

Reimagining Pathways into Environmental Science through Showcasing Technical Careers

Executive Summary

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Executive Summary

Environmental science integrates multiple disciplines, including physical, biological, and mathematical sciences, to study the environment and to solve environmental problems. It is central to addressing global environmental challenges such as climate change, water insecurity, biodiversity loss, and pollution. Addressing these challenges requires not only rigorous research but a highly skilled workforce capable of generating data-informed interventions, managing environmental resources, maintaining research infrastructure, and translating scientific knowledge into practical solutions. However, despite the importance of environmental science to addressing global and local challenges, evidence shows that careers within environmental science are largely invisible and poorly articulated, particularly with respect to technical and vocational pathways.

In this project, we sought to understand this challenge in greater detail within the context of North East England. Our aim was to support opening up the environment by identifying, including and showcasing technical career routes to the young people who would not otherwise have considered a technical career pathway or have been aware of employment opportunities in the environmental sciences. It draws from the strategic imperative in County Durham, Tyne and Wear and Teesside to improve social mobility, particularly for 16-18 year olds, alongside the Natural Environmental Research Council's strategic aim to '[work in partnership to improve the visibility of diverse role models](#).' Young people from socially disadvantaged backgrounds are less likely to be aware of or have access to training and skills provision that enables them to explore a career in environmental science. With this as the challenge statement for the project, we brought together a team that represented the diversity of lived experience and expertise of technical staff wishing to enable opportunities for develop and nurture the technical workforce of the future. Alongside them were research enabling academics and professionals with expertise in outreach and engagement, research culture and evaluation to advance strategic direction with evidenced-led interventions.

This study explores how technical career pathways within environmental science are currently understood, accessed and supported within T Levels in the North East of England. Focusing on the experiences of technical professionals at Durham University and the perspectives of Further Education (FE) colleges and stakeholders associated with T Levels in the North East of England, this study identifies barriers and opportunities in developing clearer, more inclusive pathways into environmental science-related technical roles. The aim is to inform future efforts to improve visibility, accessibility, and progression within environmental science technical careers.

A summary of the key findings from the research are presented below, followed by recommendations for future interventions, policy and practice.

Key findings about the technical professional community at Durham University

Forty responses were received to the survey of technical professionals at Durham University. Respondents were experienced, highly qualified, from across a range of departments, with the majority having North East regional origins. The majority of survey respondents held degree level academic qualifications or above, with nearly half having completed a doctoral degree or

equivalent. There was an equal split between female and male survey respondents, but limited representation from other gender identities. There was also limited diversity in age and ethnicity of respondents, as well as low numbers of individuals at entry-level work grades and lower educational qualifications. Knowledge of the technical professional community at Durham University indicates that younger participants (under 30 years of age) and lower work grades (Grades 3-4) are likely to be underrepresented in the survey sample. This may reflect survey self-selection bias, but it may also highlight a potential gap in accessible entry routes and early career pipelines into technical roles, particularly for those without advanced academic credentials.

1. Technical professionals responding the survey had extensive breadth and depth of expertise. The findings emphasise the multi-dimensional scope of technical work being undertaken, where scientific knowledge and skills are supported by operational, analytical and collaborative skillsets. The data reinforces the important role of technicians for their highly skilled specialisms in addition to contributions to research culture and operational resilience. The findings also highlight the range of skills and opportunities that are available to individuals who chose to pursue a technical career. There was also evidence of potential unused or underutilised expertise in areas such as advanced scientific techniques, creative and digital skills, hands-on practical craftsmanship and public engagement skills.
2. Technical professionals were supporting and contributing to Environmental Sciences across four key areas: research, resource management, education, and external impact. Respondents significantly contribute to maintaining infrastructure, managing resources sustainably and supporting teaching and skills development in addition to facilitating and delivering research outputs. Responses demonstrated the important and varied contributions technicians make to Environmental Science.
3. The highest level of qualification of respondents was significant in predicting work grade. Higher educational qualifications were associated with higher work grades even after controlling for length of time in a technical role. While this may reflect the technical and research-intensive nature of many roles, it also raises the possibility that formal qualifications could act as a structural filter into and within technical careers, potentially limiting access for individuals without the resources or opportunities to pursue advanced education.
4. Both length of time in a technical role at Durham University and gender were not significant in predicting the work grade of respondents. This potentially highlights that technical professionals at Durham University with many years of technical experience may be struggling to progress into higher grades.
5. The predominant entry route into technical careers for the respondents to the survey was through academic routes (e.g. undertaking a degree), with apprenticeships and internships significantly less common.

