REVITALISING OUR ESTUARIES

INVESTMENT PORTFOLIO

Revitalising our Estuaries (RoE) is a programme of river estuary restoration managed by Groundwork. It delivers Nature Based Solutions (NBS) to support nature restoration and communities living on North East river estuaries, whilst fighting climate change.

What are Nature Based Solutions (NBS)?
NBS are actions to protect, sustainably manage and restore natural and modified ecosystems, providing social and environmental benefits.

RoE presents unique **opportunities to invest in NBS** which provide benefits to the environment, communities and businesses across the North East.

This portfolio brings together current research findings to provide up-to-date information on NBS, investor benefits and monitoring procedures.

Potential investor benefits:

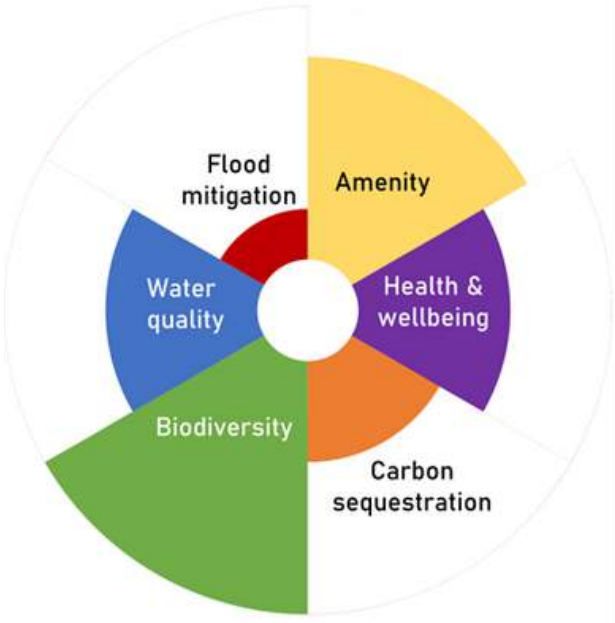
- Carbon storage
- Biodiversity
- Water quality
- Health and wellbeing
- Flood mitigation
- Amenity

Photo: Peter McDermott / River Tyne / CC BY-SA 2.0

FLOATING ECOSYSTEMS

Floating ecosystems are buoyant islands covered with native plants, creating new habitat and food sources for nature.

Underneath the structures, a mini-reef system promotes biodiversity and provides shelter for fish.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Increased populations of pollinators, aquatic birds, mammals, fish, amphibians and molluscs due to provision of shelter and feeding grounds.

WATER QUALITY

Submerged roots provide habitat for microorganisms and molluscs that purify the water through consumption of algae, carbon and excess nutrients.

AMENITY

Transformation of grey, artificial river banks into living ecosystems, greening cities and improving public amenity and waterfront value.

HEALTH AND WELLBEING

Provision of green spaces for recreation and active travel, improving physical and mental health. Opportunities for volunteering and educational visits. Improved connection to nature.

Photo: Groundwork / Floating Ecosystem -Tyne Estuary

FLOATING ECOSYSTEMS

How are the environmental benefits monitored?

- Assessing percentage cover on the upper surface
- Installing cameras to look at species underneath
- Undertaking fish, bird and invertebrate surveys to understand changes in species composition
- Assessing water quality, pH and temperature

How are the social benefits monitored?

- Assessing the influence of relationships with nature on health and wellbeing through surveys
- Measuring job creation, job retention, volunteer hours and training course provision
- Surveying employee skills and knowledge to understand placement benefits
- Evaluating visitor changes

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; £50,000 - £150,000
- Monitoring; From £3,000 p/a

What are the returns on investment?

