

DEEP TIME

A National Model for Citizen-powered Landscape Intelligence



OVERVIEW

From 2021 to 2025, DigVentures delivered 9 major citizen science missions through its Deep Time platform, spanning over 5,300 km² of the UK's most ecologically and archaeologically sensitive landscapes. These missions trained thousands of participants to collect high-quality spatial data on habitats and heritage, providing land managers and policymakers with actionable insights—while also delivering measurable public benefit.

PROGRAMME THEMES

1. Climate & Conservation

Missions such as Purbeck and Northumberland Coast delivered timely ecological data for climate resilience planning, coastal management, and habitat restoration.

2. Heritage at Risk

Projects in the Peak District, Brightwater, and Wallington provided critical spatial data to protect buried archaeology in dynamic, at-risk landscapes.

3. Natural Capital & Land Management

Missions like North Pennines and Brightwater NE supported natural capital strategies, supplying ecological baselines for biodiversity net gain, woodland creation, and ecosystem services modelling

4. Digital Inclusion & Learning

Deep Time reached thousands of people across the UK and beyond, offering flexible, self-paced training and building transferable skills in spatial analysis, digital mapping, and heritage or habitat identification.

AT A GLANCE

Theme: Heritage

Case Studies: Brightwater, Purbeck and Studland, Peak District, Wallington Estate, Hadrian's Wall Corridor

Area Mapped: 431 km²

Features Identified: 12,619 historic environment markers

Avg. Data Quality: 84–94%

Theme: Habitat

Case Studies: Brightwater, Hadrian's Wall, North Pennines National Landscape, Northumberland Coast National Landscape, Wallington Estate

Area Mapped: 4,880 km²

Features Identified: 58,722 habitat polygons

Avg. Data Quality: 76–85%

VOICES FROM THE PROGRAMME

"We're thinking differently about how we involve people. This kind of volunteering is scalable, accessible, and powerful."

Tom Dommett, Head of Historic Environment, National Trust

"The quality and scale of the dataset created is really high. The process was collaborative, fast, and deeply valuable."

Adam Millington, Biodiversity Lead, North Pennines National Landscape

"It was a dream come true. I never thought I'd contribute to archaeology— but I did."

Sara, Brightwater Pastronaut

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WHAT WE LEARNED

Citizen science at scale delivers

Trained participants produced spatial data that matched or outperformed AI-generated and professional datasets—at a fraction of the cost.

Place-based participation creates long-term engagement

Participants formed emotional and educational connections with their chosen landscapes, often continuing involvement beyond the mission.

Action reduces climate anxiety

Many participants reported that taking part made them feel more hopeful, empowered, and motivated to make changes in their everyday lives to benefit the environment.

New models of volunteering are emerging

Missions attracted intergenerational, digitally connected, and globally distributed communities who contributed to real-world conservation and planning.

Partnerships unlock potential

Deep Time's success depended on collaboration with National Trust, Natural England, National Park Authorities, Wildlife Trusts and community groups, ensuring data integration, policy relevance and utility for local and regional advocacy.

WHAT'S NEXT?

With a proven, repeatable model for high-impact citizen science, Deep Time is now poised to support:

 **Regional Nature Recovery Strategies (LNRS)**

 **Participatory approaches to biodiversity net gain and green investment frameworks**

 **National ecological and cultural baselining**

 **Heritage Partnership Agreements**

Hobbyist archaeologists identify thousands of ancient sites in England

Exclusive: Bronze age remains and Roman roads among 12,802 sites discovered using latest technology



📷 The Peak District was one of the three sites studied by Deep Time volunteers. Photograph: Jo Finney Photography/Getty Images

