A Study of

Career paths and Education Provision for Forestry

Prepared by

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Career paths and Education Provision for Forestry

Contents

Executive summary

- The findings provide an insight into the perceptions of young people at secondary school and university forestry students about forestry and forestry careers,

- The findings are from the four case studies and thus represent those participants' views. However, the findings do provide an understanding of how forestry is perceived as a career choice by young people.

- General aspirations of pupils from the case study schools suggest that the most common career choices are engineering, other modern and traditional professions. These three broad occupational areas provide a context for pupils' choices when they are considering other possible careers such as forestry.

- Pupils had little or no knowledge of the Forestry Commission.

- Pupils had little or no awareness of career opportunities in forestry.

- The dominant perception of occupations related to forestry is one of 'timber cutting'.

- There appeared to be little awareness of multi-purpose forestry.

- Most pupils surveyed were not thinking about going into occupations directly linked to forestry such as forest worker, forest officer, or tree surgeon.

- The predominance of engineering is possibly linked to occupations associated with the geographical area, the North East of Scotland, namely the oil and gas industry.

- Reasons given for not pursuing a career in forestry were no personal interest, poor pay and unaware of the types of job available.

- A number of pupils were interested in related occupations such as zoologist, engineer or countryside ranger.

- At school events, such as careers fairs, induction days/ parents' evenings for senior phase pupils (S4-S6), the emphasis was on occupations such as engineering, modern and traditional professions, and college and university courses associated with those occupations.

- There appeared to be two significant factors that influenced the forestry students' choice of course and possible career:

    1. Family (working in forestry), friends (working forestry), school careers advisor.

    2. Information about the course form the university.

- Career aspirations of the students emphasised harvesting and wood production with little or no mention of multi-purpose forestry.

The findings from this study mirror to an extent some of the findings of the RFS study of Current and Future Skills in Forestry which stated “Forestry still faces a challenge in being an attractive career proposition for school leavers and others. Few school pupils are made aware of forestry as a profession and those entering the sector find out about it through other sources.” (RFS, 2017b). The RFS study, however, was limited to England and Wales, it is, therefore, useful to have this small-scale study conducted in Scotland which indicates similar issues with young people’s understanding and perception of forestry. The purpose of the 2017 RFS study was to “provide an evidence base that informs the skills action plan to support national policy objectives of achieving growth of the forestry sector and active management” (p2). However, the study only had an emphasis on the forest establishment, management and harvesting sub-sectors.

This small scale study set in the North-East of Scotland comes at a time when the Scottish Government have just conducted a consultation exercise designed to inform the development of the Scotland’s Forestry Strategy 2019-2029. It is hoped that this brief report may provide some modest input into that exercise, given that the stated outcomes of the strategy will require “developing an interest in forestry in young people (Scottish Government, 2018, p23)

Some reflections and suggestions are provided for further action at the end of this report.

Career paths and Education Provision for Forestry

Introduction

This research was commissioned by the Forestry Commission and The Scottish Forestry Trust and undertaken by the University of Aberdeen. Given concerns with attracting young people to careers in forestry, and the need to understanding the life and educational experiences that influence career choice with respect to forestry, this study looked at the personal experiences that may have influenced views of forestry as a career. The research reports the findings from online questionnaires from four case study schools and two Scottish Universities.

Background

There has been, in recent years, worldwide concern raised over the fall in the numbers of students undertaking forestry courses in universities (Ratnasingam, Ioras, Vacalie, & Wenming, 2013). While there is speculation about why this might be, and several critical reasons have been given (Ratnasingam et al., 2013) high on the list is the reducing interest in forestry academic programs (Leslie, Wilson, & Starr, 2006; Nyland, 2008). While there may be some evidence to suggest that young people are now more attracted by careers that offer higher salaries (Ratnasingam et al., 2013), there is also some evidence that young people are influenced by their own experiences in outdoor and forest settings (UNECE/FAO, 2006). However, such experiences are in decline because of lack of access to natural environments. The recent survey by Natural England indicates that at least 10% of children have not set foot in a park or gardens or other natural environment in the past 12 months (Natural England, 2016). With the UK becoming an increasingly urbanised society, children's knowledge of forests and their contribution to society have become very limited (Bingley & Milligan, 2004; Milligan & Bingley,