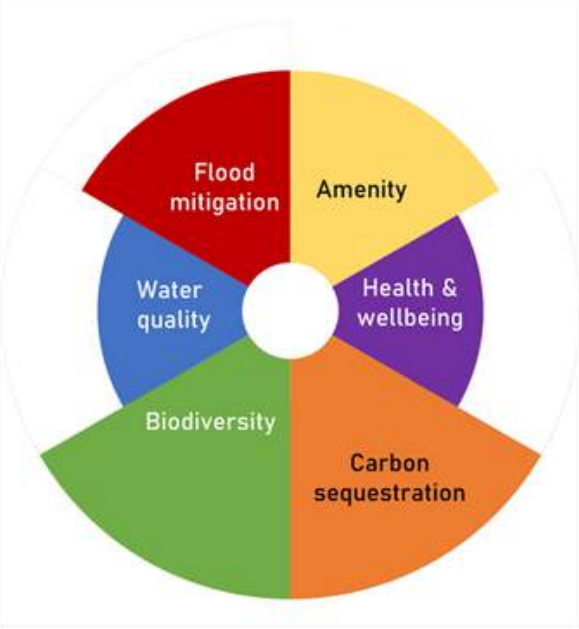
- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Groundwork / Floating Ecosystem - Tyne Estuary

SALTMARSH ENHANCEMENT

Saltmarsh enhancement can be achieved through restoring the natural mud or sand, installation of breakwaters or managed realignment processes.

RoE has created new mud flat and intertidal saltmarsh terrace using brush wood fascines and coir rolls.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Restoring the saltmarsh plants on the estuary edge retains sediment and provides habitat for marine species. This can increase the number of birds, marine mammals and invertebrates present.

CARBON SEQUESTRATION

Research has found that natural saltmarshes in the UK have an average sequestration rate of 4.34 t CO2e ha-1 y-1. Conservation and restoration of saltmarsh habitats could have significant carbon storage benefits.

FLOOD MITIGATION

Saltmarshes can provide offer flood risk benefits to coasts by buffering storm surges, preventing erosion and reducing wave energy.

AMENITY

Healthy saltmarsh habitats can offer significant social, cultural and recreational benefits within coastal communities, including amenity benefits.

Photo: Groundwork / Saltmarsh Restoration - Tyne Estuary

SALTMARSH ENHANCEMENT

How are the environmental benefits monitored?

- Photos, videos and site visits to see changes in species composition
- Sediment depth measurement
- Measuring carbon sequestration

How are the social benefits monitored?

- Assessing the influence of relationships with nature on health and wellbeing through surveys
- Measuring job creation, job retention, volunteer hours and training course provision
- Surveying employee skills and knowledge to understand placement benefits
- Evaluating visitor changes

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; £50,000 - £100,000
- Monitoring; From £2,000 p/a

What are the returns on investment?

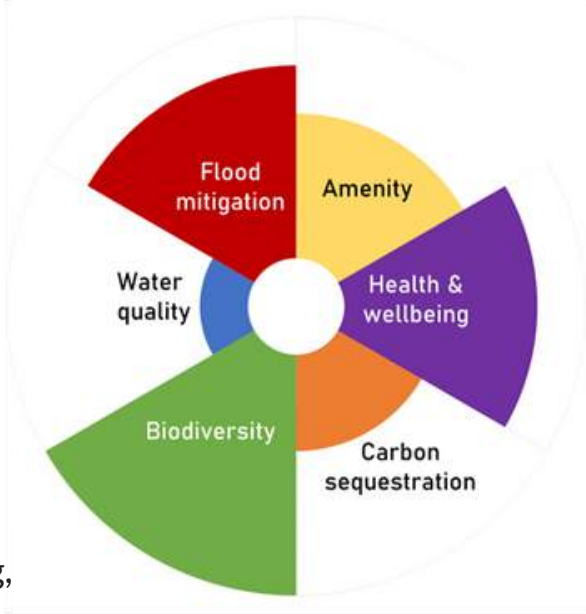
- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Groundwork / Saltmarsh Restoration - Tyne Estuary

SAND DUNE EROSION PREVENTION

Sand dune erosion prevention may involve vegetation planting, restricting human access and sand fencing enclosures.