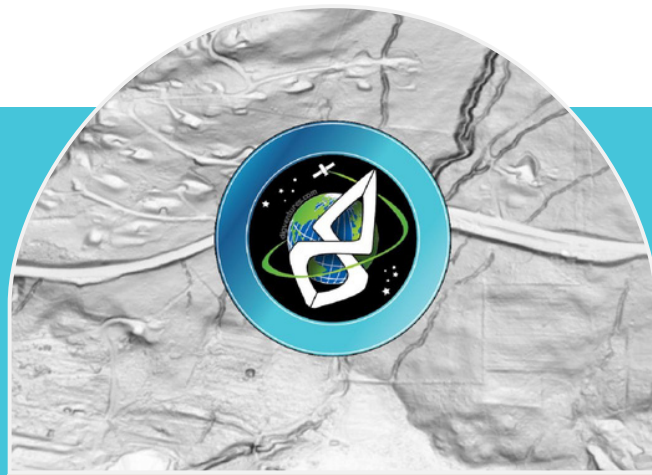
WE ARE HONORED TO HAVE BEEN SELECTED AS PART OF THE 2025 COHORT FOR THE EUROPEAN UNION PRIZE FOR CITIZEN SCIENCE



Mapping Heritage at Risk

BRIGHTWATER LANDSCAPE PARTNERSHIP

Partners: Durham County Council



THE CHALLENGE

The Brightwater Landscape Partnership needed accurate, spatially defined archaeological data to support environmental and planning decisions. The existing Historic Environment Record listed 3,925 sites, but lacked the precision required for effective heritage management at landscape scale.

OUR APPROACH

Launched during the Covid-19 pandemic, this pilot used the Deep Time platform to train participants in identifying archaeological features using LiDAR, satellite imagery, and historic maps. Initially capped at 100, the cohort expanded to 150 due to overwhelming demand. Citizens submitted georeferenced data via a custom-built GIS, which also provided a dataset for testing AI-led archaeological detection.

IMPACT

This mission demonstrated that trained citizens can produce archaeological data of a quality that rivals or exceeds professional standards. It laid the foundation for subsequent Deep Time missions, validating a new model of crowd-led mapping that supports both planning and public engagement.

"The experience improved my sense of self worth. Even though I am old and disabled, I can still be useful via online archaeology."

he/him, 65-74 retired

"A really easy system for a novice that's interested in archaeology to join in and make a difference. It was a dream come true."

Sara, 45-54, Teacher

AT A GLANCE

 Location: County Durham (Brightwater Landscape)

 Focus: Green and Brown Field Archaeology

 Area Mapped: 220 km²

 Participants: 150 citizen scientists

 Features Identified: 3,670 (+94% increase)

 Data Quality: 94.32% vs 88.71% (Historic Environment Record)

 96% of participants reported improved understanding of archaeology's role in planning

WHAT MADE THIS WORK

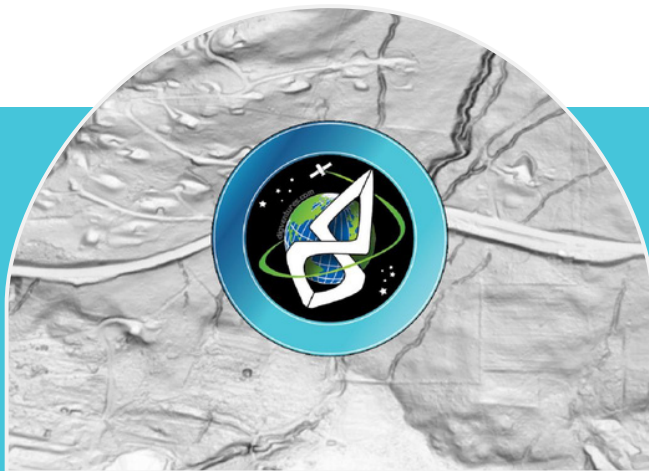
- ✓ Self-paced, accessible training
- ✓ GIS tools combining LiDAR, satellite, and historic maps
- ✓ Strong community motivation to protect local heritage

VOICES FROM THE MISSION

Mapping Heritage at Risk

PURBECK AND STUDLAND

Partner: National Trust



THE CHALLENGE

Coastal erosion is accelerating along the Jurassic Coast, threatening both natural landscapes and archaeological features. The National Trust urgently needed updated data to inform climate resilience planning, but conventional surveys were slow and incomplete.

