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To cite this article: Briony Carlin, Tina Sikka, Peter Hopkins, Laura Braunholtz, Louise Mair & Zarah Pattison (30 Oct 2023): Identifying the barriers to inclusion in field-based environmental sciences research, *Studies in Higher Education*, DOI: [10.1080/03075079.2023.2274378](https://doi.org/10.1080/03075079.2023.2274378)

To link to this article: <https://doi.org/10.1080/03075079.2023.2274378>



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Published online: 30 Oct 2023.



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# Identifying the barriers to inclusion in field-based environmental sciences research

Briony Carlin<sup>a</sup>, Tina Sikka<sup>a</sup>, Peter Hopkins<sup>a</sup>, Laura Braunholtz<sup>b,a</sup>, Louise Mair<sup>a</sup> and Zarah Pattison<sup>b,a</sup>

<sup>a</sup>Newcastle University, Newcastle Upon Tyne, UK; <sup>b</sup>Biological and Environmental Sciences, University of Stirling, Stirling, UK

## ABSTRACT

Fieldwork is an important component of data collection in environmental sciences and other related disciplines. Sensitive to the ways in which field based environmental sciences (FBES) research is often unsafe and lacks inclusivity, we explore findings from a mixed methods study that identified barriers to inclusion and overlooked risks to safety for FBES researchers. We found that gender and gender identity presented a direct risk for discrimination, harassment, and violence in the field (63.8% of cis females and 100% of nonbinary/genderqueer respondents). Sexuality, race, and ethnicity also posed a risk to FBES researchers with 88.3% of respondents stating that marginalised groups are underrepresented in FBES. Over half of our respondents stated class and socio-economic background to be a barrier to their participation in FBES research due to job precarity and lack of funding. These risks and barriers experienced by researchers can lead to a lack of novelty in environmental science. As such, we argue that we need to increase diversity whilst reducing risks in FBES and cultivate a more prosperous, safe, and empowered research culture.

## ARTICLE HISTORY

Received 6 June 2023  
Accepted 18 October 2023

## KEYWORDS

Inclusive fieldwork; structural barriers; safety; wellbeing; science

## 1. Introduction

Challenging inequalities and promoting inclusion in higher education have become increasingly popular in recent decades (Salmi and D'Addio 2021). This has included initiatives to address gender equality or racial inequity in specific faculties, departments and disciplines to maximise accessibility, promote inclusion, and to educate higher education staff and provide accessible educational contexts for all. In this vein, recent research has explored the experiences of students from lower socio-economic groups (Macqueen, Southgate, and Scevak 2023), the engagement of racially minoritized students (Thomas and Quinlan 2023), and support for disabled students in higher education (Shpigelman et al. 2022). The aim of this paper is to contribute to these important discussions by exploring the barriers to inclusion in field-based environmental sciences (FBES) research. To do this, we present an analysis of evidence for risks to safety and wellbeing affecting people belonging to marginalised groups.

FBES research is an important component of many disciplines including environmental science, ecology, biology, geography, geology, chemistry, atmospheric science, and geophysics. The commitment to practical fieldwork is key in environmental sciences; for example, the Subject Benchmark

**CONTACT** Peter Hopkins  peter.hopkins@ncl.ac.uk  Newcastle University, Newcastle Upon Tyne, NE1 7RU UK

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Statements of the Quality Assurance Agency for Higher Education in the UK require undergraduates to analyse field data (QAA 2022), and this continues at the postgraduate level. Fieldwork is also a major factor in university recruitment initiatives and many students see fieldwork as an attraction to study such subjects at university level.

Traditionally, oversight for field-based teaching and research is governed within the context of health and safety and/or risk assessment with teaching and research staff being required to outline the steps they have taken to minimise any injury-related risks in the field. Moreover, these risks often focus on issues such as travel to and from the field location, accommodation safety, plans in the case of an emergency, equipment issues, and response to adverse weather conditions. Rarely are matters of equality, diversity and inclusion referred to (Schneider 2020).

Likewise, when it comes to planning and designing fieldwork, the focus tends to be on the different approaches to delivering fieldwork teaching and research, pedagogical innovation in field-based teaching, and promoting the value and importance of data collection through fieldwork (France and Haigh 2018). Equality, diversity, and inclusion are generally given minimal consideration and often attached to broad injury related risk assessments. For example, in providing guidance for the design of effective fieldwork for the natural and environmental sciences, Maskall and Stokes (2008) devote little more than a page to issues of inclusivity, with a focus only on disability. This tends to be the main equalities consideration when it comes to undertaking FBES research and teaching (e.g. Collins, Atchison, and Whitmeyer 2022).

