describe living alongside it, for example: *"I'm very fond of the Esk, and I love the fact that I live in the Esk Valley"* (RPD4), and *"It's a special river, unique in the North York Moors National Park, it's worth cherishing"* (RPD10).

Respondents had a strong emotional bond with the river catchment: *"it's in my blood. It's in my fibres. […] I'm not from the North York Moors, but ever since I visited when I was sixteen, I just fell in love with it, and I couldn't be happier living anywhere else"* (RPD4). Emotional bonds foster a strong sense of place and support **wildlife and habitat** conservation.

2. Nostalgia and nature connectedness

Participants express longing and reflection on past experiences, highlighting everyday emotional connectedness and loss, for example, during one of the research walks, a respondent expressed: *"God, this makes me realise how much I miss doing this"* (RPD3). Memories were triggered through leisure walks, which produced a sense of enjoyment: *"We bought a little booklet at the Esk Valley Walks… they were really lovely little walks"* (RPD20). Emotional connections have been demonstrated to produce sensations of nature connectedness and increase **pro-environmental awareness** (Richardson et al., 2021).

3. Sensory experiences and wellbeing

Sense of place is deeply rooted in sensory experience, underscoring the value of meaningful moments in contrast to the number of minutes spent in nature (Richardson et al., 2021). Activities such as listening, watching, and feeling the environment, for example one respondent described, *"You could sit down here […] just the sheep in the background and the sound of the water"* (RPD20), and another expressed, "*I don't think I can cross a stream or river without stopping… I listen, and I look, and […] how fast [its] running and how clear it is*" (RPD4).

Respondents value the river catchments understated, non-dramatic qualities, which reinforce an intimate attachment, and appreciate the river as a living, moving presence. For some respondents, it was enough to just sit by the river and "*watch it flowing*" (RPD4), and described how "*there's always something coming down the river… a floating feather or a duck or a leaf or a twig"* (RPD4). This evidences how **everyday sustainable awareness and leisure-based actions** build an appreciation for the importance of **wildlife and habitats**.

There was also an appreciation of building an intimate relationship and knowledge of **wildlife and habitats**, produced deeper connections and appreciation for what we have, for example: "*So many of our wildflowers… you do have to look*" (RPD1), and how nature connectedness builds knowledge of the river, which is: "*just gurgling away quietly, you know, it doesn't draw attention to itself"* (RPD11).

For participants, the river catchment serves as a place of calm, reflection, and emotional relief and restoration, fostering a sense of well-being, for example: *"Sitting by a river, what nicer thing is to do actually than just to sit by a river and watch it flowing"* (RPD4). The power of connecting to nature helped with human well-being, one respondent expressed:

"If I've got stuff on my mind, I just go and walk on the beach […] your problems go away […]. I think it's because the sea doesn't care, right? It's just going to carry on doing what it feels forever" (RPD17).

4. Sensory immersion and nature connectedness

Participants describe being absorbed in a place, rather than merely visiting it, for example: *"If we're not with the group […] we'll just walk out and – just start living it"* (RPD7).

During a school trip, one leader described how the group witnessed: "*a whole pod of dolphins just in front of them. […] We stood there for twenty minutes just watching the pod of dolphins that were about twenty-five metres away from us. […] All the kids were totally immersed"* (RPD15).

The children experienced a sense of wonder and awe. Encounters with wildlife create powerful emotional bonds and lasting memories, which build familiarity, intimacy and place-based knowledge. Sense of place is often strongest in specific, named locations tied to everyday life:

"*Every part of it, there's some somewhere of interest […] whether it's a building or a bridge or some feature […] I'm more familiar with the upper, this part of the river because it's nearer to home"* and "*if I had a favourite part of it, it's Egton Bridge. I mean, it's a kind of, it's a little world of its own*" (RPD11). These statements demonstrate awareness and support for **wildlife and habitats**. Nature connectedness is grounded in moments, not minutes, which build profound emotional connections that impact values and behaviours (Richardson et al., 2021).

Shared responsibility and social reinforcement

REConnect is a programme that aims to co-create solutions to biodiversity loss that mitigate threats now and in the future. This requires a two-way learning process with communities and stakeholders encouraged to develop existing pro-environmental actions and new approaches to engaging communities in pro-environmental behaviours. Seven sub-themes were identified.

1. Developing a shared sense of responsibility

A fundamental message that caring for the environment is a shared obligation across all communities was evidenced by respondents expressing: *"We all have a part to play"* (RPD10), and *"What we can do is listen to everybody and make sure that everybody's inclusive of it. Look after what we've got"* (RPD10).