6. The main motivations of survey respondents for choosing a technical career were linked to the practical, hands-on nature of the job, personal interest in the subject area and the accessibility of opportunities to pursue this profession.
7. Involvement in some type of industry-facing activity within the past five years was reported by half of survey respondents. The remainder either indicated that they had not engaged with industry or chose not to respond to the question. This variation highlighted the diversity of technical professional roles across departments and the differing opportunities available for external collaboration. Providing external services and contract work was the most common form of industrial engagement. Activities ranged from sample analysis and preparation to the provision of specialist expertise for clients across academic, commercial, and public sectors. Technicians also identified that they contributed to research collaborations, training activities and skills exchange.
8. The research highlighted the role of technicians as key facilitators bridging the gap between research and society. The findings demonstrated the significant role that technicians play in outreach, public and community engagement activities as well as the opportunities and challenges associated with their involvement. The majority of participants reported contribution to outreach activities 1-3 times per year within the past five years, reflecting a commitment to widening participation and sharing knowledge beyond the university. However, barriers persist, particularly time and workload pressures, limited access to opportunities, and resource constraints, which inhibit greater participation. Participants emphasised the need for structured workload models, dedicated resources, and recognition of technician expertise in outreach planning.
9. There was a strong interest among the technical professionals responding to the survey to remain engaged in the project beyond the initial survey phase. Many respondents were interested in learning more about becoming Technical Champions, helping to showcase diverse routes into technical work, to challenge outdated perceptions and empower the next generation of NERC technicians by sharing authentic and motivating career narratives.

Key findings about the T Level ecosystem in the North East of England

Round table discussions and interviews were carried out with curriculum lead representatives from six FE colleges as well as stakeholders from the wider T Level ecosystem in the North East of England. Desk based research was also conducted to understand T Level provision and the Further Education infrastructure and networks in the North East.

10. The findings show that T Levels, as a new and developing suite of qualifications, suffer from limited visibility with the wider public, and their novelty presents challenges of recognition and understanding of their value when compared to more established pathways (such as A Levels or apprenticeships). Learners, families, teachers and employers appear to have low awareness of the T Level options and curricula, and the career opportunities that they can lead to. There is concern from FE colleges around careers guidance within schools about

undertaking T Levels, and uneven regional availability of T Levels provision, especially across subject areas. Marketing of post-16 options is broadly focussed on more established routes, contributing to low visibility and under-recruitment to T Levels both nationally and in the North East. This low uptake has also been reported by the National Audit Office which estimates that national forecasts suggest that around 66,100 students will undertake T Levels nationally in 2029/30, compared to the 2021 projection of over 110,000.

11. Environmental science is not offered as a standalone T Level, meaning learners must find relevant content within other, less visibly linked routes, mainly land-based, engineering, science, and construction. These subjects lack clear signposting to environmental careers, resulting in low visibility for environmental pathways across the region. Both desk research and college interviews show that environmental themes are usually embedded indirectly rather than presented as distinct learning elements, with integration depending on local curriculum design and staff initiative. Consequently, although environmental learning exists within multiple T Level routes, it rarely appears as a clearly defined or easily identifiable pathway for learners.
12. Social inequalities and stereotypes were found to influence who enters and completes T Levels. Gender imbalances, limited role models and narrow perceptions about “who belongs” in technical and environmental roles mean that many potential learners are not choosing to enter into T Levels, let alone seeing what the potential outcome of a T Level could be in terms of career opportunities.
13. Structural barriers were identified for learners from socio-economically disadvantaged backgrounds, including challenges relating to transport costs, additional family-related responsibilities, and the demands from T Levels delivery and assessments. These made participation and completion more challenging for these learners, risking exacerbating inequality in who could access technical careers.
14. Learners are missing opportunities for real-world, practical, career-linked learning in environmental science due to the high content load and assessment focussed curriculum. Teaching staff reported limited flexibility within the delivery of T Levels due to the intense structure and pace, which means that environmental and sustainability content can be squeezed, treated as add-ons, optional or positioned at the end of academic years.
15. Placements are one of the biggest pressures for FE colleges, particularly as completion of a placement is essential to achieving the qualification. FE Colleges reported struggles with organising suitable and accessible placements for T Levels learners in disciplines such as environmental science, and also identified that many employers, especially in small and medium sized enterprises (SMEs), lack awareness and understanding about T Levels, and struggle with the administrative and supervision demands of hosting a placement.
16. T Levels learners face practical barriers that can limit their ability to undertake and complete placements. Long travel distances, limited public transport infrastructure within the North East, high transport costs, and limited local opportunities, especially in rural or