Sand dunes are an important coastal habitat for vegetation and wildlife. They also act as natural barriers against large waves and coastal flooding, protecting inland properties and habitats.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Sand dunes are habitats for many unique species that cannot survive elsewhere e.g. plants adapted to acid conditions and high wind.

FLOOD MITIGATION

Sand dunes form a natural flood defence by acting as a buffer to high tides reaching further inland. They protect the low-lying land behind the dunes from inundation, preserving the coastline.

HEALTH AND WELLBEING

By preserving the coastline, sand dunes allow beaches to be accessible to people for recreation, promoting access to beautiful, unspoilt beaches and providing benefits to health and wellbeing.

Photo: Sue Adair / Sand Dunes and Beach, Freshfield / CC BY-SA 2.0

SAND DUNE EROSION PREVENTION

How are the environmental benefits monitored?

- Flora and fauna surveys to understand changes in species composition
- Photography to observe changes in the dune shape and size
- Measuring sediment depth

How are the social benefits monitored?

- Measuring health and wellbeing through surveys
- Quantifying volunteer participation
- Measuring social media engagement to understand people's connections to nature

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; £5,000 +
- Monitoring; From £2,000 p/a

What are the returns on investment?

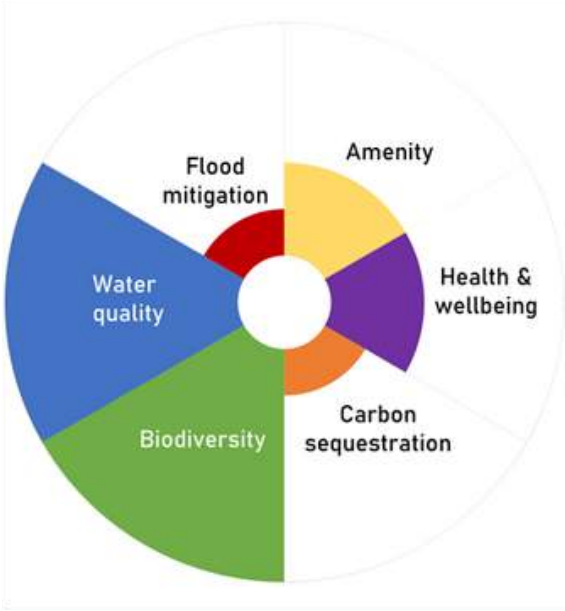
- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Groundwork / Sand Dune Footpath Improvements -Tees Estuary

MUSSEL ROPES & OYSTER NURSERIES

Mussel ropes are free-hanging underwater ropes that provide the ideal environment for growth of mussel colonies.

Native European **Oyster nurseries** are used to repopulate areas where previous populations have disappeared. They act as **rehabilitation hubs** and form a **micro habitat** suspended beneath the quay.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Mussel ropes and oyster nurseries, as well as encouraging growth of mussels and oysters, also attract other plant sand animals to form a unique ecosystem.

WATER QUALITY

Mussels and oysters take in water as they feed and as a result filter nutrients and pollutants out leading to improved water quality.

Photo: Vicki Burton / Towan Beach

MUSSEL ROPES & OYSTER NURSERIES

How are the environmental benefits monitored?

- Site visits, photos and videos to measure mussel and oyster abundance
- Quarterly water quality, pH and temperature monitoring

How are the social benefits monitored?

- Assessing the influence of relationships with nature on health and wellbeing through surveys
- Measuring job creation, job retention, volunteer hours and training course provision
- Surveying employee skills and knowledge to understand placement benefits

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; £50,000 - £100,000
- Monitoring; From £3,000 p/a

What are the returns on investment?

