



British Ecological Society

December 2013

## **Making Ecology For All:**

**A report on equality and diversity in ecological education  
and career pathways**

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## Executive Summary

The British Ecological Society (BES) is committed to promoting and increasing diversity amongst its members and the wider ecological community. A more varied pool of ecological students and ecologists will maximise talent, allowing ecology to advance and count over the next 100 years.

The BES recognises the need to increase efforts in making ecology more inclusive for all. To identify issues of highest concern and relevance to the BES, a detailed investigation into equality and diversity in ecological education and career pathways has been carried out. Quantitative diversity data was collected from the BES membership and the wider ecological community via an online survey. In addition, qualitative information was gathered from stakeholders via a focus group in which findings of the survey were considered and ideas for recommendations were developed.

Findings suggest that the current make-up of ecologists and ecological students is largely homogeneous. Barriers faced by those of a low socio-economic status (SES) and those from Black and Minority Ethnic (BME) groups were identified as most critical. For both of these strands of diversity, a lack of awareness and understanding of ecology is inhibiting initial participation. Addressing this issue needs to occur at an early stage; these groups are simply not engaging with ecology in the first place rather than dropping out at later stages. Ecology needs to be more visible amongst school students so that they can develop an interest and consider it as a viable option.

Securing employment or further education in ecology is increasingly dependent on having experience as well as theoretical knowledge. Opportunities to gain experience, such as through an internship or voluntary work, are regularly available but often only to those who are able to support themselves through a period in which they are not receiving an income. Those of a low SES, in particular, may not be in a position where they are able to gain such experience and may be prevented from progressing as a result.

Barriers faced by women and by those with a disability were also examined. Within the BES membership, there is imbalance in gender representation in the favour of males. More worryingly, underrepresentation of female members increases in more senior employment types. Only a very small proportion of survey respondents were disabled, although this proportion was greater amongst student respondents. Despite issues faced by women and those with a disability requiring attention, they have not been prioritised as highly as those faced by people of a low SES or of a BME.

The findings of this investigation have been used to formulate and develop several recommendations that, if implemented, will allow the BES to expand on current efforts to increase and promote diversity through Society-wide strategy. The proposals are currently being put forward to the BES Council for consideration.

Widening participation in ecological education and careers needs to become a priority for the BES so that talent can be maximised for the future. The first 100 years of the BES have illustrated the exceptional science that can occur via ecology; let the next 100 years demonstrate that brilliant science can come from a great variety of different people.

## 1 Introduction

For ecology and the BES, having as many talented ecologists as possible with a breadth of diversity will strengthen and grow the science. With fewer people engaging in ecology, however, there is a need to make this science more accessible and inclusive so that the talent pool does not dry up.

Growing evidence across science, technology, engineering and mathematics (STEM) education and careers indicates a huge lack of diversity amongst participants (see Box 1.1). For women, barriers to progression are resulting in huge underrepresentation at increasingly senior levels despite overrepresentation at early career stages; this is often referred to as the “leaky pipeline”. There are many more diversity issues in addition to gender imbalance; other strands include, but are not limited to, socio-economic status, disability and ethnic background.

### **Box 1.1 A snapshot of diversity across STEM education and careers**

- In 2010/11, women made up **61.4%** of undergraduates, **61.0%** of postgraduate research students and **69.0%** of postgraduate taught students in biological sciences.<sup>1</sup>
- Biosciences is generally considered to be doing better in gender balance compared with other STEM disciplines yet still only **15.0%** of biosciences professors are female<sup>2</sup>.
- **3.8%** of people in STEM careers have a disability compared with **5.9%** across other sectors.<sup>3</sup>
- In 2010/11, **9.3%** of all biological sciences students were disabled in comparison with **7.8%** of all SET students and **8.0%** of all students<sup>1</sup>.
- Students that apply for and receive HE places in science subjects tend to be from a higher SES background when compared to the general student population. However, in Biology this trend is not as pronounced as it is in other subjects such as Physics.<sup>4</sup>
- Members of **Bangladeshi & Black Caribbean** ethnic groups are significantly less likely to be in a SET profession when compared to White counterparts.<sup>5</sup>
- **Black African** and **Pakistani** ethnic groups are also underrepresented in SET occupations when compared to those from the White population.<sup>5</sup>
- In 2010/11, Black and Minority Ethnicities (BMEs) made up **16.7%** of all biological science students. This is an underrepresentation when compared to both the total for all SET subjects, **20.1%**, and for all subjects, **18.4%**.<sup>1</sup>