In this study, we counter the dominant discourse of eliding substantive matters of equality, diversity, and inclusion in FBES by placing these issues centre-stage. We discuss the main barriers to inclusion supported by lived experiences from survey and interview participants to highlight structural issues reducing inclusion and safety in FBES. We frame inclusion as a structural, ethical, and political ideal that will cultivate a more prosperous, safe, and empowered research culture for those participating in FBES.

## 2. Methods

Our study focused on issues of inclusion and safety in FBES. We considered the often overlooked risks faced by researchers from marginalised groups undertaking fieldwork. To explore these issues, we used a combination of (1) an online survey, (2) individual in-depth interviews with a subset of the survey participants, and (3) a two-day workshop to discuss and verify our findings with key stakeholders. Ethical approval was granted by the Newcastle University Faculty of Science, Agriculture and Engineering Ethics Committee (Project # 22-005-PAT).

### 2.1. Online survey

Participants engaged in FBES based within UK institutions, at any career stage, were invited to complete a survey that asked a mixture of closed and open questions about inclusion, diversity, risk, and safety in fieldwork. We promoted the survey via social media (Twitter and Facebook) and academic mailing lists. The first page of the online survey gave background information on the project and participation, details of data security and storage systems, and a warning regarding the sensitive nature of the questions. Prior to taking part in the survey, informed consent was required by all participants. The questions were selected following consultation with two independent reviewers with backgrounds in EDI in fieldwork settings. Questions focused both on experiences in the field as well as perceptions around risk and exclusion. Overall, the survey asked 42 questions across five sections focusing on: (1) demography and identity; (2) work (i.e. career stage, discipline, type of field-based research); (3) perceptions of discrimination, harassment, or violence; (4) experiences whilst carrying out field-based research; and (5) experiences of reporting any incidents of discrimination, harassment, or violence.

## 2.2. Interviews

Survey participants were asked if they would be willing to be interviewed. Eleven participants opted-in and were interviewed about their experiences of undertaking field-based research. Interviews adopted a narrative and reflexive approach (Lumsden 2019) whereby participants were invited to reflect upon their perceptions about, and experiences of, engaging in FBES research. Interviews began with gaining written informed consent and acknowledging the potentially sensitive content of the discussion. The conversations were then loosely structured and guided by: establishing questions; expanding on survey responses; participant identity; how is marginalisation enacted in the field; lived experiences and felt consequences of marginalisation/discrimination; the intersecting way in which marginalisations are experienced; perception versus lived experience; institutional responses to experiences relating to marginalised identities; and institutional structures and potential solutions.

All interviews were fully transcribed and anonymised to protect the confidentiality of the participants. The initial thematic analysis produced groupings of data in response to the following question headings:

1. What kinds of barriers exist in FBES that may prevent people from participating, and how do they manifest?
2. What stories have people shared about their perceptions and experiences of inclusion and safety in FBES research?
3. How have these experiences impacted individuals?
4. How have institutions responded to these individuals' experiences?
5. What have we learned about the intersecting way in which marginalisations are experienced?
6. What do these stories tell us about FBES more generally?
7. How can inclusion and safety in FBES be improved for a wider demographic of researchers? (suggestions from participants)

## 2.3. Workshop

We facilitated a two-day workshop with key researchers and practitioners working in environmental sciences research to discuss our preliminary findings. Workshop participants were selected based on their previous work or engagement with the issue of safety and inclusions in FBES research, identified predominantly through their recent publications, social media profiles or peer recommendations. There were 15 participants which included academics, fieldwork technicians, staff working in health and safety, and specialists in equality, diversity and inclusion. We engaged participants in a combination of structured tasks for small group discussion and open debate. Data from the workshop were captured in the form of visual minutes (see [Figure 1](#)), and more generally, discussions during the workshop served to qualify and expand on themes that emerged in the survey and interview data.

## 2.4. Analyses

Our focus for this research was identifying key themes and detailing lived experiences of FBES researchers from qualitative data. Qualitative data from the three activities were analysed using an iterative form of thematic analysis (Braun and Clarke 2019). Keywords or corresponding themes from each comment were plotted onto a spreadsheet. The qualitative survey data was analysed alongside the interview transcripts to identify key themes across both datasets.

## 3. Results and discussion

### 3.1. Online survey and interview participants

We had 102 responses to the online survey, of which 68.6% identified as cis female, 2% identified as non-binary or genderqueer, 22.5% identified as non-heterosexual/LGBTQIA+, 8.8% identified as



Figure 1. Barriers to inclusion and safety in field based environmental sciences research.

minority ethnic group, 31.4% identified as coming from a lower socio-economic background and 10.8% identified as having a disability [we use 'D' for disabled and 'ND' for those who identified as non-disabled (Centre for Disability Rights n.d.)]. Overall, quantitative survey data showed that an overwhelming 84.4% of respondents believed FBES is not equally accessible to all researchers, and 92.1% believed there are barriers to participating in FBES. We had 11 interview participants, of whom 8 identified as cis female, 4 identified as minority ethnic group, 4 identified as non-heterosexual/LGBTQIA+, and 2 identified as having a disability.