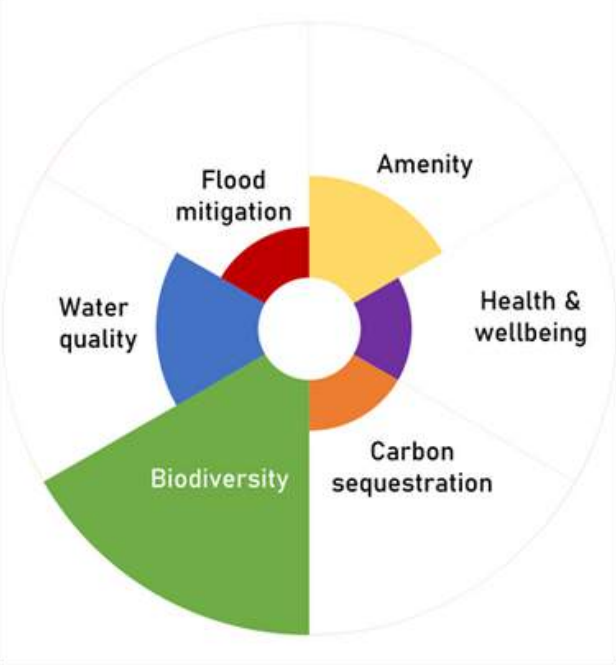
- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Getty Images

ARTIFICIAL ROCK POOLS

Artificial rock pools are one of the retro-fit options designed to create new habitat for marine life on hard-engineered structures.

They are covered by a high tide but exposed at low tide and support an array of marine flora and fauna.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Artificial rock pools create habitat on structures that would otherwise reduce biodiversity. They are designed in a way that can support life both inside and outside the pods.

AMENITY

Artificial rock pools, such as Vertipools, are designed to be visually appealing, adding interest to seawalls, harbours and dock structure. They provide a good opportunity to engage and educate the local community.

Photo: Groundwork / Artificial Rock Pools - Blyth Estuary

ARTIFICIAL ROCK POOLS

How are the environmental benefits monitored?

- Photos, videos and site visits to understand species composition
- Quarterly water quality, pH and temperature monitoring

How are the social benefits monitored?

- Assessing the influence of relationships with nature on health and wellbeing through surveys
- Measuring job creation, job retention, volunteer hours and training course provision
- Surveying employee skills and knowledge to understand placement benefits
- Evaluating visitor changes

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; From £12,000
- Monitoring; From £3,000 p/a

What are the returns on investment?

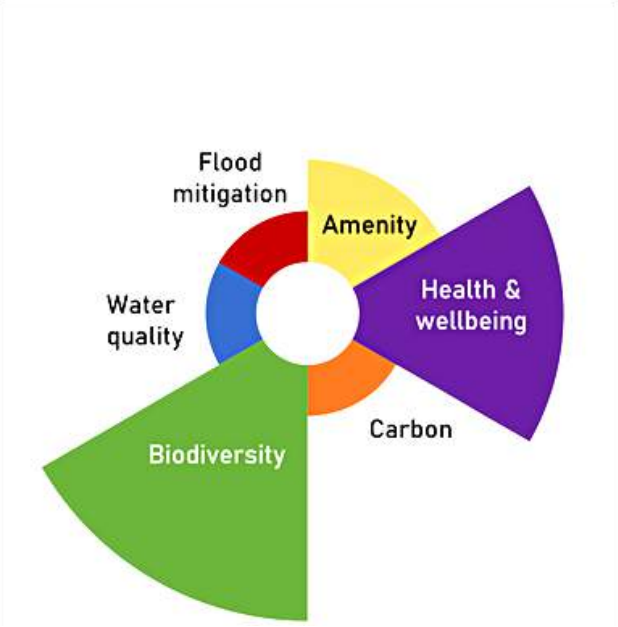
- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Groundwork / Artificial Rock Pools - Blyth Estuary

BIRD ROOSTS

Artificial bird roosts are formed from timber to create roosting and nesting ledges.

As a result of encroachment on estuary edges, natural nesting sites have disappeared. An artificial structure can provide a good replacement for a safe place where birds can roost and raise their chicks.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Bird roosts can increase the number of bird and invertebrate species. They can also help increase the percentage cover of nearby marine plants.

HEALTH AND WELLBEING

Existing studies suggest that seeing or hearing birds can provide humans with increased wellbeing. Birds can improve local connection to nature and engage a wide range of demographics. This can improve community cohesion and reduce pressure on physical and mental health services.