OUR APPROACH

DigVentures launched a citizen-powered mapping mission through Deep Time, combining satellite imagery, historic maps, and high-resolution LiDAR. 743 participants received self-paced training and used a custom GIS to map archaeological features—many with no prior experience.

IMPACT

The project delivered high-quality archaeological data at speed, while opening access to new volunteer demographics and strengthening the case for citizen-powered climate resilience work.

VOICES FROM THE MISSION

"We can already see how climate change is affecting some of our most distinctive landscapes. This project helped us go further—and showed how new demographics are stepping forward to take part."

**Tom Dommett, Head of Historic Environment,
National Trust**

AT A GLANCE

📍 Location: Dorset, Jurassic Coast

🔍 Focus: Coastal Archaeology and Climate Threat

📏 Area Mapped: 35 km²

👥 Participants: 743 Pastronauts

📈 Features Identified: 2,887 (+367% increase)

✅ Data Quality: 87.3% vs (up from 83.2% in the HBSMR)

🚀 Enabled informed planning across a vulnerable protected landscape

WHAT MADE THIS WORK

✓ Flexible training, accessible worldwide

✓ High resolution LiDAR, maps and imagery

✓ Real-world contribution to heritage protection

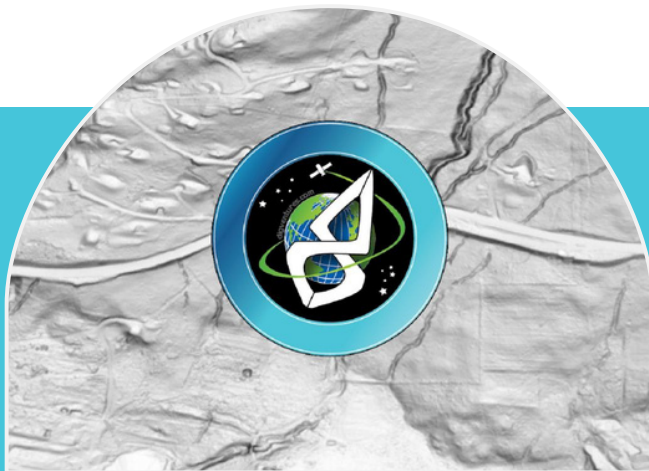
"Using investigative skills to identify archaeology in the landscape and record this so it contributes to the bigger picture. This was pure joy."

Stephanie, 45–54, Pastronaut

Mapping Heritage at Risk

WALLINGTON ESTATE

Partner: National Trust



THE CHALLENGE

To guide a major reforestation effort, the National Trust needed precise archaeological data to avoid disturbing buried heritage. The existing record—while extensive—lacked the spatial clarity needed to inform planning.

OUR APPROACH

DigVentures trained 1,040 citizen scientists through the Deep Time platform. Participants learned to identify archaeological features from LiDAR and satellite data, and submitted geo-referenced polygons through a custom GIS tailored to land management needs.

IMPACT

This mission demonstrated how heritage and environmental goals can align. The citizen-powered survey produced high-quality data faster than traditional methods, while making space for inclusive participation.

VOICES FROM THE MISSION

"We're thrilled with the results. It's made us think about how we engage with volunteers—and how to expand our offer to communities at scale."

**Tom Dommett, Head of Historic Environment,
National Trust**

AT A GLANCE

- 📍 Location: Northumberland
- 🔍 Focus: Archaeology in Reforestation landscapes
- 📊 Area Mapped: 54 km²
- 👥 Participants: 1,040 Pastronauts
- 📈 Features Identified: 2,626 (+194% increase)
- ✅ Data Quality: 92.7% vs (up from 91.2% in the HBSMR)
- 🌲 **Data directly informed tree planting decisions on National Trust land**

WHAT MADE THIS WORK

- ✓ Training tailored to reforestation context
- ✓ Seamless data pipeline into land management systems
- ✓ Scalable engagement with local and remote participants