The following sections delineate our findings across singular axes of identity as this is often how our participants discussed these issues. Data from surveys and interviews are accompanied by identity characteristics in parentheses as indicated by the respondent.

### 3.2. Sexism, homophobia, and ethnocentrism

Experiences of marginalisation, discrimination and/or harassment when conducting FBES were reported mostly in relation to the survey respondent's gender (experienced by 15.4% of cis male, 63.8% of cis females, and 100% of nonbinary/genderqueer respondents) and sexual identity (experienced by 47.6% of non-heterosexual and 10.1% of heterosexual respondents). These include respondents experiencing discrimination (39.6%), verbal abuse (46.1%), verbal sexual harassment (38.2%), and sexual assault (13.3%). Of these reported incidences, at least half of participants identified gender being the motivating factor. This highlights a barrier in FBES research but is also indicative of the gender bias in our survey participants, of which 68.6% identified as female. Women are often more motivated than men to complete surveys to improve inclusion and safety and do EDI work.



### 3.2.1 Misogyny and gender identity barriers

Conversations during the workshop clearly pointed to a widespread culture of patriarchy and misogyny in FBES. Manne (2017) has framed misogyny as

primarily a property of social environments in which women are liable to encounter hostility due to the enforcement and policing of patriarchal norms and expectations – often, though not exclusively, insofar as they violate patriarchal law and order.

While misogyny is generally defined as the hatred of women, it is specifically about enforcing patriarchy, so it can encompass discriminatory or pejorative attitudes and actions towards other people who do not identify as cisgendered, heterosexual, and/or male (Wrisley 2023). Through enforcing and policing the subordination of those who are not men, misogyny functions to ‘uphold male dominance, against the backdrop of other intersecting systems of oppression and vulnerability, dominance and disadvantage, as well as disparate material resources, enabling and constraining social structures, institutions, bureaucratic mechanisms, and so on’ (Manne 2017).

A culture of misogyny in FBES is evident in reports of gender-based harassment and abuse, and the high percentage of researchers who perceive this as a risk (84.2%). Significantly, most researchers who experienced gender-based discrimination, sexual harassment or abuse reported that it was perpetrated by those directly associated with the research project. This includes senior colleagues, field site staff, research colleagues in the field, and previously unknown field assistants (assigned to prevent lone working). This highlights failures in the systems designed to support and protect researchers, put in place by field stations, universities, and research institutions, which directs responsibility to the institutions themselves via the people they employ. One survey respondent (25–34 yrs old, white, heterosexual, woman, early career researcher (ECR), ND) was sexually harassed via text message by their gender equality officer, which undermined their wider trust in male colleagues and made their research with majority male stakeholders extremely challenging. As the source of discrimination most often originates within the fieldwork team or institution, researchers are more at risk from institutional employees or collaborators than they are from the individuals they interact with during fieldwork within the UK and abroad. This important finding was corroborated by another survey respondent noting ‘I experience more issues inside a traditional workspace’ (25–34 yrs old, mixed race, woman, bisexual, lecturer, ND).

A lack of toilet breaks or accommodations for menstruation were raised as challenges when working in the field. Ill-fitting safety equipment and outdoor clothing designed for male bodies, as well as assumptions about physical strength, fitness, or capability based on being bigger or smaller than the conventional (male) researcher were also issues. This connects gender discrimination with sizism inclusive of fat bias (e.g. Michelfelder, Wellner, and Wiltse 2017). One survey respondent (45–54 yrs old, Latin American, woman, bisexual, ECR, ND) described being excluded from fieldwork altogether on the assumption that she wouldn’t want to work with an all-male team:

I stopped counting the times I have been excluded by male researchers from going to expeditions ‘because I might not be comfortable being the only woman present’. In [specialism redacted], if I worried about being the only woman, I would never do any fieldwork, I am almost always the only woman present.