Photo: Peter Whitcomb / Starlings come to roost / CC BY-SA 2.0

BIRD ROOSTS

How are the environmental benefits monitored?

- Monitoring of species composition on and near the roosts
- Site visits to measure improvements
- Monitoring of breeding numbers, nests and young fledged

How are the social benefits monitored?

- Assessing the influence of relationships with nature on health and wellbeing through surveys
- Measuring job creation, job retention, volunteer hours and training course provision
- Surveying employee skills and knowledge to understand placement benefits
- Evaluating visitor changes

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; From £5,000
- Monitoring; From £3,000 p/a

What are the returns on investment?

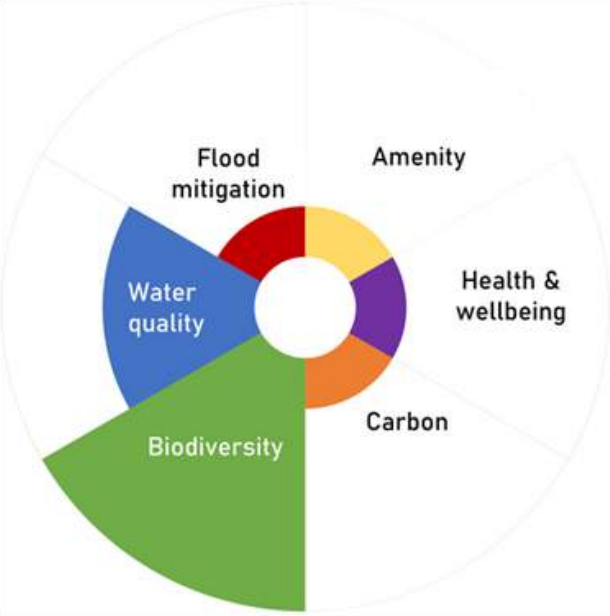
- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Getty Images

FISH REFUGIA

Fish refugia are small shells that provide a nursery for fish.

Once installed, marine organisms colonise the outside, improving biodiversity. This provides new habitats and can improve water quality.



Benefits ranked on a scale of 1 to 5 to show relative benefit provision. Ranking was undertaken by Groundwork and is indicative only.

What are the key benefits?

BIODIVERSITY

Fish refugia create fish nurseries and promote the growth of marine plants. This attracts marine invertebrates, mammals and birds, enhancing the biodiversity of the estuary.

WATER QUALITY

Many marine molluscs and invertebrates take in water as they feed and as a result filter nutrients and pollutants out, leading to improved water quality.