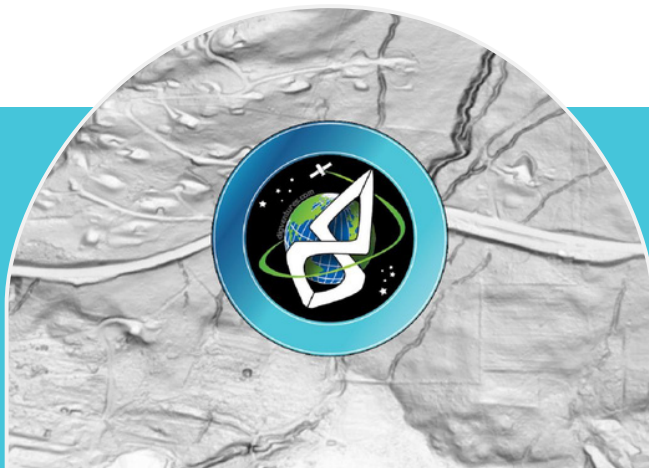
"I loved the opportunity to learn. It's something I've always loved but have no qualifications in—it can be daunting to engage with archaeology, but this was so inclusive."

Deirde, 35–44, Pastronaut

Mapping Heritage at Risk

PEAK DISTRICT

Partner: National Trust



THE CHALLENGE

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**Tom Dommett, Head of Historic Environment,
National Trust**

AT A GLANCE

- 📍 Location: Peak District National Park
- 🔍 Focus: Peatland Archaeology and Landscape Recovery
- 📊 Area Mapped: 122 km²
- 👥 Participants: 700 Pastronauts
- 📈 Features Identified: 3,436 (+106% increase)
- ✅ Data Quality: 84% vs (up from 63% in the HBSMR)
- 🌲 **Data directly informed tree planting decisions on National Trust land**

WHAT MADE THIS WORK

- ✓ Training tailored to reforestation context
- ✓ Seamless data pipeline into land management systems
- ✓ Scalable engagement with local and remote participants

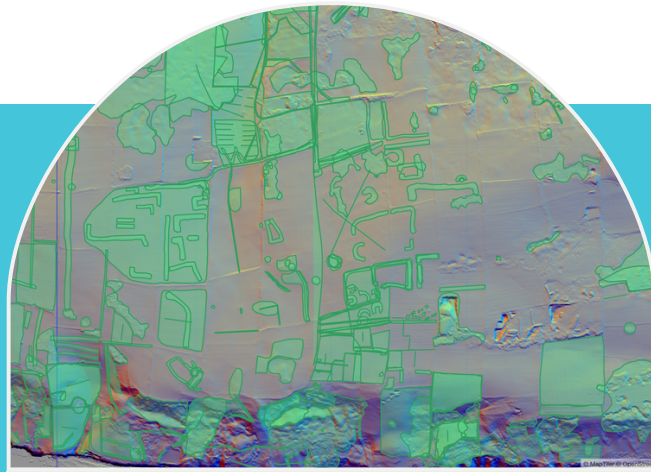
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Deirde, 35–44, Pastronaut

Mapping Habitats

HADRIAN'S WALL CORRIDOR

Partner: Northumberland National Park Authority



THE CHALLENGE

The Hadrian's Wall corridor required comprehensive, high-resolution habitat data to guide nature recovery efforts and climate adaptation planning. However, existing datasets like Living England's Habitat Probability Maps lacked the accuracy and detail needed across this complex landscape.

OUR APPROACH

Citizen scientists received structured training via the Deep Time platform to classify 16 UK Biodiversity Action Plan habitats using satellite imagery and LiDAR data. Participants mapped the entire corridor and submitted georeferenced habitat polygons through our bespoke GIS.

IMPACT

This mission demonstrated that citizen scientists can produce habitat data comparable to professional surveys and spatial AI, offering a scalable, cost-effective method for ecological mapping. It fostered deep personal engagement, with many participants reporting a stronger sense of connection to the landscape.

VOICES FROM THE MISSION

"This project aligns closely with our Hadrian's Wall Wetlands Landscape Recovery work. We share a commitment to broadening participation, fostering knowledge exchange, and combining cultural and natural heritage."