<sup>1</sup>Equality in Higher Education: Statistics Report 2012

<sup>2</sup>Women and Men in Science Engineering And Technology: UK Statistics Guide 2010; The UKRC

<sup>3</sup>Delivering Diversity: Making Science and Engineering Accessible to All; Campaign for Science and Engineering, 2008

<sup>4</sup>SES and Science Education Report, Royal Society, 2008

<sup>5</sup>SET and the UK's Ethnic Minority Population; Royal Society; April 2005

Data specifically for ecology is largely absent but anecdotal observations suggest that diversity is scarce. If these perceptions are correct, then targeting groups of people who do not traditionally participate in ecology will both increase engagement and create a more varied pool of talent.

The BES recognises the need to make ecology more inclusive and has already demonstrated this through several successful initiatives such as the BES Mentoring Scheme for Women in Ecology and sponsorship of the [In2Science](#) programme. These activities, however, have come from individual departments rather than being co-ordinated across the Society. Going forward, actions towards increased diversity amongst participants must come from BES-wide strategy to ensure consistency and success.

Only now has it become possible to dedicate a meaningful amount of time and resources to examining equality and diversity in ecology. This report summarises the main findings of a 3-month investigation in which the following methods were used to gather evidence and information:

- Collation and review of existing literature and data.
- Collection of ecology-specific data from the BES membership database, the INTECOL 2013 feedback survey and a diversity survey (see Appendices 1, 2 and 3 respectively).
- Communications with diversity co-ordinators from other societies and academies to gather examples of best practice in diversity strategy.
- Discussions with stakeholders during a focus group to identify barriers to increased diversity and formulate ideas for recommendations (see Appendix 4).

This report aims to emphasise the most critical barriers to progression faced in ecological education and career pathways and to stress the issues that need to be prioritised in BES-wide strategy. Following this report, a number of recommendations will be proposed to the BES Council for deliberation. The Council, as well as the Society itself, is urged to give much consideration to the findings outlined in this report and to the actions that need to be taken next. The future of ecology depends on great ecologists; only by widening participation can the BES ensure that potential talent is not being impeded by unnecessary barriers.

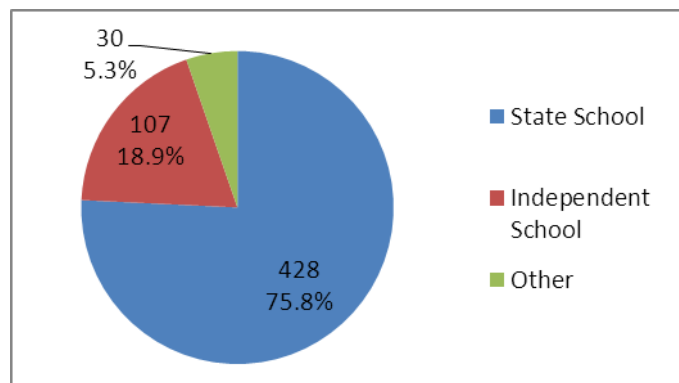
## 2 Summary of findings

Data and information gathered focused largely on gender, ethnicity, disability and SES. Ethnicity and SES have been prioritised as the groups facing the most relevant and worrying barriers to accessing and progressing in ecology. Qualitative and quantitative data supporting this conclusion is presented below, along with the data on gender and disability.