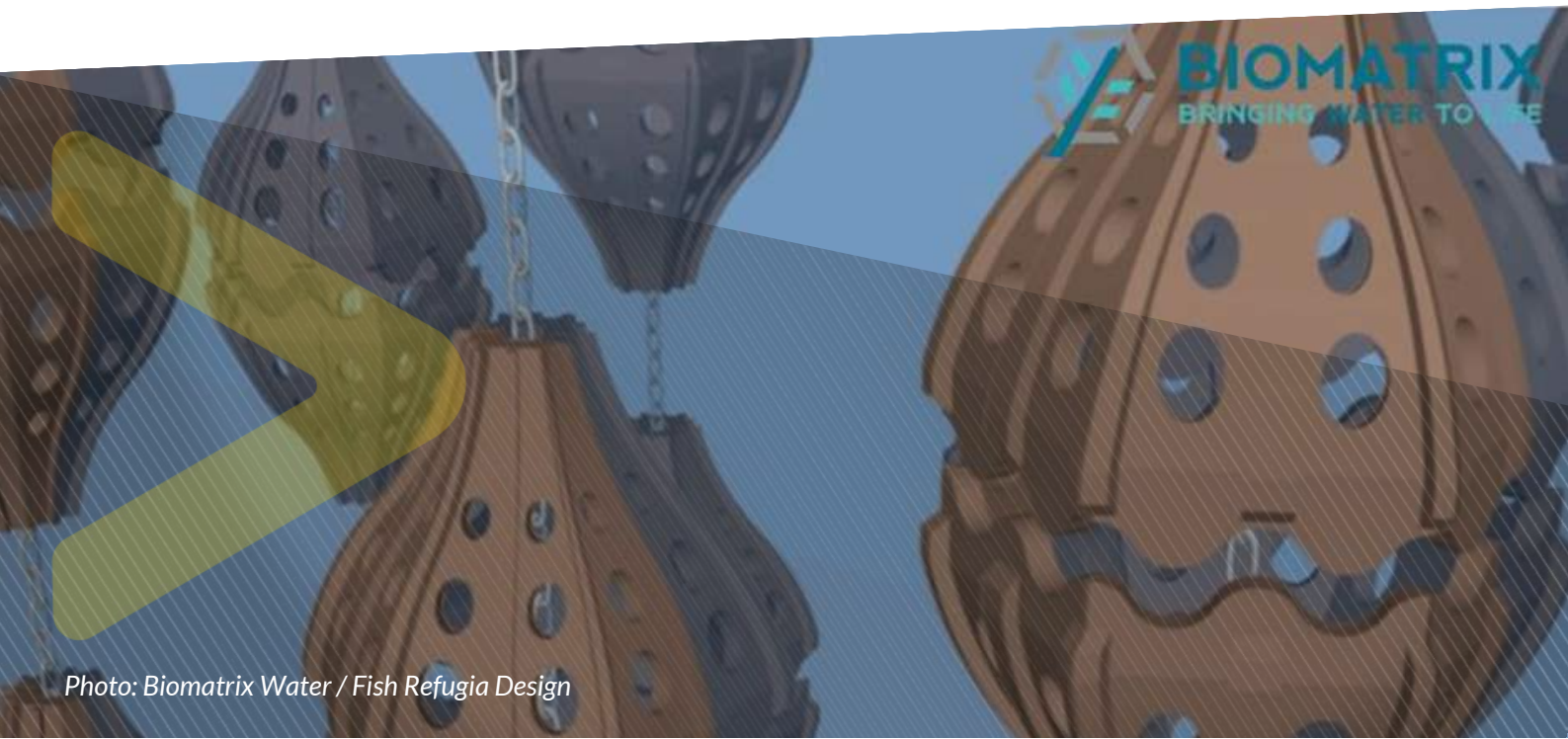


Photo: Biomatrix Water / Fish Refugia Design

FISH REFUGIA

How are the environmental benefits monitored?

- Photos, videos and site visits to understand species composition
- Quarterly water quality, pH and temperature monitoring

How are the social benefits monitored?

- Assessing the influence of relationships with nature on health and wellbeing through surveys
- Measuring job creation, job retention, volunteer hours and training course provision
- Surveying employee skills and knowledge to understand placement benefits
- Evaluating visitor changes

What are the associated costs?

Upfront and annual costs typically include

- Design, build and installation; £25,000 - £50,000
- Monitoring; From £3,000 p/a

What are the returns on investment?

- Credit for the environmental and social benefits
- Access to annual updates with photos
- 5-yearly monitoring results

Photo: Biomatrix Water / Fish Refugia - Blyth Estuary

FOR MORE INFORMATION ON SPONSORING ANY OF OUR INITIATIVES CONTACT: GNEC.DEVELOPMENT@GROUNDWORK.ORG.UK

REVITALISING OUR ESTUARIES INVESTMENT PORTFOLIO

GROUNDWORK NE & CUMBRIA

Visit: www.groundwork.org.uk/north-east-and-yorkshire
Email: north.east@groundwork.org.uk
Telephone: 01388 662 666

@GWKNE
@GWKNE | @RevitalisingOurEstuaries
@Groundwork In The North
@gwkne | @revitalisingourestuaries
Groundwork North East & Cumbria

Groundwork NE & Cumbria is a company limited by guarantee and registered in England.
Company Registration Number: 2702815 Charity Registration No: 1017706
Published January 2023