Knowledge of **actions** needed to improve biodiversity was also expressed, for example, *"We need to control the invasive non-native species as part of improving it for other species"* (RPD10). This demonstrates a desire for **action** and the latent potential of stakeholders to contribute to biodiversity restoration.

2. Education, social and intergenerational knowledge

"My mother took us for walks and taught us the names of the local wildflowers" (RPD2).

Figure 11 River Esk Research Walk 3, Credit: Burns (2025)

Participants highlighted the loss of informal practical ecological knowledge across generations and the need to actively rebuild knowledge-sharing among families, schools, and communities. For example, being able to identify flowers, plants and animals: *"one hundred years ago, that was a given… We now have two generations without this knowledge"* (RPD2).

Families are not passing on local knowledge of the environment they live in, which demonstrates a loss of knowledge and a disconnection with nature. The impact is also felt in schools: "*We have a cohort of teachers who aren't able to pass that on"* (RPD2), and "*that's part of our out-of-touchness with nature as well, the lack of understanding and the fear"* (RPD2).

Developing intergenerational education was framed as critical for enabling the adoption of responsible, pro-environmental behaviours and for reducing fear, misunderstandings, and harmful behaviours. For example, one respondent described: "*Dog owners have a big part, partly because the vets now are currently saying you must treat your dog for ticks and fleas, 'put this chemical on your dog' and then if your dog goes in the water, it has a massive effect on the invertebrate life, the aquatic life in the river... If people were aware that putting their dog in the water could damage the ecosystem beneath the water, most of them would then appreciate that"* (RPD10).

Children were highlighted as key stakeholders in creating a pathway to **behavioural change**. Some respondents identified children as powerful agents of social reinforcement, influencing family practices and attitudes. For example, on respondent expressed that: *"the education side, getting kids out… the school trip is often what they remember" (*RPD10*),* and *"what you hope for is that when they go home, they speak to their parents, and they're encouraging their parents*, *[…] and they're encouraging their parents to sort of take them […]"* (RPD19).

Overcoming a fear of species such as those that bite and sting was also considered important, with the NP recognising that installing signs warning of adders led to fear of animals. One NP volunteer expressed, *"out on an open moor […] there's someone who likes to put a really big sign up saying 'warning adders'. We quite often take the sign down because then the kids think they're being chased by Adders all the time"* (RPD15).

To alleviate negative attitudes towards plant and animal life, key stakeholders were identified as educators and agents for change, for example: *"We've got landowners that will help us with […] educating the children". (RPD10).* This demonstrates that everyday actions lead to better relationships between humans and animals/plants and to **sustainable actions**.

3. Community action and social reinforcement

Behaviour change is often reinforced through observing others, joining group efforts, and informal peer influence. Other organisations, such as the Youth Hostel, located at Whitby Abbey, have *"their own litter pickers and encourage groups to go off and out to do litter picks"* (RPD12).

Informal networks through social media channels such as Facebook also acted as a pathway to action, as one respondent described, *"It was because we'd seen it… her litter picking Facebook group… 'we'll come along to this one'" (RPD7).* Some respondents held a strong sense of personal responsibility and would act when they encountered litter, saying if we "*see something, we'd pick it up"* (RPD7). One strong message that the project partners were keen to promote was as one respondent expressed:*"why maybe we shouldn't leave rubbish and why we should selectively retrieve rubbish"* (RPD15). This demonstrates both a sense of **community responsibility** and the need for **collective action**.

4. Creativity, innovation and social messaging

Respondents described creativity as a method to prompt positive reflection on responsible behaviours, open up conversation, and encourage pro-environmental behaviours and action that reinforce shared norms. For example, St Mary's Church, Whitby, holds an annual Christmas tree competition, which inspired the creation of a tree made of rubbish found on the beach: *"the whole tree is made out of green plastic bottles".* The idea was to try *"to make people think about what they do with their litter" (RPD17*). This demonstrates the power of social messaging as a tool for reinforcing responsible behaviours and **collective action**.

Social messaging concerning the issue of cross-contamination of invasive species is a significant issue, as one respondent described, *"certainly stopping the spread. The stop that the 'check, clean, and dry' message is an important one that we all should listen to" (*RPD10*).*

The recreational use of contaminated waters, such as Scaling Dam, which has invasive species such as crayfish, and the risk of contamination in the River Esk are significant. The National Park has moved to tackle this, but there is recognition that this work needs to be extended:

*"We've got signs out at the moment telling the fishermen to 'stop, clean, and dry', which is great, but should be extended not just to the fishermen but to anybody that's using the river for recreation, the paddle boarders, the canoeists, the wild swimmers. We all have a part to play" (*RPD10*).*

Sharing good practice between commercial/industrial practices and leisure-based informal environments could have a significant impact. This is a demonstrable call for **collective action** and **monitoring** that supports **wildlife and habitats**.