2007; Podmore, 2004). The problem is not unique to the UK. A survey of American school leavers destined for university showed that 31% knew nothing about forestry as a profession and only 1% felt they were knowledgeable about the sector (Wellman, 1987). The same study demonstrated that the students' view of forestry was associated with felling trees and operating sawmills, rather than social and environmental activities. (Leslie et al., 2006)

While there is, therefore, some indication of factors that *may* influence young people's career choice in forestry, there have been no studies in Scotland looking at forestry as a career choice, or the key trigger points in the decision making process in. Although there have been some studies looking at the forestry skills gap in England and Wales (RFS, 2017a, 2017b). This study, therefore, contributes towards addressing that gap. Extensive longitudinal research undertaken in relation to, for example, the Science Technology Engineering and Mathematics (STEM) education fields suggest that understanding and influencing post 16 career choices and paths requires in depth knowledge and understanding of young people's aspirations and attitudes towards specific disciplines/fields as well as information on how they acquire such knowledge and attitudes (Archer, 2013). Based on a review of literature and ongoing longitudinal studies, Archer (2013, p 3) noted that aspirations in relation to the sciences 'can provide a probabilistic indication of a young person's future occupation' and research suggests that interest in science, for example, is formed by the age of 14 years. While it is important to acknowledge the varying contexts in which different subjects and disciplines have evolved, there is much to be learned from the more general work that has been undertaken on influences of career choices and young people as well as the work undertaken in relation to STEM subjects (Archer, 2013). With respect to forestry the UNECE/FAO (2006) report using data from Germany, UK and Nordic countries, suggested that "career advice on forestry is at best ambivalent and at worst negative" (p14), a view also reported by Evison & Morgenroth (2013) in New Zealand. The UNECE/FAO report looking specifically at gender in forestry and suggested that childhood experiences in nature has a significant influence on career choice in forestry, particularly for young people having positive experiences through living close to, or visiting, forests.

This research builds on the notion of an ecological model' (see CEIC 2008) of young people's career choice journey. This model emphasises the importance of considering the varied and dynamic experiences, influences and relationships that shape young people's aspirations as they navigate through schools in making career choices. These may include inter alia influence of parents /households and their backgrounds, professionals (school and careers) peers and communities as well as institutional practices and policies. A study of young people's aspiration provides a useful lens to understand how wider social influences and identities (social class, gender, ethnicity etc.) shape their career paths and choices in relation to the forestry sector with a view to developing appropriate strategies to address barriers and /or misperceptions (identified as important in relation to understanding career choices) of the sector. Whilst this has been the subject of research in relation to the Forestry profession and sector in relation to adults (Ambrose-Oji 2009; 2010), there appears to be a gap in research involving young people. Despite this there is growing research on identifying children and young people's attitudes towards the environment, climate change and forestry and the factors that shape their attitudes (COI, 2008; Harrison, 2010; Lovell & O'Brien, 2009) and the role that early engagement with the outdoors and place based education might play in developing pro-environmental behaviours and attitudes (e.g. Evans & Brauchle, 2007; Ewert, Place, & Sibthorp, 2005). However, there is little research evidence that focuses on the extent to which these early experiences might shape young people's career choices related to sectors such as forestry.

Current policy context in Scotland

At the time of writing this report, Forestry is undergoing organisational changes and a proposed new structure introduced (Scottish Government, 2018). This new structure will continue to work in relation to the seven key themes encompassed in the 2006 Scottish Strategy (FCS, 2006), these being: 1: Climate change; 2: Timber; 3: Business development; 4: Community development 5: Access and health; 6: Environmental quality; and 7: Biodiversity. It is anticipated that similar themes will be reflected in the strategy which will emerge from the Scottish Government's current consultation process for the period 2019-2029 (Scottish Government, 2018). The themes address a wide range of issues ranging from contribution to the economy

through wood production to a wide ranging set of environmental outcomes including climate change mitigation and enhancing the health and wellbeing of those who live in and visit Scotland. The current consultation process suggests that the aim is to increase forest cover from 18% to 21% by 2032 and a further range of economic, social and environmental benefits contained within a future 50 year vision.