One interviewee (25–34 yrs old, white, woman, heterosexual, PhD researcher, ND) described not raising concerns about a safety issue with a ladder out of fear that she wouldn’t be ‘taken seriously’ as a female junior researcher. This perception on the part of the researcher indicates she anticipated being discriminated against based on both gender and seniority. She formed this perception through the response of senior members of staff to another incident involving a stakeholder at the field site making sexist and racist comments. More senior members of staff had told her she should expect and tolerate such behaviour from this person because access to the field site depended on their good relationship consistent with the complicity and minimisation identified by feminists like Chung (2005). The interviewee knew another female researcher who had been taken off the project after complaining about this person. However, the interviewee only realised

she had minimised her fear and discomfort about both issues when concerns were raised by a male colleague. This was then validated by the same senior colleague who had previously been dismissive. Survey responses to a question about whether researchers would include identity-based risks in their risk assessment expressed worry about infantilisation based on their gender. Comments (all from women) expressed concerns they would be perceived as ‘weak’, ‘needy’ or ‘unreliable’ which conflicts with contemporary calls for women to ‘lean in’ and align with workplace confidence culture (Gill and Orgad 2017). One survey respondent (25–34 yrs old, mixed or multiple ethnic groups, woman, bisexual, PhD researcher, ND), commented:

I worry that if they saw I was worried about sexual harassment, it wouldn’t get approved. The feeling is that you have to be ‘up for anything’ to be deemed a legitimate researcher. I feel like saying I’m concerned about sexual harassment would make them pre-emptively assume I would be the person to complain about it, which would make more problems for them, so they would have a bias and hinder my work. I may just be paranoid.

These instances describe the ways in which researchers’ gender identity, and their expectations of how people will respond to them, impacted their sense of wellbeing as well as their professional performance. This suggests that cultures of misogyny and sexism function to diminish the validity of researchers’ claims to safety and wellbeing.

### 3.2.2 Sexuality and self-censorship

Another form of self-censorship was evident in accounts from researchers who identified with non-heterosexuality. Survey comments and three interviewees reported that they did not feel safe doing fieldwork in countries that criminalise homosexuality and did not disclose their sexuality to colleagues due to expectations or experiences of homophobia. One survey response detailed receiving abuse from team members relating to her bisexuality. Several researchers did not feel comfortable broaching this topic with their supervisors or including these details on their risk assessment. Three interviewees shared different views on how non-disclosure, attempting to ‘pass’ for cisgender and heterosexual, or being misrecognised while in the field can have advantages whilst also presenting challenges (Ozbilgin et al. 2023). This can often have a detrimental effect on mental wellbeing. One survey respondent (25–34 yrs old, white, non-binary/genderqueer/asexual/gender fluid, bisexual, postgraduate/PhD, ND) commented:

Because my gender and sexuality are ‘invisible’ I often choose not to come out in situations where I expect it could impact my work [...]. However, the stress associated with not being myself has had negative effects on my mental health, which probably affected my ability to carry out work.

This person also discussed ‘visible’ or ‘invisible’ identity markers in an interview; the nature of overseas fieldwork, inclusive of unfamiliar surroundings and being physically distanced from familiar support networks, compounded their sense of anxiety and gender dysphoria. This was exacerbated by their junior research position:

Being queer can mean greater dependence on support networks outside the family, e.g. friends, so moving around a lot as a PhD/ECR and going on fieldwork for long stretches of time creates additional insecurity about what support would be there for them ‘back home’.

The researcher navigated a complex combination of intersecting identity factors including socio-economic status, career stage, gender identity and sexuality, and race in describing their depression whilst living and working in a remote, unfamiliar environment (Collins and Bilge 2020).

### 3.2.3 Ethnocentrism

There is a further dimension to sexual harassment and gender-based discrimination that resulted from people not involved in the field research project, but local to the fieldwork site, although this was less common. Researchers attributed these incidents to different cultural attitudes to gender and sexuality, different legal frameworks, and patriarchal and/or religious values. As a team, we inferred that *some* of these comments were influenced by ethnocentrism: a view that

overseas cultures in which researchers work should conform to the Western values of gender equality – this expressed a neocolonial Othering of those cultures by positioning their behaviours as less civilised or not meeting Western expectations (Quimpo 2000).

### **3.3. Socio-economic exclusion and career progression**

Class and socio-economic background were reported by 50.5% of survey respondents as barriers to participation in FBES research. These factors were perceived to present less direct risk of discrimination, harassment and violence compared to categories of gender, sexuality, race, ethnicity, and ability. However, they almost always factored into how researchers explained their willingness to compromise their physical or mental wellbeing during fieldwork, with survey respondents and interviewees frequently citing issues of precarity and lack of funding. ‘Precarity’ describes the nature of insecure work in a deregulated labour market (Walsh 2019). This is often associated with zero-hours contracts and the gig economy that is increasingly linked to working arrangements and career progression in academia (McKenzie 2022). This finding corresponds with existing reports that the neoliberalisation of universities has intensified stress, workloads, and competition for ECRs (Caretta et al. 2018).