economically deprived areas, all of which hinder access and frustrate their commitments. These challenges mean that even highly motivated learners may be unable to accomplish a suitable placement, potentially preventing them from completing their T Levels, further shrinking the candidate pools and workforce provision, and limiting environmental science related opportunities.

17. Teaching staff in FE Colleges are highly committed and technically skilled but there can be gaps in awareness beyond their sector specialism, meaning that they may not have holistic knowledge of environmental science. With that said, even with frontier industrial experiences, the staff are occupied with incumbent teaching, assessing and administrative loads with no extra time and efforts adopting industrial knowledge to the taught forms in classrooms. Heavy workloads and limited access to professional development mean staff rarely have the time or opportunity to update their skills or connect with employers in these areas.
18. Existing partnerships between FE colleges and employers tend to be clustered around established industries such as engineering or construction and distributed amongst the regional industrial networks and facilities. It means that there is emerging convergence between the training skillsets with the industrial bases that would expect the graduation and employment of the T Level qualifiers. Developing and sustaining links with a broader range of employers linked with environmental sciences needs dedicated time and resourcing to support embedding these links into T Level provision.
19. T Level learners currently face unclear and uneven progression pathways from their studies into careers in environmental science. Environmental content is often embedded within broader T Level courses rather than presented as a distinct pathway, making it difficult for learners to recognise environmental science as a career field. Employers' limited understanding of T Levels qualifications and limited access to suitable placements undermines access and recruitment opportunities, whilst inconsistencies in universities accepting T Level qualifications for degree entry creates uncertainty for learners considering environmental degree routes. The consequence is that learners may study environmentally relevant materials without seeing the full range of related future opportunities.

Recommendations for future interventions, policy and practice

Recommendations for future interventions are suggested in Table 1 below in relation to broadening pathways into technical careers in environmental science. These are linked to four key themes to support advocacy of promotion, partnerships, policy, placements.

Table 1: Recommendations for future interventions to support pathways into environmental science careers through T Levels.

Theme		Implications for future interventions	Links to
1	Equality, Diversity and Inclusion	For future interventions there is a need for the collection of, and better access to, high-quality demographic data at intervention and institution level to support efforts to widen access to technical careers. It is crucial that interventions are proactive in encouraging diversity within the workforce and EDI must be at the centre with purposeful measures to actively remove structural, cultural, and socio-economic barriers. This includes: • avoiding reinforcing stereotypes, • recognising and mitigating socio-economic barriers, • using diverse role models, • equipping employers, technical professionals, teachers/advisers to challenge bias, and • designing T Level placements that do not exclude learners.	Policy Promotion Placements
2	Impact of qualifications on technical careers	There is a need to further investigate two key areas in relation to the impact of qualifications on careers as pertaining to technical professionals in environmental science: • Whether there are systemic barriers to entering technical careers in research-led universities without Level 6+ academic qualifications. • Whether there are systemic barriers to those interested in, and already within, technical careers gaining higher level qualifications and whether there are differential impacts on different communities.	Policy