This also applies to domestic settings, as the Esk River frequently overflows due to inadequacies in the sewerage treatment system. As one respondent described, every resident could help by considering what they pour down drains and sinks:

*"If we think outside the sink before it goes into the water, it can help pollution, chemicals, even some of the drugs that we take when we go and pee, it ends up in our waterways" (*RPD10*).*

Campaigns that target environmentally friendly domestic products, the impact of microplastics and chemicals and encouraging leave no trace messaging for recreational users, for example, 'taking a wild wee' ten meters away from a water source, were advocated as cues for **social messaging** that mobilise **everyday sustainable action**.

5. First-hand engagement builds responsibility

Direct experience of the environment is repeatedly described as more effective than abstract messaging for fostering care and responsibility. Respondents acknowledged that:

*"engaging people, getting people to experience the environment first hand, makes a really big difference" (*RPD15*). "Nothing ever beats engaging people with the environment […], but if people don't understand why or what it used to be"* (RPD15).

The view was that direct experiences lead to a reflection on values and what to value. It was felt that educating older generations was important:

"Let's educate the older people as well, make them aware of what they've got. Use citizen science. If you give them an interest to say, 'did you know you got bats? Can you tell us what kind of bats?" (RPD10).

Research evidence indicates that informal citizen science and monitoring are considered important for understanding and caring for the environment. Building this **community** through **collectively monitoring** and reporting species and observed changes could build capacity.

6. Managing harmful practices and pathways to pro-environmental behaviours

Shared responsibility also includes addressing harmful or careless behaviours, such as littering, the spread of invasive species, and the damage to conservation traps. Respondents expressed tensions between rules, regulations, and conservation, which they saw as resolvable through engagement rather than enforcement.

For example, the leisure activity of crab-lining on the pier at Whitby presented particular problems; one respondent described how a resident: *"goes out in a kayak and cuts away all the crab lines that are still underwater".* The problem is that *"Kids love catching crabs… and then they just leave it there"* (RPD17).

One project led by Beach Esk launched a successful in-situ campaign promoting responsible ways to look after crabs and the environment. This provided demonstrable **behaviour change** with children adopting the principles and putting them into practice, such as only putting one or two crabs in a bucket at a time and taking home their rubbish.

Tensions were evident with conservation activities, and the need for better communication was identified to inform the public that some animal traps are humane and necessary, one respondent explained:

"*People… come out and damage their traps… if we let them know that this predator control is an essential part of conservation*" (RPD10).

Social messaging was identified for addressing negative attitudes towards tacking invasive species, which in turn supports **wildlife and habitats**.

7. Stewardship for future generations

Responsibility was framed by respondents as not just in the present, but as moral stewardship for the future, countering nostalgia with realism and care, for example: *"we have this really nostalgic view of what things used to be, and they're not necessarily accurate. I think if we can get people to appreciate that environment, understand maybe why looking after it for future generations would be valuable, that's really important"* (RPD15).

Respondents expressed how history and heritage can provide a key moment of reflection about how we need to build better sustainable actions now and, in the future, for example one respondent who led local walks described:

*"in the case of that walk, communicating how everybody was self-sufficient, you know, until the coming of the railway, […] in the 1860s […]. […] They made their own cheese, […] had their own farm animals, made their own honey, you name it" (*RPD11*).*

Our heritage and histories hold key messages, methods, and practices for reclaiming **sustainable** ways of living.

Applied knowledge and skills

Our research identified how knowledge is practised, transmitted, operationalised, and used to inform action. Across the data, applied knowledge and skills are characterised by:

- Forms of knowing like doing, observing, recording, and teaching
- Situated, place-based expertise, often informal but highly developed
- Recognition of limits and gaps, motivating continued learning
- Direct links between knowledge, care, and action
- Five sub-themes were identified.

Figure 12 Research Interview at the Esk Hydro, Credit: Burns (2025)

1. Recognition of knowledge gaps and limits of expertise

Participants frequently acknowledge that even well-informed individuals possess only partial knowledge, especially regarding less visible species and systems. One respondent discussed how the doom and gloom picture often portrayed, by some conservation charities may not be as dire as promoted. In his view, there were a lot of knowledge gaps and under-recorded species *"that you can't see so easily"* (RPD10) and a second respondent expressed that "*I would consider myself to be reasonably well informed. But even I… I'm only aware of a fraction of what there was to know really*" (RPD4).