#### **3.3.1 Socio-economic exclusion**

Class and socio-economic background as identity-based categories are themselves reflective of complex historical, structural, financial, and geographic factors (Archer and Leathwood 2003). Moreover, they function as barriers at various levels of researchers’ educational and professional experiences. Participants described undertaking FBES in adverse weather conditions with undergraduate students who did not have adequate raincoats or footwear. With only a few mandatory field visits per undergraduate course year, students were unable to purchase equipment unless they had spare funds, an existing interest in outdoor leisure pursuits, or both. Three interviewees linked physical safety and comfort during initial fieldwork experiences with students’ likelihood to pursue further field research. Other comments reflected that certain socio-cultural groupings have greater confidence with ‘being outdoors’ more generally, often reflecting racial hierarchies (e.g. Finney 2014; Mizelle 2019), and particularly ‘those from city backgrounds may not feel confident in exposed outdoor conditions’ (survey respondent: > 65 yrs old, postgraduate/PhD, ND).

As researchers advance through their training, they are likely to require additional, expensive training or skills. Some of these are specialised, such as scuba diving. Some are more basic, such as being able to swim or holding a driving licence. Several survey responses noted that the cost of acquiring these skills can be prohibitive for many individuals, excluding them from opportunities. This was further highlighted by one interviewee (25–34 yrs old, woman, mixed race, bisexual, Lecturer, ND) who described having to secure funding for swimming lessons for their undergraduate students when working at an overseas institution.

Responses from participants reflected views that the desirable and competitive nature of FBES, combined with many poorly paid/voluntary schemes to gain experience, means FBES is more accessible to those who can ‘pay their own way initially’, while impeding those ‘without independent/family wealth’. One interviewee (25–34 yrs old, white, non-binary/genderqueer/asexual/gender fluid, bisexual, postgraduate/PhD, ND) described how they could only afford a fieldwork trip following their Masters degree because they received a small inheritance; this trip produced a publication that they believed helped them secure their PhD funding. Other interviewees had to save from part-time jobs or depended on parental assistance for this initial career boost. Dependence on part-time work could restrict researchers from taking up field opportunities, due to annual leave or other financial restrictions. These socio-economic factors intersect with the racial inequality inherent in generational wealth (Taylor and Cantwell 2019).



### 3.3.2 Financial precarity and risk taking

The financial barriers to inclusion in FBES were shown to leave those researchers who do access postgraduate study at an increased risk to their safety and wellbeing. All the experiences of marginalisation, harassment or other physical or emotional discomfort described by interviewees occurred during the precarious stages of postgraduate or early career research. Reasons given suggested that researchers in precarious positions, especially those from less affluent socio-economic backgrounds, would tolerate greater risk to physical and personal safety, for longer, and were also less likely to report incidents if something went wrong, a finding which maps across other sectors (Salminen 2023). These reasons included having ‘no backup if things go wrong’ and ‘insufficient funding for a field assistant, leaving researchers to work alone’.

One interviewee (35–44 yrs old, Latin American, woman, heterosexual, PhD researcher, ND) from a lower socio-economic background felt they couldn’t back out of their fieldwork trip or fail with data collection because they would lose their funding/income and jeopardise future career prospects in a labour culture where ‘one job leads to another’. Thus, they experienced more pressure to continue fieldwork regardless of circumstances, often prolonging and increasing their exposure to uncomfortable and/or hazardous situations. This researcher also cited imposter syndrome and described feeling ‘lucky’ to have had certain fieldwork opportunities. They described how, at the time of their fieldwork, they had low self-esteem in relation to what they should ‘put up with’ to be deserving of those opportunities (Breeze 2018).

Precarity also emerged in the form of international researchers with a vulnerable visa status. One workshop participant reported limited access to work visas which functioned as a barrier for international researchers studying at UK universities. Beyond this, the dependency between the right to live and work, and completion of field research tasks could also leave the researcher more willing to compromise their safety and wellbeing in case non-compliance presents a perceived threat to their continuation of employment and/or quality of life ‘back home’, meaning their country of residence.

There is a close, cyclical relationship between the barriers that make it more difficult to access and undertake FBES research safely, the factors that make researchers more vulnerable to harm, and the reasons they endure inappropriate working conditions for longer than others that do not face these barriers (see Ziersch et al. 2021). Financial insecurity inhibits them from ‘complaining’ in case they lose the income associated with that research position, as well as subsequent opportunities.

### 3.4. Racism and ethnic diversity

Our participants echoed the view that: ‘field researchers are so white’. Most survey respondents (88.3%) said certain individuals, or groups of individuals, are underrepresented in FBES (90.1% of our respondents identified as white). Similar surveys such as British Antarctic Survey Race Impact Survey (Frater 2021) and Students Organising for Sustainability UK (SOS-UK 2022) have reported congruent results. That being said, there was a high perception of race (86.3%) and ethnicity (87.3%) as additional risk factors when doing fieldwork, but lower evidence that this had been *experienced* as a risk (26.3% based on race and 21.5% based on ethnicity) amongst participants, which is consistent with most respondents identifying as white.