A key priority of Governments both north and south of the border in the UK is therefore to achieve a continued expansion in forest cover through planting more trees and increasing the active management of existing woodlands (RFS, 2017b; Scottish Government, 2018). Such growth, along with related environmental and social developments, will require the availability of a workforce with a range of skills that can be deployed across the broad range of forestry activities in the foreseeable future. However, in contrast to this the Higher Education provision of forestry courses has declined in recent years as a result of lack of demand from students (RFS, 2017b). It is important, therefore, to try to determine what are the factors which help to influence young people in making career choices with respect to forestry.

Research aims

Given concerns with attracting young people to careers in forestry, and the need to understanding the life and educational experiences that influence career choice with respect to forestry, this study focussed on:

- The forestry related career guidance that is provided for young people during school years in selected case study schools.
- Participants perceptions of forestry as a career and the range of pathways available.
- Personal experiences that may have influenced participants views of forestry as a career.

Research Questions

1. To what extent are young people in upper secondary school aware of the opportunities for forestry as a career?

2. If aware, how many consider this as a possibility?
3. Do career guidance teachers offer guidance with respect to forestry as a career? To what extent are career guidance staff aware of forestry careers?
4. What appear to be the factors which have influenced young people who have embarked on a forestry study and/or career path?

Methodology

As (Hirschi, 2011) states 'Developing career-choice readiness is an important task in adolescence, but current theory and research has provided a rather static view of the phenomenon' (p.340). Thus this study focuses primarily on the factors that influence career choice in young people with particular reference to forestry, but also requires some consideration of the extent to which current education provision prepares prospective forestry professionals for forestry work in the 21st century. As adolescence is a pivotal time for vocational preparation for future career development, which also has important implications for well-being and adjustment (Skorikov, 2007), a study of this type has the potential to add to the field as well as providing significant insight into the factors that influence career choice linked to forestry.

Given the time and budget available for this study, there was a need to conduct a study which identified and focused on key groups of respondents. These were likely to be: secondary school students, undergraduate forestry students and career guidance teachers.

Case Studies

The research was conducted by adopting the principles of multiple case study analysis (Stake, 2006), each case being an identified group with specific attributes. With respect to experiences of school students we identified four secondary schools, two of which were schools which have an identified connection with forestry e.g. one of the schools had its own forestry plot, or schools which were known to have strong connections with Forest School provision or Outdoor Woodland Learning Schemes. The other schools had no identified connection with forestry or forest schools and were characterised as semi-rural and urban schools. Each of the schools was

considered as a case. School students in their fourth, fifth and sixth years in each of these schools were the target populations. In addition, career guidance teachers in each of these schools were involved in the collection of data and two teachers were interviewed.

The other study group comprised of students on forestry related degrees or qualifications, in Scotland. The students undertaking these courses were the target population. The intention with these students was to try to determine some of the factors which had influenced their decision to follow a forestry path.

Questionnaires

A specific questionnaire was developed for the case study schools. (See appendix 1) In the case of the school students the questionnaire was developed to collect general information about their aspirations and specific information about their awareness of forestry as a career, any information or guidance they might have been given with respect to forestry and the source of that information, and significant experiences that may have influenced their interest in and potential for career in forestry, e.g. childhood experiences, relatives in forestry, other guidance or information received. Background information on socio-economic and culture background was also gathered to see whether this might be an influential factor. The questionnaires were given to all secondary school students in the middle and upper stages of the case study schools.

In addition, a questionnaire was developed to gather information from students who had enrolled in forestry related degrees or HNC courses in Higher or Further Education colleges in Scotland. (See appendix 2).

Findings Section

The findings section is divided into two parts. Part one presents the findings from the pupils' responses to the online questionnaire and where appropriate comparing and contrasting between case study sites. Part two looks at the forestry student's responses to the online questionnaire.

Pupil case studies

While the questionnaire was distributed to all pupils in their 4th, 5th or 6th year in each of the schools, the response rate was disappointing. Access to the schools was difficult, with schools preoccupied at the time with forthcoming SQA exam preparations. Researchers were, therefore, dependent on guidance teachers providing links to the on-line questionnaire and encouraging participation during the pupils' Personal and Social Development classes. Reminders were sent to the schools periodically but the return rate was only around a quarter of what we had anticipated at the outset. Nevertheless, the results did provide some useful data.
Details of the response rates from each school and the overall gender breakdown are provided in tables 1 and 2.