### 2.1 Socio-economic status

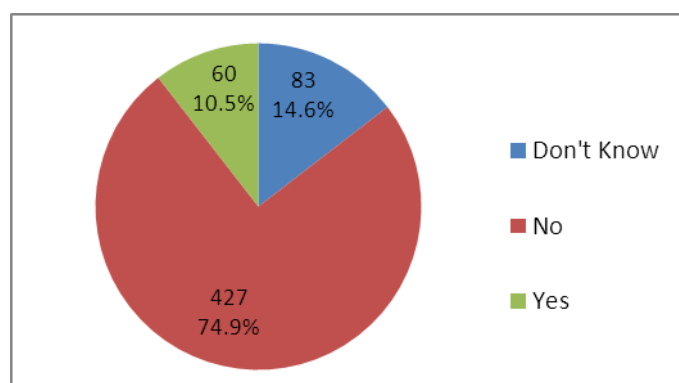
Barriers faced by those people of a low SES were regarded as most concerning for ecology by the focus group attendees. This conclusion was reached after considering the following data gathered from the diversity survey:

- **18.9%** of survey respondents attended an independent school (see Figure 2.1). When compared to the current proportion of UK school pupils attending independent schools, which is 6.9%<sup>1</sup>, this suggests a large overrepresentation in ecology.



**Figure 2.1** Pie chart showing the responses to question 7 of the diversity survey, 'What type of secondary school did you attend?'. Percentages have been calculated from given responses; blank responses have been omitted.

- Figure 2.2 shows that **10.5%** of respondents were eligible for free school meals when at school. The current proportion of pupils eligible for FSM in state-funded schools is 18.3%<sup>1</sup>.



**Figure 2.2** Pie chart showing the responses to question 7 of the diversity survey, 'Whilst at school (primary and/or secondary), were you eligible for free school meals?'. Percentages have been calculated from given responses; blank responses have been omitted.

<sup>1</sup> Schools, pupils and characteristics: January 2013; Department for Education

- Respondents were also asked whether they were the first in their family to go to university and if they studied close to home; answering yes to both of these could suggest coming from a low socio-economic background. **9.2%** of respondents answered yes to both of these questions and just **1.4%** also attended a state school and received free school meals.

It is hard to accurately interpret these results since they are not directly comparable with other statistics and some questions were ambiguous. However, when coupled with the qualitative information from open-ended survey questions and the focus group, there is a compelling indication that socio-economic barriers are rife in ecological education and careers.

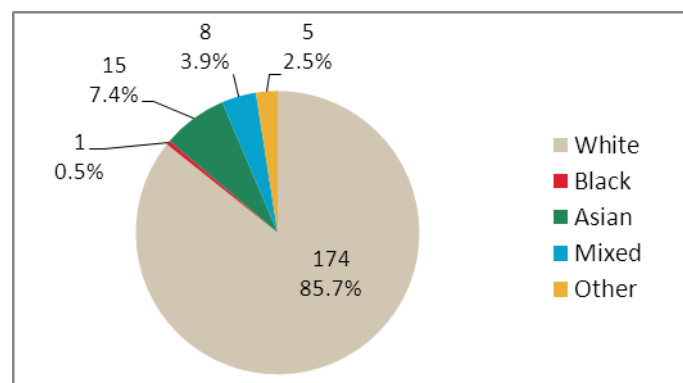
Barriers to ecological progression are likely to be faced at a number of stages for people coming from a low SES background. Qualitative information gathered from the diversity survey and the focus group indicates that opportunities to accessing ecology in the first place are lacking. Speculative reasons include disadvantaged schools not being able to take their pupils away on exciting field trips, lack of green spaces in urban areas and parents not being able to afford to give their children inspiring outdoor experiences. Additionally, concern was raised over a lack of coverage of ecology at school, which in turn results in a poor understanding of what ecology is and the careers that it can offer.

Once in ecological education, there are still difficulties to overcome. The highly competitive nature of the ecological sector means that further education alone is no longer enough to secure employment. Additional experience is often crucial but gaining this will usually require the flexibility to do so unpaid. Many respondents of the diversity survey identified unpaid work as a barrier to progression, particularly for people of a low SES background. Indeed, several respondents suggested that the BES provides funding that will enable financially disadvantaged people to gain work experience. Attendees of the focus group reinforced the thoughts of survey respondents.