**Nick Pepper, Engagement Officer,
Northumberland National Park Authority**

AT A GLANCE

- 📍 Location: Northumberland, 10k north and south of Hadrian's Wall inclusive
- 🔍 Focus: Broad Habitat Classification
- 📊 Area Mapped: 1,120 km²
- 👥 Participants: 1,208 Futureonauts, led by 41 Mission Leaders
- 📏 Features Mapped: 20,826 habitat polygons
- ✅ Data Quality: 80% matched or exceeded professional datasets
- 📈 60% of grids surpassed Living England and Habitat Probability Maps
- 📦 Delivered fine-grained habitat data at landscape scale

WHAT MADE THIS WORK

- ✓ Comprehensive training in habitat classification
- ✓ Intuitive mapping tools tailored to ecological data
- ✓ Alignment with nature recovery goals at national and regional levels

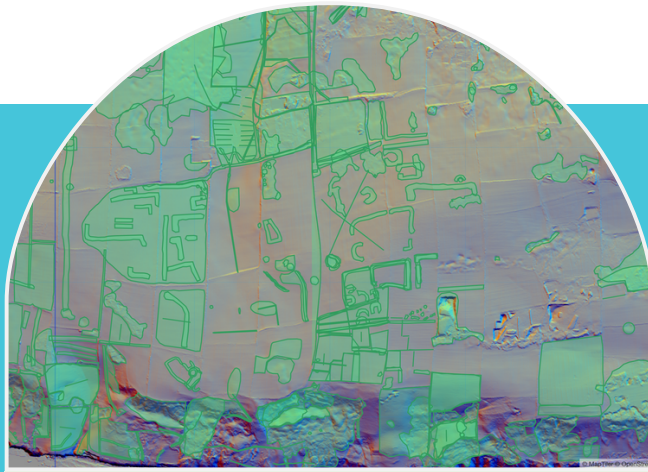
"I really enjoyed every aspect—from learning about all the different habitats to studying the maps and plotting the polygons. It felt great to contribute to something important."

Linda, 25-34, Futureonaut

Mapping Habitats

NORTHUMBERLAND COAST

Partner: Northumberland Coast National Landscape



THE CHALLENGE

Coastal ecosystems are changing rapidly due to climate impacts, yet traditional ecological monitoring is too slow and costly to keep up. The Northumberland Coast needed timely, fine-grained data to inform resilience planning across complex habitat mosaics.

OUR APPROACH

Community scientists were trained to identify 16 UK habitat types using satellite, aerial, and LiDAR data. Participants used a bespoke GIS interface to map seasonal habitat change across the coastal zone, providing real-time intelligence for land managers.

IMPACT

This mission produced high-quality ecological data to support dynamic coastal conservation strategies. It also enabled deeper public connection to the landscape and built new pathways for long-term volunteer engagement.

VOICES FROM THE MISSION

"The work done by the Futureonauts is fantastic—not just on the designated landscape, but across inland areas too. The passion, quality of data, and enthusiasm are all exceptional."