One respondent shared: *"British flora is recorded more than anywhere else in the world. So, there's this vast body of knowledge known by relatively few people, […] what I'm trying to do is bridge the gap in some way and help people to get started* (RPD2)". The desire to share knowledge was repeatedly expressed.

The research identified a significant body of informal amateur **monitoring and citizen** science within the NP that could be leveraged to build capacity.

2. Citizen science, recording, and monitoring practices

Applied skills are evident in systematic recording, surveying, and long-term monitoring of species and environmental change. For example, one respondent discussed how *"We've done a lot of winter bird surveys for the British Trust of Ornithology"* (RPD10), and a second had undertaken wildflower surveys annually for many years. She described how: *"you record everything you find in flower… we've done that every year. So, we've got our own local record"* (RPD2). In Westerdale, the respondent shared that "*I've recorded over four hundred species in the Dale*" (RPD2).

Recognising the knowledge and skills and finding approaches to build a wider **community of practice**, could further the efforts of these individuals and thus, NYMPA to encourage people to connect with nature:

*"I was out the other morning in the moonlight, it was just at that time when the bats were going in, and the swallows were starting to come out, and I thought it was a brilliant time of day and trying to catch it on camera" (*RPD10*).*

As previously discussed, intergenerational knowledge and practical skill sharing were identified to encourage informal **citizen science monitoring:**

"M*y mother took us for walks and taught us the names of the local wildflowers. I tried really hard to recall the information but find it incredibly difficult, you know, whereas I've been with my granddaughter, she's 14, she goes 'Oh look Granny! and she can tell by the flight pattern of a bird' "* (RPD2). This evidence shows the potential of knowledge sharing across generations.

3. Knowledge networks and informal information sharing

"I'm very keen that people do learn and understand" (RPD2).

Participants had built informal networks to share observations and opportunities for applied practice. This shows how informal networks often operate unseen and have little opportunity to influence wider policy in public organisations responsible for the environment. For example: "*there was a group of interested people up around the top end of the Esk, around down the Castleton originally, who started to look at basically climate change and green projects*" (RPD18). Knowledge was often shared through informal networks :*"we go from the upper middle to lower courses of the river and talk about all the changes that have occurred*" (RPD15). One amateur citizen scientist explained that *"people who have got an interest… will let me know if there's anything of interest, and then that gives me the opportunity to go out and try and catch it on camera"* (RPD10).

These processes and practices of teaching, interpretation, and knowledge sharing demonstrated how specialist knowledge was being transmitted into accessible formats for others. For example, one amateur botanist expressed her motivations that: "*recording it for people to be able to identify them has been very important to me, which is why this book's now coming out because I'm very keen that people do learn and understand, because I think if you know what's there, you're far more likely to look after it"* (RPD2).

4. Active stewardship and applied pro-environmental behaviours

Knowledge is applied through behavioural skills and practices that minimise ecological impact and promote stewardship. For example, East Barnby Outdoor Centre promote the normalisation of pro-environmentalism, for example:

"*We try to minimise our own impact on the environment, particularly when we go rock pooling. We talk about how we're the big scary thing in the ecosystem that kills everything, and how we want to leave no trace and if anything, leave a really positive impact on the environment around us"* (RPD15).

The organisation aims to develop appreciation of the *"outdoor world […], and how insignificant we are in that ecosystem… about how much of an impact we can have on that ecosystem"* (RPD15), particularly on children and young people.

Key organisations and networks used knowledge to shape attitudes and **behaviour**, applying it as a driver of **behaviour change** through demonstration and visibility. For example, a one respondent, who volunteered as a ranger, shared the reactions to the conservation undertaken: *"people seem to appreciate it. You do get people saying, well, thank you for what you're doing"* (RPD4). Project partners expressed the view that during activities such as litter picks: "*If we can do it when they're around and let them see what we're doing, they may think again*" (RPD8). Such work encourages **everyday sustainable actions.**

5. Ecology, land-use knowledge, heritage and traditional skills

"*Old men came in gangs of threshing men… the women would have to provide all this food*" (RDP20).

Respondents demonstrated an applied understanding of how historical and ecological processes shape current landscapes. Applied knowledge includes historic land-use practices, food systems, and technologies, rooted in lived experience.