Demographics

Table 1: Pupil response rate from each of the case study schools.

School 1	N= 16	Rural; links to forests/forestry
School 2	N=30	Semi rural; links to forests/forestry
School 3	N=32	Urban; no known links to forests/forestry
School 4	N=15	Semi rural;no known links to forests/forestry

Table 2: Overall Gender Distribution

Gender	Percentage (N= 93)
Female	43.2
Male	48.4
Prefer not to say	8.4

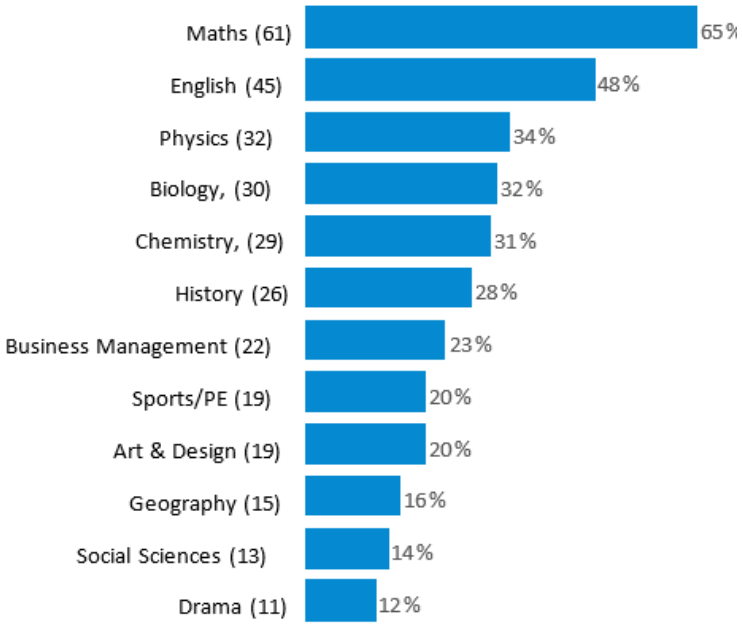
In order to provide additional context for the study participating pupils were asked about what subjects they would like to study in the following year and general aspirations as well as specifically forestry related.

The percentages of students giving their preferred subject choices indicated a predominance for science and maths subjects with 65% of all pupils choosing maths and about a third of pupils favouring at least one of the three sciences: biology, chemistry or physics (Chart 1). However, it should be noted that Maths would have

been a compulsory subject for 4th year pupils. Many of the pupils would have chosen several of these subjects. This pattern was similar across all four school case study sites.

Chart 1: Percentage of respondents choosing subjects they would like to study the following year.

Question asked: Which subject areas would you like to study at school in the following year? Please select all as appropriate.



In addition to being asked about their preferred subject choices the pupils were also asked about their general aspirations in terms of the types of jobs they would like to enter in the future.

They were asked to choose from a range of professions with some examples given (see full examples provided in Question 10 in appendix 1). The categories of occupations with a few specific examples are:

Modern professional occupations e.g. teacher, nurse, physiotherapist, social worker, artist.

Clerical and intermediate occupations e.g. secretary, personal assistant, clerical worker.

Senior managers or administrators e.g. finance manager, chief executive

Technical and craft occupations e.g. motor mechanic, fitter, plumber, electrician, gardener.

Semi-routine manual and service occupations e.g.: postal worker, security guard, farm worker.

Routine manual and service occupations e.g. HGV driver, van driver, cleaner, porter.