#### 3.4.1 Lack of representation

Several comments claimed the uneven representation of different ethnic groups in FBES reflected general societal trends of inequality, and some suggested a link between socio-economic background, ethnicity, and urban dwelling:

Rarely see any BAME people in the countryside in general (whether or not doing research) (survey respondent: 55–64 yrs old, white, heterosexual, man, intermediate academic position, ND)

BAME and gender identities other than male may feel unwelcome or at risk outside of urban environments [*sic*]; (survey respondent: 35–44 yrs old, white, man, heterosexual, ECR, ND)

Those from city backgrounds may not feel confident in exposed outdoor conditions, may be fearful. (survey respondent: > 65 yrs old, [no gender/ethnicity specified], postgraduate/PhD, ND)

These comments reflect entrenched racial stereotypes relating to urbanisation, rurality, and nature that intersect with class and socio-economic background. Interviews elucidated greater nuance regarding the lack of racial diversity in FBES. One interviewee (35–44 yrs old, white, woman, heterosexual, ECR, ND) recalled hearing a Black female undergraduate student describe how she had almost chosen a different course in a more ethnically diverse university, because she ‘wasn’t seeing herself reflected there’ on an open day. The interviewee reflected on her surprise, realising how little she had thought about ‘the diversity of the room’. In the time since, she described working in international teams in UK institutions, but said that ‘we’re getting all our diversity from elsewhere’. This interviewee also described being shocked by what she termed ‘self-segregation’ among undergraduates on field trips, in which international students tended to work together. This shock resulted from previously working at an institution with no racial diversity, but also concern that teaching staff hadn’t mixed students together to foster better inclusion (Kwon, Hernandez, and Moga 2019).

The question of representation was also addressed in detail by a Black interviewee who discussed taking on extra roles on EDI committees and participating in science communication events for students from schools in London, most of whom were Black. Despite describing themselves as ‘quite introverted’, the interviewee (25–34 yrs old, Black, woman, queer, ECR, D) takes on this extra labour to show that a diverse range of career paths are possible. They reflected that in their own university experience, ‘I didn’t get taught by someone who was not white, until second year, my undergrad, and that was only for like one lecture ... That’s the first time I saw a Black man who does research in [specialism redacted]’. This interview expressed a material link between representation, aspiration and achievement which has been repeatedly observed elsewhere in studies of race and pedagogy (Ahmed 2012; Burke 2018; Giroux 2000). The interviewee acknowledged their research interests were partially connected with their ethnic heritage, suggesting that greater diversity among FBES researchers also broadens the scope of science produced (Hammonds and Subramaniam 2003).

### 3.4.2 Colonial legacy

A small percentage (approx. 4%) of survey comments reflected negatively on experiences of whiteness when carrying out fieldwork abroad. Responses by white researchers visiting majority non-white countries included reports of ‘anti-foreigner sentiment’ and marginalisation or harassment. These remarks express a tension within the context of racial and colonial histories in which much fieldwork is located and raises questions about how UK institutions might engage in research projects in ways that are ethical, sustainable, and sensitive to unlearning imperialist attitudes. One interviewee (25–34 yrs old, woman, mixed race, bisexual, Lecturer, ND) described how the mixed racial grouping of their research team benefited their communication with local people, particularly law enforcement, on fieldwork abroad.

### 3.5. Disability, access and neurodivergence

Our findings demonstrate that while numerous survey comments reflected ableist attitudes in relation to fieldwork, the prevailing methodologies and research practices in FBES reflect a disabling model that plays a greater role in excluding people of different abilities (Oliver 2013). General comments frame exclusion based on disability as simply unavoidable:

Controversial point of view, but does environmental research not often involve work in inaccessible places? So, by definition is not equally accessible, even when trying to make provisions? (25–34 yrs old, white, man, heterosexual, postgraduate/PhD, ND)

This ‘controversial’ point of view assumes people with impairments possess a deficit that prevents them from participating in certain activities. Following the social model, it is in fact the activities themselves, and the structures they are situated within, that make these tasks difficult or impossible for people who are disabled.

### **3.5.1 Lack of disability provisioning**

There is often neither the time nor the resources to accommodate or rethink fieldwork activities for disabled researchers. One interviewee (35–44 yrs old, white, woman, heterosexual, ECR, D) acquired a disability whilst on fieldwork. She thus felt it was no longer safe or comfortable for her to engage in fieldwork as a disabled researcher. A lack of institutional provision meant that not only could she not travel to the university via public transport, but the lab itself was not wheelchair accessible, limiting her research both in the field and in the lab. As a result, this researcher had to analyse secondary open-source data and ultimately produced novel FBES research from her home, demonstrating how her disability could make new, expansive contributions to knowledge. Another disabled interviewee (25–34 yrs old, Black, woman, queer, ECR, D) also developed a mode of FBES research that worked with archival methods, in addition to traditional fieldwork, to better suit their needs.