Sarah Winlow, Landscape Officer
Northumberland Coast National Landscape

AT A GLANCE

📍 Location: Northumberland Coast National Landscape

🎯 Focus: Dynamic Coastal Ecosystems

📊 Area Mapped: 593 km²

👥 Participants: 1,208 Futureonauts, led by 41 Mission Leaders

📐 Features Mapped: 12,364 habitat polygons

✅ Data Quality: 82% matched or exceeded professional datasets

📈 94% of grids were equal or superior to at least one baseline dataset

🔄 Established a replicable model for rapid coastal mapping

WHAT MADE THIS WORK

✓ Specialist training for coastal conditions

✓ Agile monitoring tools for rapidly changing environments

✓ Data aligned with Natural England and NCNL priorities

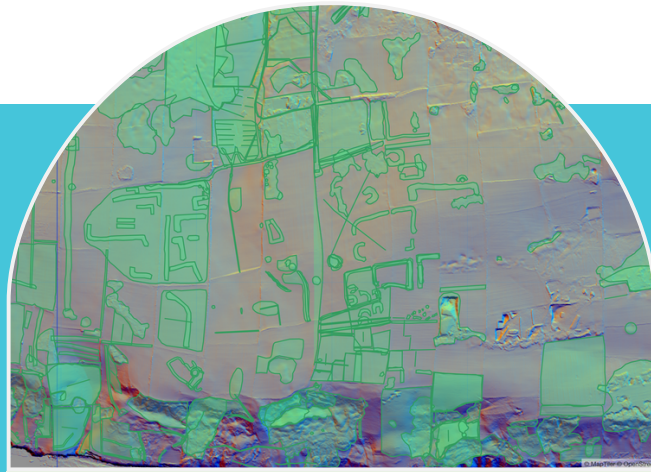
"Deep Time gave me the opportunity to use tech in a way that felt meaningful—not like work, but like contributing to something important."

Deborah, 42
Actor and Futureonaut

Mapping Habitats

BRIGHTWATER (NATURAL ENVIRONMENT)

Partner: Durham Wildlife Trust



THE CHALLENGE

To support a natural capital approach, the Brightwater Landscape Partnership needed detailed baseline habitat data—while also building public understanding of nature recovery. Existing datasets lacked the local specificity needed for planning decisions.

OUR APPROACH

Deep Time provided structured ecological training and intuitive mapping tools, enabling participants to identify and map habitats across diverse landscapes. Participants used satellite imagery and LiDAR to record features, directly supporting natural capital monitoring.

IMPACT

The mission generated valuable habitat data at scale while fostering community connection and ecological literacy. Participants reported a heightened awareness of local landscapes and a desire to continue contributing.

VOICES FROM THE MISSION

"Participating in Deep Time was a great experience for me. It allowed me to have a place where I really felt like I could contribute to conservation efforts on my own time and from the comfort of my own home. It became quite a relaxing activity for me."

She/her, home educating parent

AT A GLANCE

📍 Location: County Durham
(Brightwater Landscape)

🔍 Focus: Urban and Rural Habitat Mapping

📏 Area Mapped: 483 km²

👥 Participants: 620 Futureonauts

📐 Features Mapped: 11,647 habitat polygons

✅ Data Quality: 87.5% matched or exceeded professional datasets

📈 60% of grids surpassed Living England and Habitat Probability Maps

🧠 Strengthened public understanding of ecological value

WHAT MADE THIS WORK

✓ Combined cultural and natural heritage context

✓ Custom tools aligned with Durham Wildlife Trust needs

✓ Reinforced value of local knowledge in ecological work

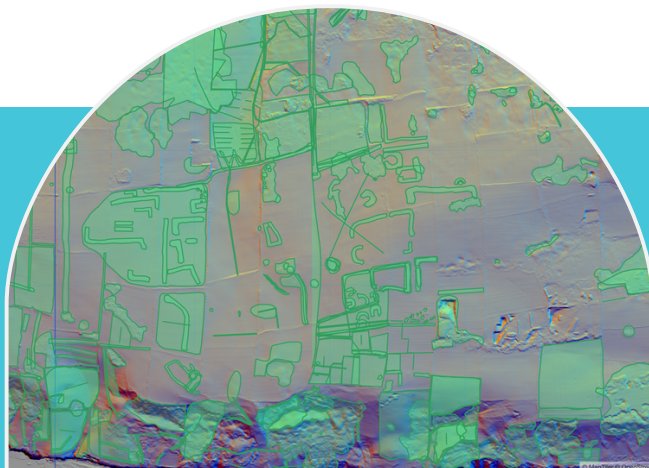
"I gained a better understanding of the project areas—especially being a resident and frequent visitor to all the sites we covered."

**Jim, 68, Retired
Healthcare Professional**

Mapping Habitats

WALLINGTON ESTATE (NATURAL ENVIRONMENT)

Partner: National Trust



THE CHALLENGE

Wallington Estate needed high-quality habitat data to support ecological initiatives and inform reforestation decisions. Existing data was fragmented and costly to update using traditional surveys.