A sense of how the Esk Valley had once been a thriving, largely self-sufficient farming community was keenly felt by farming elders. The flour mill at Ruswarp was described as a focal point of "*the weir that produced enough head to drive the mill, now on a good day, produces enough head to drive the turbine*" (RPD18). The weir on which it operated now supports a community hydro scheme, thus continuing to be a valuable manmade infrastructure on the river.

One farming elder described the lost tradition of making frumenty, a traditional medieval dish produced in the Esk Valley and Northern England:

"I had a friend […], who grew up on a farm at Danby […] she […] was in her hundreds when she died, and I used to love her stories, […] she used to tell me about her dad. They used to go on Christmas Eve down to […] the mill that was at Ruswarp. That's where he got most of his corn wheat and seed and everything like that. [The grain to make Frumenty], that's what the [mill gave my Dad] […] as a Christmas present […]. Mother would cook it on Christmas Eve night in the side oven, and then she would [serve] it on Christmas Day. Oh, absolutely wonderful" (RPD20.

Food heritage and the lost skills associated with food production offer a crucial way to connect people with the land and to build everyday sustainable ways to support local food production through practical skill-sharing and storytelling. This could be an intervention that offers a **pathway to pro-environmental behaviour, promoting local food production and consumption and** leading to **everyday sustainable actions**.

Farming heritage also has an important role in educating current practices, for example, one respondent expressed:

"there's a lot of farming on rivers because the river spills over on the floodplain and brings with it all the nutrients. Whereas now farmers are trying to stop the rivers flooding, but that's, you know, the legacy of why they're farming there is because it's rich because of the river" (RPD1).

Barriers to accessing nature

Whilst not one of the four core themes identified by the project partners, barriers to access emerged as a recurring theme among respondents and could inform programme initiatives. It is also acknowledged that this is not a comprehensive list of barriers to accessing nature.

Key themes relating to land and river access and rights emerged. These themes highlight how legal frameworks, private ownership, environmental protection, and pollution concerns shape people's ability to access and use rivers and surrounding landscapes. Overall, the data reveal that access to land and rivers is shaped by:

- Legal and ownership boundaries
- Environmental protection measures
- Pollution and safety concerns
- Changing access over time

These factors combine to create a fragmented, unequal, and emotionally charged access landscape, affecting not only recreation but also connection, stewardship, and care for the river.

Figure 13 Research Walk 1, Credit: Burns (2025)

1. Pollution, safety, and trust as barriers to access

Concerns about water quality act as an informal but powerful barrier to recreational access. For example, one respondent described how:

"*I would swim potentially in parts of the Esk, but I actually consider them to be too, mostly too disgusting. Or I can't trust what's in there*" (RPD4), and that there was fear that the river contained *"sewage, or […] chemical fertilisers or hormones from dairy cows"* (RPD4).

2. Public vs private access to rivers and inequalities

A dominant theme is the sharp contrast between open-access areas and privately owned stretches, resulting in fragmented access along the river. The contrast between accessible endpoints and restricted middle reaches creates unequal access along the river's length, as expressed by one respondent: "*Whitby, which is also open access… but the bit in between, there's quite long stretches that you can't access because it's on private land and there's no public right of way*" (RPD11).

Participants demonstrate awareness that legal status (tidal vs. non-tidal) determines who can access the river. *"The only legal access is as far as Ruswarp, where it's tidal, […] no one can stop you from using the tidal stretch. Beyond that… it's private"* (RPD6).

There was a sense of fragmentation and discontinuity of access, which was described as interrupted and inconsistent, undermining the idea of a continuous river corridor: "*There's quite long stretches that you can't access*" (RPD11). For example, one respondent noted the irony of the Esk Valley Walk having to divert from the river due to access issues.

Participants noted a decline in access compared with childhood, reinforcing a sense of loss and exclusion:

"*You could kayak all the way back down to the dam… absolutely wonderful. But all that now… you can't even get climb over that field*" (RDP9).

This illustrates the tensions between recreational use, landowner control, pollution and environmental regulation. Whilst environmental protection measures were valued, they were perceived as limiting access. Restricted access generates frustration and a sense of exclusion from places where people once felt connected. A possible solution could be to develop a code of responsible use and access to the river.

Conclusion

Figure 14 Launch Event Guided Walk, Credit: Burns (2025)

This evaluative research demonstrates that the REConnect pro-environmental framework provides a robust and theoretically grounded structure for understanding how awareness, emotional connection, shared responsibility, and applied knowledge interact to support pro-environmental behaviours within a river catchment. The findings align closely with nature connectedness theory, which emphasises cognitive, emotional, and experiential relationships with the natural world (Frantz and Mayer, 2014); Lumber et al., 2017), and with well-being theory, which recognises nature as a key contributor to psychological, emotional, and social wellbeing (Britton et al., 2020; Capaldi et al., 2014).