## 2.2 Ethnicity

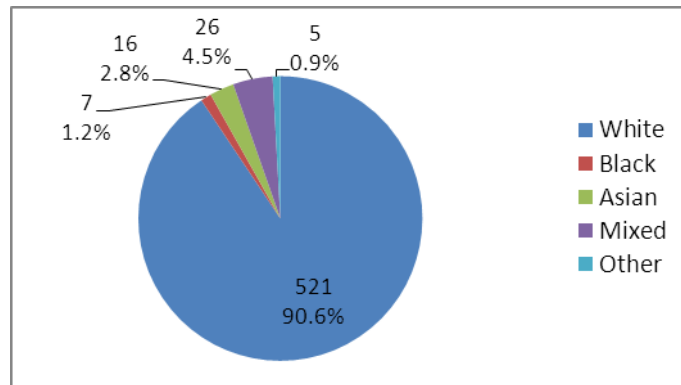
An absence of Black and Minority Ethnic (BME) diversity amongst participants of ecological education and careers is implied by the following data:

- **85.7%** and **90.6%** of respondents of the INTECOL and diversity surveys, respectively, were of a White ethnicity (see Figures 2.3 and 2.4).



**Figure 2.3.** Pie chart showing the summary of responses to question 2 of the INTECOL survey, 'Please state your ethnic group'. Individual ethnicities have been grouped together, e.g. Black Caribbean and Black African have been grouped into Black. Percentages have been calculated from given response; blank responses have been omitted.

- Black ethnicities had particularly poor representation amongst survey respondents. Only **0.5%** of respondents to the INTECOL survey were of a black ethnicity. The proportion for the diversity survey was only slightly higher at **1.2%**.



**Figure 2.4.** Pie chart showing the summary of responses to question 5 of the diversity survey, ‘Please select your ethnic group’. Individual ethnicities have been grouped together, e.g. Black Caribbean, Black African and Any Other Black Background have been grouped into Black. Percentages have been calculated from given responses; blank responses have been omitted.

- Within the Black ethnic group, ‘Black or Black British – Caribbean’ had no representation in either of the surveys.
- The Bangladeshi ethnic group had no representation amongst the diversity survey surveys and just 0.5% of the INTECOL survey respondents.
- For the Pakistani ethnic group, there was no representation amongst the INTECOL survey respondents and 0.3% amongst diversity survey respondents.
- The ‘White - Gypsy or Irish Traveller’ ethnic group was selected by just one respondent (0.2%) of the diversity survey. This category was not used in the INTECOL survey.

Such an apparent lack of ethnic diversity, which is also described in qualitative information, is worrying and the attendees of the focus group identified barriers faced by BME groups as critical. Most barriers encountered by BME groups appear to occur early on in the recruitment to ecology. Some reasons for being impeded may be similar to those for people of a low SES; a lack of awareness and understanding of ecology means that many ethnic minorities simply do not consider ecology as a viable option for themselves. Cultural reasons may also prevent some groups of people from contemplating a career in ecology.

An absence of ethnic diversity can also be seen when observing activities involving ecologists such as meetings, events and committees. When considering the BES committees, for example, there is very little, if any, representation of BME groups. Ensuring that BME groups were represented amongst the focus group attendees proved extremely difficult, which further reinforces the current state of underrepresentation. Further anecdotal observations were offered by several survey respondents who commented on knowing very few or no ecologists of a BME background.

### 2.3 Gender

Despite issues faced by women in science being widely publicised of late, barriers faced by women in ecology may be less urgent than those encountered by other underrepresented groups. However, barriers to progression for women still very much exist and continue to need attention. In particular, the data indicates retention of women in senior levels is a worrying problem in ecology:

- When considering the BES membership as a whole, there are more male members than there are female (see Figure 2.5). With the split approximately 40/60, in the favour of men, it could be argued that this is not particularly worrying.