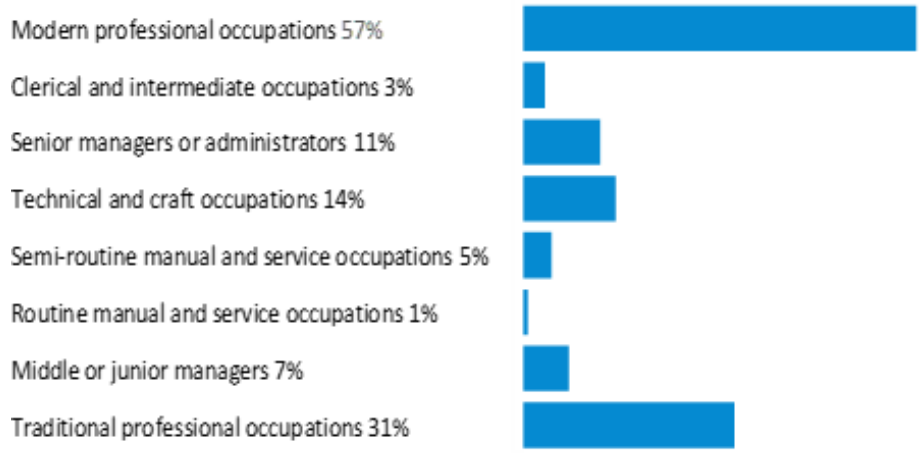
Middle or junior managers e.g. office manager, retail manager, bank manager.

Traditional professional occupations e.g.: accountant, solicitor, scientist, civil/mechanical Engineer

The types of occupations preferred by the pupils are shown in Chart 2.

Chart 2 General Aspirations of participants

Question asked: What type of job would you like to do in future (tick all that apply)?

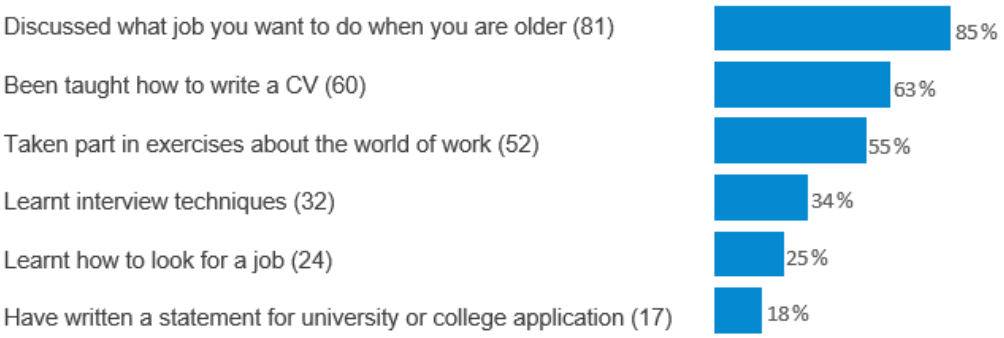


Like the subject choice there was very little difference between the case study sites, the one exception being in the rural school which had forestry links, in which 20% of pupils chose semi-routine manual and service occupations. Given that this category contained farm working and the school with forestry links was also a rural school in a largely agricultural area, it is perhaps not surprising that around a fifth of the pupils selected this occupation. However, most of the pupils from across all four case study schools aspired towards modern professional occupations followed by traditional professional occupations. In other words, aspirations towards occupations such as teachers, nurses, solicitors, engineers.

When trying to develop some ideas about influences in career choice, it is important to try and ascertain the degree to which schools may influence that choice or equip young people for preparing for the world of work. The next question was aimed at eliciting an indication of the degree to which the secondary students had been exposed to some of these issues (Chart 3).

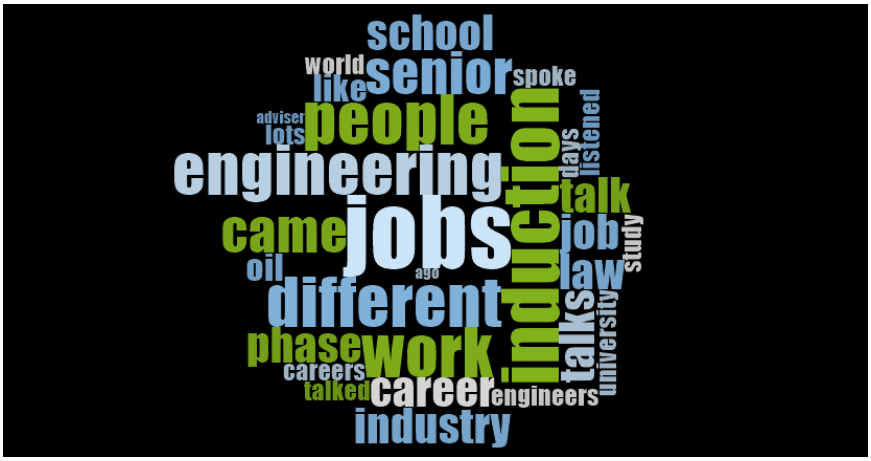
Chart 3 Preparation for the World of Work

Question asked: Looking at the list below, have you ever done any of the following in school time?