Participants demonstrated deep, often intimate relationships with the river and its landscapes, shaped by lived experience, heritage, and everyday encounters. These relationships reflect place-based and relational understandings of nature, in which identity and meaning are co-produced through ongoing interaction with place (Zhang et al., 2023; Zhang et al., 2025). Awareness and understanding emerged primarily through experiential and sensory learning rather than abstract or formal knowledge. Direct observation, memory, and repeated engagement shaped perceptions of biodiversity, environmental change, and ecological vulnerability.

However, awareness was uneven, particularly regarding river processes, source-to-sea connectivity, and ecological timescales. Static perceptions of landscapes, alongside competing pressures between conservation objectives and farming livelihoods, highlight the need for context-sensitive engagement that supports both ecological resilience and social inclusion.

Emotional connection and sense of place were among the strongest findings. The river functioned as a source of identity, memory, restoration, and well-being, consistent with research showing that emotional bonds with nature are associated with greater life satisfaction, reduced stress, and increased pro-environmental concern (Capaldi et al., 2014; Richardson et al., 2020). Sensory immersion and everyday moments of noticing, fostered care and motivation to protect valued environments. While climate anxiety and ecological grief were evident, these emotions were often balanced by cautious optimism grounded in observed recovery, perceived resilience of nature, and the legacy of collective action. This supports evidence that nature connectedness can buffer environmental distress by fostering agency, hope, and meaning (Clayton, 2020).

Shared responsibility and social reinforcement played a central role in translating values into action. Participants

consistently framed environmental care as a collective responsibility rather than an individual burden. Education, particularly intergenerational learning, community action, creative social messaging, and visible stewardship, reinforced shared norms of care. These findings align with social well-being theory, which highlights belonging, contribution, and shared identity as core components of well-being (Olive and Wheaton, 2020; Olivos and Clayton, 2016), and with evidence that social contexts strongly shape pro-environmental behaviour (Lengieza and Aviste, 2025). Children and young people were identified as important catalysts for change, reinforcing research showing that early-life nature experiences influence long-term environmental values and behaviours (Richardson et al., 2019).

Applied knowledge and skills revealed a rich capacity for stewardship within the catchment. Informal expertise, amateur monitoring, traditional ecological knowledge, and heritage-based practices supported engagement and care. Participants recognised both the limits of their knowledge and the value of continued learning, indicating readiness for citizen science and co-produced conservation. Knowledge was inseparable from care, as knowing led to noticing, noticing led to valuing, and valuing led to action. This relational feedback loop reflects competence pathways within nature-connectedness theory and eudaimonic well-being theory (Lumber et al., 2017; Capaldi et al., 2014).

Finally, barriers to accessing nature, including pollution concerns, fragmented access, and private ownership, risk undermining connection, stewardship, and trust. Without addressing these structural and emotional barriers, opportunities for equitable engagement and sustained pro-environmental behaviour may remain unevenly distributed.

Overall, the findings strongly support the REConnect framework as an applied model that integrates nature connectedness and wellbeing theory. By nurturing emotional connection, shared responsibility, applied knowledge, and everyday action together, REConnect can strengthen norms of care and belonging while supporting adaptive, place-based responses to biodiversity loss and climate change.

Recommendations

1. **Expand place-based education programmes** that emphasise source-to-sea connectivity, natural river processes, and ecological timescales, using experiential and sensory learning approaches.
2. **Develop intergenerational learning initiatives**, particularly involving children and young people, to rebuild lost ecological knowledge and reinforce pro-environmental norms within families and communities.
3. **Formalise and support citizen science networks**, recognising existing informal monitoring, providing simple tools, training, and feedback loops to build capacity and shared ownership of data.
4. **Strengthen partnerships with schools, outdoor centres, and community organisations** in socially deprived and adjacent areas to broaden access and participation.
5. **Co-design engagement with farmers and landowners**, addressing water scarcity, regulatory pressures, and ecological goals through dialogue, flexibility, and shared problem-solving.
6. **Use creative social messaging and visible stewardship** (e.g. art, signage, public events) to normalise responsible behaviours and reinforce collective action.
7. **Address barriers to access** by exploring responsible access codes, clearer communication around safety and pollution, and opportunities for negotiated access where appropriate.
8. **Integrate heritage, food traditions, and traditional skills** into engagement activities to connect sustainability with local identity and everyday practices.
9. **Provide spaces to acknowledge climate anxiety and loss**, while foregrounding hopeful narratives of recovery, resilience, and positive futures through collective action.