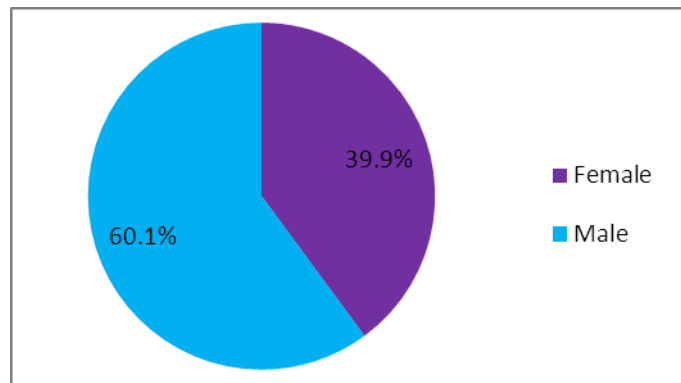


Figure 2.5 Gender profile of the BES membership. The membership database was accessed 30/09/13 at which time gender information was available for 4539 of 5251 members. Members with unknown gender have been excluded.

- However, the underrepresentation of female members worsens at increasingly senior employment types. Women are overrepresented at undergraduate and postgraduate levels but increasingly underrepresented at postdoc and staff/faculty levels (see Figure 2.6).

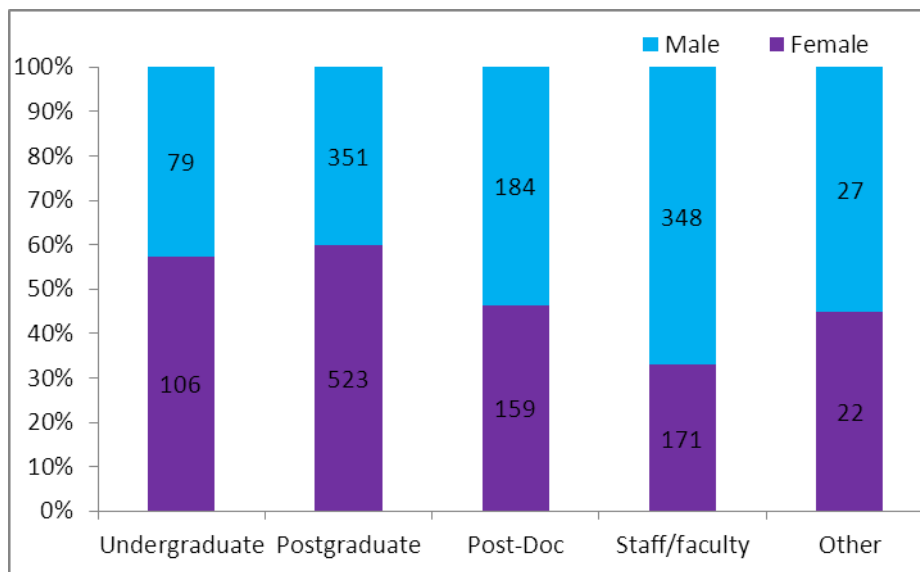


Figure 2.6 Gender profile of the BES membership by employment type. The membership database was accessed 30/09/13 at which time gender information was available for 4539 of 5251 members. Members with unknown gender have been excluded.



- A similar trend was seen amongst respondents to both the INTECOL and diversity surveys (see appendices 2 and 3, respectively).

Reasons for this loss of women at more senior positions were discussed during the focus group and also commented on by survey respondents. When women reach postdoc level, where the drop-out usually begins, they are often at an age when they will be considering starting a family. This is not a coincidence; a lack of support in allowing women to stay connected to science during maternity leave and then return later on was commented on by a large number of survey respondents. Other barriers faced by women include subconscious bias towards men, an ‘old boys’ culture and stereotyping.

## 2.4 Disability

Of the four key areas that this project focused on, disability received the least amount of attention. This is likely to reflect the very small number of disabled participants in ecological education and careers; those without disabilities may feel less able to talk about the issues that are occurring. Certainly, the data implies that disabled people make up a very small proportion of ecologists:

- **5.0%** of all respondents to the diversity survey were disabled (see Figure 2.7). This increased to **8.1%** for student respondents and decreased to **3.4%** for workforce respondents.