OUR APPROACH

Through Deep Time, participants were trained to identify habitat types using satellite and LiDAR data. Using a bespoke GIS platform, they mapped key areas across the estate, supporting ecological and land use planning.

IMPACT

Citizen scientists produced data at a level suitable for conservation decision-making, while deepening their own sense of environmental stewardship. The mission also opened doors for more inclusive forms of digital volunteering.

VOICES FROM THE MISSION

"We're absolutely thrilled by the collective effort, and to see new demographics stepping forward to take part. It's helping us do even more landscape resilience work."

Tom Dommett,
Head of Historic Environment, National Trust

AT A GLANCE

📍 Location: Wallington Estate, Northumberland

🔍 Focus: Woodland and Land Management

📏 Area Mapped: 315 km²

👥 Participants: 638 Futureonauts

📐 Features Mapped: 6,456 habitat polygons

✅ Data Accuracy: 77% matched or exceeded machine-learning datasets

🌲 Informed National Trust landscape management strategies

WHAT MADE THIS WORK

- ✓ Training accessible to all ages and backgrounds
- ✓ User-friendly mapping tools for non-specialists
- ✓ Tangible outcomes for land and woodland management

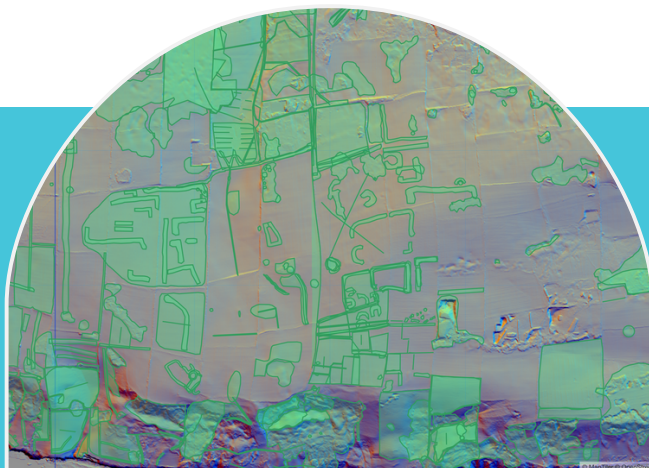
"I learnt a lot and can apply what I've learnt in the interests of the community. It makes me happy to work for a community that respects nature, it makes me feel like part of something bigger."

Krista, 64, Art Conservator

Mapping Habitats

NORTH PENNINES

FPartner: North Pennines National Landscape



THE CHALLENGE

North Pennines National Landscape needed a dataset of open water bodies to guide eDNA sampling and support nature recovery efforts. The data had to meet strict standards for ecological monitoring—on a tight timescale.

OUR APPROACH

Deep Time trained participants to identify and map open water bodies using satellite imagery and LiDAR. With input from NPNL staff, the mission used a bespoke Quality Assurance process to validate outputs and integrate them into local planning frameworks.

IMPACT

This mission proved that citizens could deliver precision mapping at speed—while also increasing environmental engagement. Participants reported both personal growth and lasting interest in digital ecology.

VOICES FROM THE MISSION

"The speed and quality of this project was astounding. We've felt deeply involved throughout, and we're confident the dataset will guide nature recovery at scale."

**Adam Millington, Biodiversity Lead
North Pennines National Landscape**

AT A GLANCE

📍 Location: North Pennines National Landscape

🔍 Focus: Open Water Body Identification

📊 Area Mapped: 2,369 km²

👥 Participants: 547 Futureonauts

📏 Features Mapped: 7,430 habitat polygons

✅ Data Accuracy: 85.3% Fidelity | 76% Accuracy | 82.4% Completeness

📅 1 Mapping completed in just two weeks

📄 Dataset supports eDNA sampling and restoration strategy

WHAT MADE THIS WORK

✓ Simple, focused task for first-time mappers

✓ Collaborative QA process with landscape partners

✓ Rapid turnaround with lasting planning value

"I've even treated myself to a desktop PC with multiple screens ready for this year's projects. It all stems from being involved in such a great project—thank you!"

James, 45–54, Futureonaut