Figure 15 Launch Event 2025, Credit: Burns (2025)

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Appendix 1 REConnect pro-environmental behavioural scale: Measures

Section A — connection to nature and place

1. Being in nature makes me very happy.
2. I feel emotionally connected to the River Esk and coastal landscape.
3. I feel proud of the natural environment where I live.

Section B — knowledge and skills

4. I know how environmental change affects the River Esk and the sea.
5. I know how to help nature and wildlife in practical ways.
6. I believe my actions can have a positive impact on the environment.

Source-to-sea understanding

7. I understand how pollution or waste can travel from land into the ocean.
8. I understand how my behaviours may impact marine environments.

Section C — Confidence in nature

9. I feel confident spending time in nature on my own.
10. I know where to go locally to enjoy nature.

Section D — Expanded pro-environmental behaviour scale

Everyday sustainable actions

11. I am conscious of and minimise the amount of waste I produce.
12. I avoid single-use plastics.
13. I recycle or reuse items when possible.
14. I choose environmentally friendly products.
15. I avoid harmful chemicals that could enter waterways.

Wildlife and habitat support

16. I create or maintain spaces for wildlife.
17. I leave areas undisturbed to support nature.
18. I take part in activities that restore or protect natural habitats.

Community and collective behaviours

19. I share environmental knowledge or skills with others.

Citizen science and monitoring

20. I participate in environmental citizen science or monitoring. I record and share wildlife sightings.

Source-to-sea behaviours

21. I consider how my actions on land may affect rivers and the sea.
22. I avoid behaviours that might pollute waterways.
23. I take actions to protect the coastal and marine environment.
24. I make choices with downstream impacts in mind that could harm biodiversity.

D6 — Behaviour change Attributable to REConnect

25. I have adopted new environmental behaviours because of being involved in a REConnect activity/ group.
26. I have changed how I think about the environment because of being involved in a REConnect activity/ group.
27. I now take more positive environmental actions than before being involved in a REConnect activity/group.
28. Being involved in a REConnect activity/group has encouraged me to inspire or support others to look after the local landscape and nature.

Section E — Social belonging and shared responsibility

29. I feel part of a community that cares about nature.
30. Spending time in nature has helped me meet new people.
31. I feel a shared responsibility to look after the River Esk and coastal environment.

Section F — Wellbeing (SWEMWBS, past two weeks)

32. I've been feeling relaxed
33. I've been feeling close to other people.

Section G — Barriers to engagement (select all that apply)

34. Not enough time
35. Not knowing where to go
36. Not having equipment or clothing
37. Transport difficulties
38. No one to go with
39. Not feeling confident outdoors
40. Health reasons
41. Weather
42. Cost
43. Other (e.g. care responsibilities - please specify)

Section H — Your voice

44. How has being involved in a REConnect activity/group influenced your relationship with the River Esk and coastal environment?
45. Can you describe any changes in your day-to-day behaviour as a result of being involved in a REConnect activity/group?
46. Have you used any new skills or knowledge outside REConnect activities? Please give examples.
47. Describe a moment when you felt more confident in nature because of being involved in a REConnect activity/group.
48. What has changed in how you feel about your community or local area since being involved in a REConnect activity/group?
49. What would help you continue or increase your involvement in nature or conservation?
50. Is there a story or moment from your involvement in a REConnect activity/group that stands out to you as important?

Section I — Demographics

51. Postcode (first half only)
52. Age group
53. Gender (optional)
54. How did you first get involved in REConnect?
55. Would you like to be kept informed about future opportunities?

Appendix 2 Behavioural change measures: expanded version

Section A — Connection to nature and place

1. I always find beauty in nature.
2. I feel part of nature.
3. Being in nature makes me very happy.
4. I feel emotionally connected to the River Esk and coastal landscape.
5. I feel proud of the natural environment where I live.
6. Spending time outdoors is an important part of who I am.

Section B — Knowledge and skills

7. I understand how rivers, land and sea are connected.
8. I know how environmental change affects the River Esk and the sea.
9. I know how to help nature and wildlife in practical ways.
10. I feel confident using the skills I have learned.
11. I could take part in monitoring or conservation without supervision.
12. I believe my actions can positively impact the environment.