Most pupils (85%) had discussed what type of occupation they would like to pursue after completing their education/training, and half the participants had taken part in lessons looking at the world of work. The percentages in the chart above were broadly similar for all the case study school sites. Some of those discussions and information about work and occupations would have been through induction/careers events for the senior pupils and they were asked if they had listened to or spoken to a visitor to the school about different jobs. From the responses they gave a word cloud (Figure 1) was produced which illustrates the predominant responses from pupils across all case study sites.

Figure 1 Word Cloud of responses about interaction with visitors.
Question asked: Have you listened to or spoken with a visitor to the school who talked about different types of jobs? If yes please list who they were and what jobs they talked about?



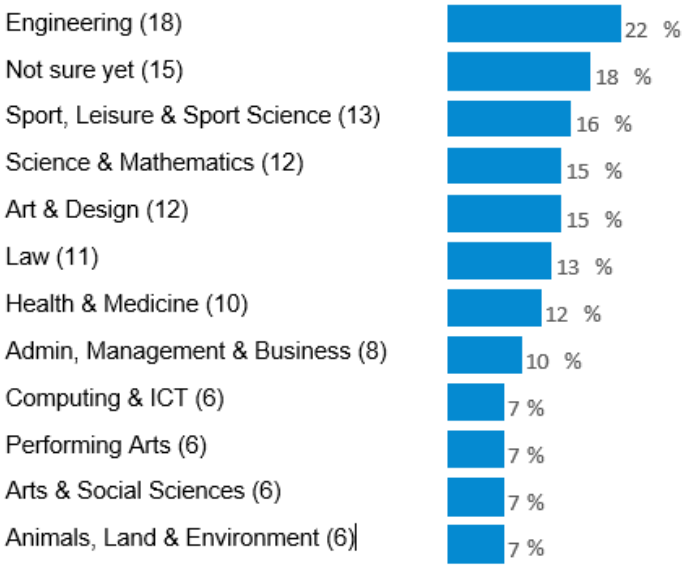
The predominant themes were around engineering, oil, law and continuing education/ university. Although there were other types of occupations mentioned, no

reference was made to forestry related occupations by the participants in any of the case study school sites.

A similar pattern was found when pupils were asked about what courses they might consider undertaking at university or college after leaving school. Across all the case study school sites, the largest single group of pupils, 22%, identified engineering as the type of course they were planning on following if they intended to go to University or College (Chart 4).

Chart 4 Secondary students Intended programmes of study after school.

Question asked: If you are planning to go to University/College what kind of course would you like to study?



Only 7% of participants, all of whom were female, identified Animals, Land & Environment as the area of study they would like to do in further or higher education. While the category does not provide a more defined area of study, the written responses suggested that this area was chosen because of an interest in animals, rather than any plant, or land-based interests, although one did suggest a tree, as well as animal, related interest:

> *'I am passionate about animals'*
>
> *'I am interested in engineering as I enjoy maths and physics. I also have a passion for animals'*

'as I am walking through the woods I might get a thought on how it would be nice to do something like observe a certain animal or look after some trees, yes, zoologist, a ranger, tree surgeon.,

However, while the last respondent did give an indication of an interest in tree related occupation, they later went on to say that they were not aware that the areas of interest related to forestry occupations.

As stated in the earlier introductory literature review, it is important to consider the possible influences, such as relationships and schools, which may have a bearing on future career choices. To this end the pupils were asked to indicate who they would be most likely to speak to with respect to considering what to do after leaving school (Chart 5) and to get information about work which they might be interested in (Chart 6)

Chart 5 Percentage responses indicating who pupils would speak to about leaving school (more than one may have been selected).
Question asked: Who are you most likely to speak to about what to do when you leave school? (MARK ALL THAT APPLY.)