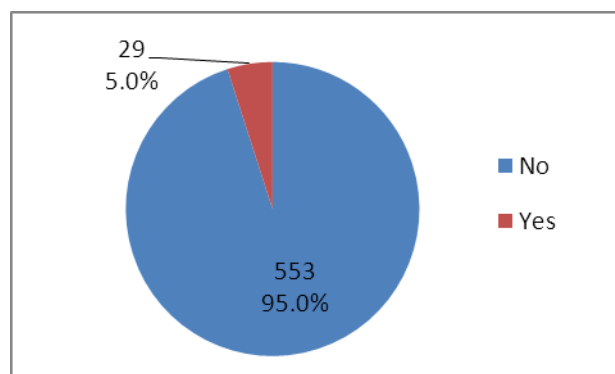


Figure 2.7 Pie chart showing the disability status of respondents to the diversity survey. Respondents were asked whether they consider themselves to be disabled, given the definition from the Equality Act 2010. Percentages have been calculated from given responses; blank responses have been omitted.

- For the INTECOL survey, just **1.0%** of respondents were disabled.

For people with a physical disability, barriers may include difficulties in participating in fieldwork and attending events such as conferences. Disabilities also include mental health issues which are often much less visible and perhaps less understood as a result. People with mental disabilities may experience barriers associated with stigma and/or inadequate support in their workplace.

During the focus group, barriers faced by people with disabilities were not prioritised as highly as those that people of a low SES and ethnic minorities come up against. Recommendations that follow this report, therefore, do not specifically target people with disabilities. That is not to say, however, that this is an issue that does not require attention. Rather, it needs more in-depth investigation so that when and why exactly barriers occur can be determined and appropriate recommendations can be formulated.

## 4 Conclusion and next steps

The current make-up of participants in ecological education and careers is mostly absent of diversity. There is much inequality in both initial accessibility of ecological education and in career progression at later stages.

Qualitative information gathered from the diversity survey and the focus group highlights the importance of ensuring that children are introduced to ecology from a young age and are aware of what it can offer them in the future. Data suggests that accessibility to ecology is skewed, however, with some groups of people more likely to be exposed to it than others. From very early on, potential talent is being lost; a probable cause of this is that many children are not able to access inspiring outdoor experiences and education. Furthermore, concern has been raised over the lack of coverage that ecology receives in school education. It is likely that much talent is being lost because many people do not understand what ecology is and therefore are not aware of the career options that are available to them should they choose an ecological route.

Having made the choice to study ecology, barriers to progression will continue to persist for some people. In the present economic climate, having higher education is often no longer enough to be able to secure even an entry-level job. Now becoming increasingly common is the need for experience, which is often only possible to achieve through an unpaid placement or internship. People of a low socio-economic status, who are unable to support themselves financially, will immediately be at a disadvantage and more likely to be lost to ecology.

Women and people with disabilities also face barriers to progression in ecology. However, the combined findings of the surveys and the focus group highlight barriers faced by people of a low SES and by people from ethnic minority groups as those most currently concerning for ecological education and career pathways. It is these two strands that the BES can add most value to; in regards to gender, for example, many women in science initiatives already exist making so it less clear whether the BES is able to provide further benefit.

Several project recommendations have been developed in response to the findings and are currently being put forward to the BES Council for consideration. Despite focusing initially on SES and ethnicity, the BES recognises that barriers to increased diversity are complex, occurring for many different people and for a variety of reasons. Gender, disability, SES and ethnicity are not the only strands of diversity to come up against difficulties. Sexuality and religion, for example, are other characteristics that may be underrepresented in ecology. To explore all diversity issues, however, was far beyond the scope of the present investigation. Concentrating on only several areas ensured that efforts were not diluted. The proposals are not exhaustive and further research may be required should other issues become apparent as especially worrying for ecology.

Actions demonstrating a commitment to inclusiveness will need to underpin the work and vision of the BES for the foreseeable future. Until ecological education and careers become accessible to a wider audience, loss of potential talent will mean that ecology cannot advance and count. A curiosity in ecology should be celebrated and nurtured no matter who it comes from; for that reason alone, barriers need to be removed and ecology needs to be for all.