Source-to-sea understanding

13. I understand how actions on land affect rivers and the sea.
14. I understand how the River Esk connects upland habitats to the coast.
15. I understand how pollution or waste can travel from land into the ocean.
16. I can explain “source-to-sea” connections to others.
17. I understand how my behaviours may impact marine environments.
18. I am aware of the ecological importance of the River Esk catchment.

Section C — Confidence in nature

19. I feel confident spending time in nature on my own.
20. I know where to go locally to enjoy nature.
21. I feel confident exploring new natural places.
22. I would feel confident taking others into nature.
23. I can support someone else to get involved in nature activities.
24. I feel confident being in less familiar natural conditions.

Section D — Expanded pro-environmental behaviour scale

Everyday sustainable actions

25. I reduce the amount of waste I produce.
26. I avoid single-use plastics.
27. I recycle or reuse items.
28. I conserve water where possible.
29. I conserve energy at home.
30. I choose environmentally friendly products.
31. I avoid harmful chemicals that could enter waterways.

Wildlife and habitat support

32. I create or maintain spaces for wildlife.
33. I take steps to protect wildlife when outdoors.
34. I leave areas undisturbed to support nature.
35. I take part in activities that restore or protect natural habitats.

Community and collective behaviours

36. I encourage others to take environmentally friendly actions.
37. I share environmental knowledge or skills with others.
38. I help others participate in nature-based activities.
39. I take part in group environmental activities.

Citizen science and monitoring

40. I participate in citizen science or monitoring.
41. I record and share wildlife sightings.
42. I contribute environmental data (eDNA, transects, surveys).
43. I feel confident contributing data to scientific projects.

Source-to-sea behaviours

44. I consider how my actions on land may affect rivers and the sea.
45. I avoid behaviours that might pollute waterways.
46. I take actions to protect the River Esk.
47. I take actions to protect the coastal and marine environment.
48. I make others aware of land–sea environmental links and the impact of their behaviour from source to sea.
49. I make choices with downstream impacts in mind.

D6. Behaviour change attributable to REConnect

50. I have adopted new environmental behaviours because of being involved in a REConnect activity/ group.
51. I have increased the number of environmentally friendly behaviours I do.
52. I have changed how I think about the environment because of being involved in a REConnect activity/ group.
53. I now take more positive environmental actions than before being involved in a REConnect activity/ group.
54. Being involved in a REConnect activity/ group REConnect has encouraged me to inspire or support others look after the local landscape and nature.

Section E — Social belonging and shared responsibility

55. I feel part of a community that cares about nature.
56. Spending time in nature has helped me meet new people.
57. I feel a shared responsibility to look after the River Esk and coastal environment.
58. People like me take environmental action here.
59. I enjoy doing nature activities with other people.
60. I feel supported by others to get involved in nature activities.

Section F — Wellbeing (SWEMWBS)

(Past two weeks)

61. I've been feeling optimistic about the future.
62. I've been feeling useful.
63. I've been feeling relaxed.
64. I've been dealing with problems well.
65. I've been thinking clearly.
66. I've been feeling close to other people.
67. I've been able to make up my own mind about things.

Section G — Barriers to engagement (for those not actively engaged with Reconnect in particular?)

68. ☐ Not enough time
69. ☐ Not knowing where to go
70. ☐ Not having equipment or clothing
71. ☐ Transport difficulties
72. ☐ No one to go with
73. ☐ Not feeling confident outdoors
74. ☐ Health reasons
75. ☐ Weather
76. ☐ Cost
77. ☐ Other (please specify):

    _____

Section H — Your voice

78. How has being involved in a REConnect activity/ group influenced your relationship with the River Esk and coastal environment?
79. Can you describe any changes in your day-to-day behaviour due to being involved in a REConnect activity/ group?
80. Have you used any new skills or knowledge outside REConnect activities? Please give examples.
81. Describe a moment when you felt more confident in nature because of being involved in a REConnect activity/ group.
82. If you have taken part in citizen science, how did contributing to scientific understanding feel?
83. What has changed in how you feel about your community or local area since being involved in a REConnect activity/ group?
84. What would help you continue or increase your involvement in nature or conservation?
85. Is there a story or moment from being involved in a REConnect activity/ group that stands out as important to you?

Section I — Demographics

86. Postcode (first half only, e.g., YO21):
    _____
87. Age group:
    _____
88. Gender (optional):
    _____
89. How did you first get involved in REConnect:
    _____
90. Would you like to be kept informed about future opportunities?
    ☐ Yes ☐ No

Figure 16 River Esk, Credit: Burns (2025)

REConnect

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