Theme		Implications for future interventions	Links to
3	Increasing visibility of technical career pathways	Future interventions should make the technical career pathways in environmental science more visible to young people, FE Colleges and industry partners by: • Highlighting the variety and dynamic nature of technical careers in environmental science, especially in research-intensive universities. • Sharing what current technical professionals enjoy about their roles in environmental science. • Exemplifying the broad range of skills and attributes developed by technical professionals in environmental science. • Communicating the importance of technician roles for actively contributing to scientific knowledge production, rather than being predominantly support based.	Promotion
4	Public engagement and outreach for widening access to technical careers	Future interventions should support widening access to technical careers in environmental science by: • Providing outreach and engagement activities with EDI at the heart, including relatable, practical hands-on experiences to broaden awareness of environmental science technical careers, and for young people to see these as potential, accessible and interesting career options. • Embedding technicians more centrally in the planning, design and delivery of outreach activities and engagement programmes. • Ensuring that there is appropriate workload recognition and resourcing for technical professionals to undertake public engagement activities.	Promotion
5	Building industry partnerships to support placements and career pathways	Future interventions should expand relationships with external industry partners to support T Level placements and technical career pathways in environmental science by: • Expanding the scope of technician-led collaboration with external industry partners to grow the network of industry partners. • Institutionally recognising the value of technical professionals in engaging with industrial partners. • Exploring opportunities for technical professionals to co-develop outreach and engagement resources and events with FE Colleges and industry partners.	Partnerships Placements

Theme		Implications for future interventions	Links to
6	Pathways into T Levels	Future developments require intervention <i>before</i> learners make post-16 choices by providing clear, consistent, and relatable information that makes environmental science pathways visible and understandable. • Strengthen visibility of environmental science early (before learners commit). • Provide consistent, standardised messaging. • Use authentic, relatable role models. • Ensure learners, families, and school advisors receive clear, aligned information.	Promotion Policy
7	T Level Curriculum and Enrichment Touchpoints	Environmental science will only become a sustained part of T Level delivery if it is built into routine curriculum structures through co-produced, employer-aligned resources that are easy for FE staff to use. • Provide resources that slot directly into the mandated curriculum, limiting extra workload. • Co-produce materials with FE staff so they are relevant, feasible, and genuinely usable. • Anchor everything in real workplace practice, not abstract sustainability add-ons. • Make environmental content part of everyday teaching, not a peripheral extra.	Promotion Partnerships
8	T Level Placement Support	Strengthening environmental science placements requires structured, low-burden, clearly defined models that make opportunities accessible, understandable, and sustainable for learners, colleges, and employers. • Reduce administrative burden for both colleges and employers. • Clarify T Level expectations so employers understand learners' skills and readiness. • Improve accessibility by addressing transport, cost, and time constraints for learners. • Codify effective practice through clear guidance, case studies, and templates. • Provide practical, workloaded tools that support consistent employer engagement. • Build credible, sustainable placement pathways that make environmental science visible and viable within the T Level landscape.	Placements Policy Partnerships

Theme		Implications for future interventions	Links to
9	Teaching, Collaboration and Professional Development	Strengthening environmental pathways in T Levels requires sustained, structured professional-learning systems so FE educators can build the sector knowledge, employer relationships, and confidence needed to embed environmental content consistently and credibly; whilst employers gain understanding and awareness of T Levels and FE. • Move beyond ad-hoc or one-off training by embedding ongoing professional learning into routine practice. • Create structured collaboration opportunities for FE staff and employers to share knowledge, build cross-sector insight, and develop clear progression narratives. • Ensure professional development is continuous and timetabled, enabling environmental science to become a stable, confidently delivered component of T Level provision.	Promotion Partnerships
10	Pathways into Environmental Science Careers	Future interventions should build a clearer and more coherent progression system, strengthening visibility of environmental roles, improving employer and HE understanding of T Levels, and providing relatable career narratives so that environmental science becomes a credible and accessible destination for young people across the North East. • Clarify how T Level routes link to real environmental jobs to improve visibility and understanding among learners, families, and advisers. • Showcase diverse, relatable career journeys to make environmental roles meaningful and aspirational. • Increase employer awareness of T Level competencies so learners are recognised as capable entrants to environmental sectors. • Strengthen alignment with HE pathways to ensure learners can confidently access environmental science degrees where relevant. • Adopt a coordinated, system-level approach to make environmental progression routes visible, viable, and widely understood.	Promotion Policy

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Reporting

Durham University confirms that it has made every effort to adhere to NERC's OutE reporting guidelines and to provide an accurate interpretation of the evidence available.

Grantee Name: Neil Tunstall

Grantee Signature:



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