This discussion raises the question: does the researcher always need to be the person conducting fieldwork? Interviewees had mixed opinions: one interviewee (25–34 yrs old, woman, mixed race, bisexual, lecturer, ND) felt it is important to have familiarity with methods of data collection to analyse it thoroughly and identify inaccuracies or trends. Other interview and survey responses reflected views that new research can be achieved by using existing or secondary data. Another interviewee (35–44 yrs old, white, woman, heterosexual, ECR, ND) lamented the requirement for field technicians to have degrees, which excludes skilled workers with qualifications such as a BTech (Business and Technology Education Council qualifications that focus on training for work in specific industries). This demonstrates how opportunities are being missed for research to be more socially inclusive of multiple marginalised groups, particularly skilled people who have followed an alternative path to academia and could potentially support data collection for those who are disabled.

### **3.5.2 Misconceptions around neurodiversity**

Ableism was evident in reports relating to neurodivergence as well as physical disability. One survey responder (25–34 yrs old, white, woman, heterosexual, ECR, prefer to self-describe disability: waiting on an autism assessment) relayed in detail the ‘degrading’ attitude of a close senior colleague who, upon beginning fieldwork, treated the researcher like a student who they ‘kept an eye on’ in a way they found ‘humiliating’. The respondent believed this attitude:

... frankly stemmed from her inability to see autistic traits as anything other than weaknesses. Over the full time of my employment, it never felt safe or appropriate to approach anyone and share about my suspected neurodivergence. Even if I had, there was not likely to be a clear understanding of what that meant or a safe-feeling response because people tend to respond normally, or with trying to condescend you and even if this is a well-meaning “trying to protect you”, it is flipping awful to feel and experience. I am competent and capable, just give me a minute if things get noisy and write things down if you want me to take it in ... even having packed lunches and sandwich fillings that were unfamiliar was a challenge, and that sounds daft but it doesn't mean I can't do the work and doesn't make me any less valid as a scientist. Fundamentally, my traits were seen as unconfident and things, but were actually a result of neurodivergence.

This account reflects how, in addition to emotional impact, the senior researcher's behaviour marginalised the person in other ways, because they wouldn't let them teach, which hindered their professional development. When they eventually did teach, later in their career, they received ‘great’ reviews.

The prevailing view that FBES is inherently inaccessible for people who are neurodivergent or have impairments to their mobility can act as a barrier to participation before researchers even come to realise access issues. This results in an exclusionary cycle such that few disabled individuals

seek to participate in FBES because it is already ruled out as something they cannot do. This sentiment is summarised by the following survey response (25–34 yrs old white, woman, heterosexual, postgraduate/PhD, ND):

At the PhD level, you can design your own research so you can fit the topic to suit your own needs more, but this may not be as possible in other positions. A lot of fieldwork is long hours, outside, may be in remote locations so that is all a barrier if you are not able to do those things easily. Perhaps one issue is that many projects advertised provide a barrier to doing the work before you even apply and get to the field. E.g. someone may not apply for the role because from the description they think it will entail something difficult for them. So maybe it also needs to start with advertised positions ensuring that flexibility according to the researcher is clearly stated and possible, that there is flexibility for you to change the fieldwork so it can suit your specific needs and you aren't doing something you are uncomfortable with.

### 3.5.3 Mental health and wellbeing

Finally, another important finding revealed the hidden toll of anxiety and mental health issues as both a barrier to fieldwork, a consequence of fieldwork, and a factor that impacts performance during fieldwork. Several survey comments and interviewees mentioned anxiety and depression, particularly linked to sexuality. It was noted that a researcher can experience anxiety both pre-, during and post-fieldwork. Safety during remote travel and isolation can induce anxiety, particularly if the supervisory and research team have not prepared sufficiently. Mental health training in FBES is not sufficient, however, initiatives are starting to provide discussions and importantly training for both supervisors and researchers (Eifling 2021).