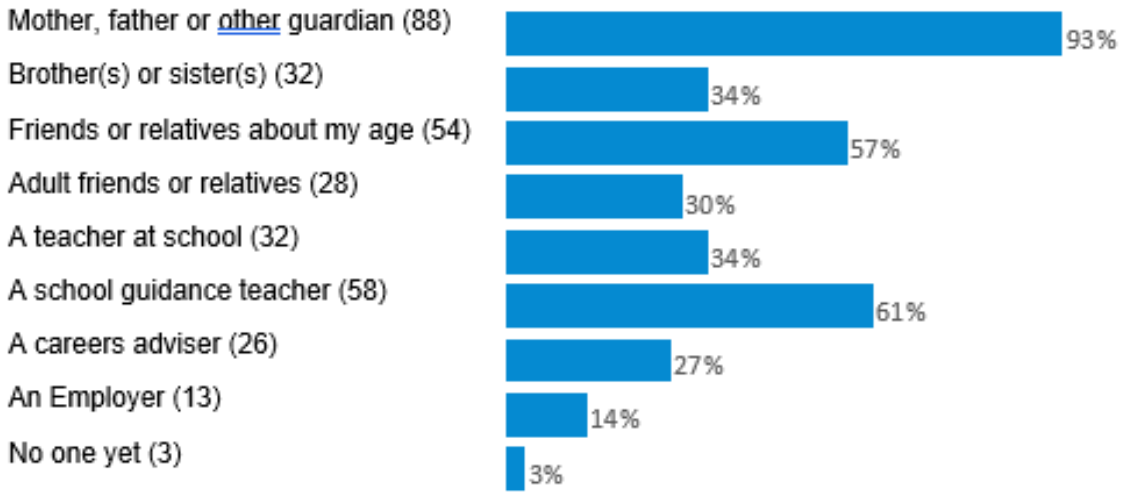
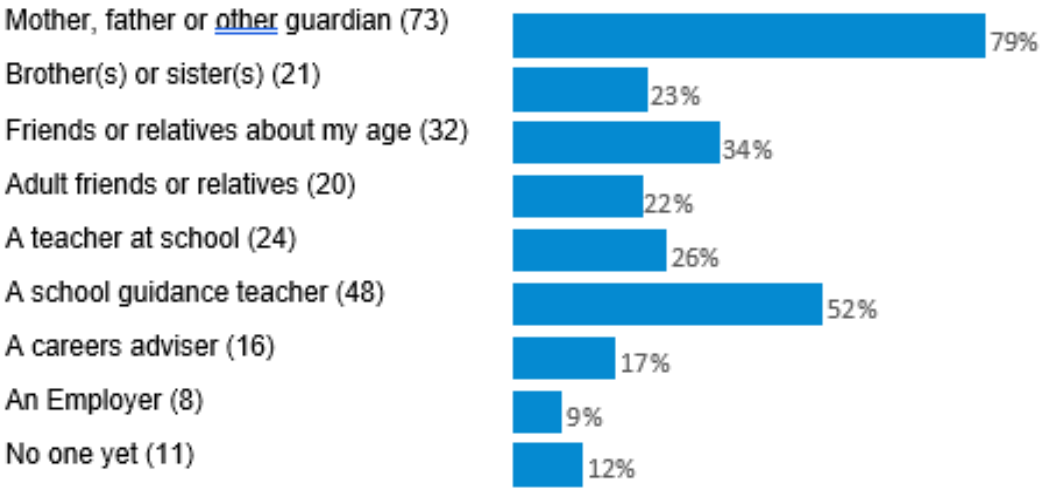


Chart 6 Percentage responses indicating who pupils would speak to get information about potential future occupations (more than one may have been selected).
Question asked: Who have you talked to, to get information about work you may be interested in when you finish your education? (MARK ALL THAT APPLY.)