### 3.6. Caring responsibilities

Activities such as childcare are gendered as women's work, and women are disproportionately affected in their career progression through maternity leave, part-time working, and caring responsibilities (Ferrant, Pesando, and Nowacka 2014). Several survey participants observed caring responsibilities were a barrier to participation in FBES. One interviewee (35–44yrs old, Latin American, woman, heterosexual, PhD, ND) was a mother and this practically impacted her availability for fieldwork. Subsequently, she was not appointed to certain jobs because project leaders made assumptions about her availability. The interviewee recounted how her intersecting identities gave her ideal skills for pursuing a particular project (i.e. ethnicity, cultural background, languages, ability). However, she was denied the opportunity purportedly because she inquired whether it would be possible to break up the long fieldwork duration due to parenting responsibilities. Initially this request was positively received, but later the project leader chose another assistant because it was considered too inconvenient to reschedule the fieldwork. The interviewee related how these various forms of marginalisation, from not being able to participate in a casual trip to the pub with her peers, to being declined an ideal research opportunity, had a cumulative effect on her mental and social wellbeing as well as career progression.

We also considered the extent to which the responsibility of care work falls to women *during* fieldwork as well as around it. This could be the domestic tasks of cooking and taking care of camp, or research-related activities. For example, one interviewee who describes herself as physically small (25–34yrs old, woman, mixed race, bisexual, lecturer, ND) hinted at this through being asked to clean fish as opposed to engaging in the 'man's work' of catching them.

### 3.7. Supervisory power relations

We found that the dynamics within institutions are replicated and reinscribed into field sites. For example, at least 1 in 10 survey respondents and 2 interviewees described a power differential in the relationship between PhD/ECR and supervisor/line managers that negatively impacted their safety and wellbeing. According to at least three interview participants and eight survey

respondents, this is because career progress is perceived to be determined by supervisors' approval, positioning them as gatekeepers. There were also numerous accounts of senior academics perpetrating sexual abuse or other forms of identity-based discrimination, as well as the mistreatment of technicians, particularly where they are local to the field site. Junior researchers felt more vulnerable and less able to protect their own wellbeing during fieldwork, as indicated in the following survey comment:

There is absolutely no checks that the fieldwork is safe at our institution. So long as a risk assessment is filled in, they are happy. Even if the risk assessment doesn't help reduce any risks. [...] For early career researchers, we just have to put up with this [tasks that are unsafe] or we're out of a job and will get a bad reputation. It's the same for all aspects of fieldwork – the data collection itself is more important than we are. (25-24 yrs old, white, woman, heterosexual, postgraduate/PhD, ND)

In some cases, researchers even express an expectation that they *should* endanger themselves during fieldwork:

Within my area [specialism redacted] there is still a culture of valorising remote, physically demanding and risky fieldwork which acts as an exclusionary filter on the entire discipline. This selects for people like me (white, male, het, able-bodied etc.) which reinforces the problem because so many of us lack any direct experience of the problem. (35-44yrs old, white, male, heterosexual, intermediate academic position, ND)

This survey respondent suggests that FBES is linked with the trope of the white, colonial explorer and acknowledged the exclusionary impacts of this: 'One could ask whether it is morally right to visit certain places given the hazards directed at specific groups, who are then either excluded or only participate by assuming a greater level of risk'. The work culture described here is outdated and unproductive in comparison to the disabled interview participant who designed their own project and methodology – one that engaged with their own identity, allowed flexibility for their physical impairment and maximised their abilities. Unsurprisingly, individual research design that responded to their (marginalised) identities and suited their needs also produced contributory insights to their field.

#### 4. Conclusion

FBES research is an enticing career for many in the environmental sciences and related disciplines. The mental and physical benefits of spending time outdoors (McCartan et al. 2023), opportunities to experience working within different cultures and learning about new environments is a draw to many researchers. However, our study shows the inherent barriers to inclusion in FBES, and to overcome those barriers, the risks researchers are willing to take to carry out FBES research to maintain and progress their careers. The barriers identified in our work included those of gender, sexuality, race, disability and socio-economic status, as well as the intersections of these identities. The lack of diversity among people in positions of power, and the structures whereby research projects are designed and recruited, likely work to exclude other points of view, skills, abilities, and experiences. We argue that it is this focus on power, social construction, and material effects that best reflects some of the more transversal accounts of our interviewees and survey participants. Approaching our findings makes clear how inequality and marginalisation are experienced in and through overlapping identity positions that are co-constructed by social forces and institutions. In this context, those forces and institutions include the university system and its policies, disciplinary practices, career expectations, and scientific norms. Race, class, gender, sexuality, dis/ability weave through these forces to produce 'interlocking systems of advantage and access' (Wijeyesinghe and Jones 2014). Inclusion as a structural and ethico-political ideal will cultivate a more prosperous, safe, and empowered research culture for those undertaking FBES research. As a complex and deep-rooted issue, the challenge of creating inclusive FBES in higher education requires a multifaceted approach. We suggest that informed changes to institutional policies for fieldwork to reduce the risks for marginalised people, is one tangible improvement that can be made.



## Disclosure statement

No potential conflict of interest was reported by the author(s).

## Funding

This work was supported by Natural Environment Research Council [grant number 2021EDIE040Pattison].

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