Charts 5 and 6 show that the people that school students are most likely to speak to about what to do after leaving school, and asking for information about future occupations, are predominantly parents or guardians, followed by the school guidance teacher. These responses were consistent across all the case study sites. While school guidance teachers, teachers and careers advisers are sources of advice/information, family and friends appear to be a significant influence when young people are thinking about future choices in relation to continuing education and or employment. As will be seen later this was also found in the forestry students studying at university.

Forestry Career Aspirations

While the first part of the school student questionnaire was aimed at eliciting general information about perceptions and perspectives on future study and career choices, it was important for this study to gain some insight into the extent that the young people were aware of forestry and forestry careers. To this end the final part of the online questionnaire for pupils asked specifically about the Forest Commission and about careers associated with forests and forestry.

Initially the school students were asked whether they had heard of the Forestry Commission (Table 3)

Table 3: Percentage of pupils that had heard of Forestry Commission?

School	No	Yes	Not Sure	NR	Total% N=93
Case study site 1	37.50	31.25	0.00	31.25	100.00
Case study site 2	30.00	60.00	0.00	10.00	100.00
Case study site 3	56.25	31.25	0.00	12.50	100.00
Case study site 4	60.00	6.67	6.67	26.67	100.00
Total	44.79	36.46	1.04	17.71	100.00

Overall, approximately one third (36%) of the school students had heard of the Forestry Commission with 45% not having heard of the Forestry Commission. However, there were variations between the response from the case study school sites (Table 3) with site 2 (semi-rural with links to forestry/forests) having 60% of respondents indicating that they had heard of the Forestry Commission. Case study site 3 (urban no known links to forestry) and site 4 (semi-rural no known links to forestry) had the largest percentage who were not aware of the Forestry Commission. Interestingly site 1 (rural with links to forestry) and site 3 (urban no known links to forestry) had a similar response to percentage of pupils having heard of the Forestry Commission. It would have been interesting to explore this further to try to ascertain when and where pupils in each of the schools had heard of the Forestry Commission, however, this was not within the capacity of this study. It is also interesting to note that only one person who had heard of the Forestry Commission indicated they may consider a career in forestry (Forest worker; Forest officer, Countryside ranger, Agricultural engineer). This pupil was located at case study site 2.

While the largest part of forestry is perhaps dedicated to the industrial sector of cultivating and harvesting of timber, it is recognised that the scope of forestry is expanding to include a broader range of societal and environmental benefits. It was, therefore, of interest to ask the pupils what they recognised as being the types of jobs related to forestry. Their responses are displayed by frequency in the word cloud below (Figure 2).

Figure 2: Top 15 words identified by participants when asked to think about jobs related to forestry

Most of the pupils, when asked about what types of jobs might be associated with forestry related occupations, responded with wood and wood cutting. A smaller number of pupils suggested planting or tree surgeon. This suggests that pupils had a narrow definition of types of occupations related to forestry, for example they did not relate it to multipurpose forestry and related occupations such as ranger, environmental/sustainability or indeed engineering.

We asked the participants to indicate if they had considered jobs which were specifically related to forestry or forest occupations. These occupation types were identified by typing in the word 'forestry' in to the Skills Development Scotland My World of Work website used in schools [1]

The pupils were provided with broader descriptions of the jobs as provided in the *My World of Work* website. These are provided below with the overall results provided in Table 4.

Job descriptions:

Tree surgeon; Keep trees healthy by carrying out work including planting, care and hazard checks.

Forest worker; Carry out practical tasks in forests and woodlands to help care for and protect the environment. Keep trees healthy by carrying out work including planting, care and hazard checks..

[1] https://www.myworldofwork.co.uk/about-us
https://www.myworldofwork.co.uk/my-career-options/search/forestry%20?group=job_profile&soc_code=&industry=#search-results

Forest officer; Look after an area of forest to produce timber and conserve the woodland environment for people to enjoy..

Mechanical engineer; Design and test components and machines like wind turbines, water pumps

Zoologist; Study animals, their habits and the places they live.

Cartographer; Research, design and publish maps on paper and online that people can use to find their way around.

Countryside ranger; Do practical work to look after the countryside and conserve wildlife. Help visitors enjoy the natural environment.

Agricultural engineer; Help farmers tackle their environmental problems with specialist equipment, land improvement projects and new agricultural techniques.

Table 4. Have you considered any of the following jobs:

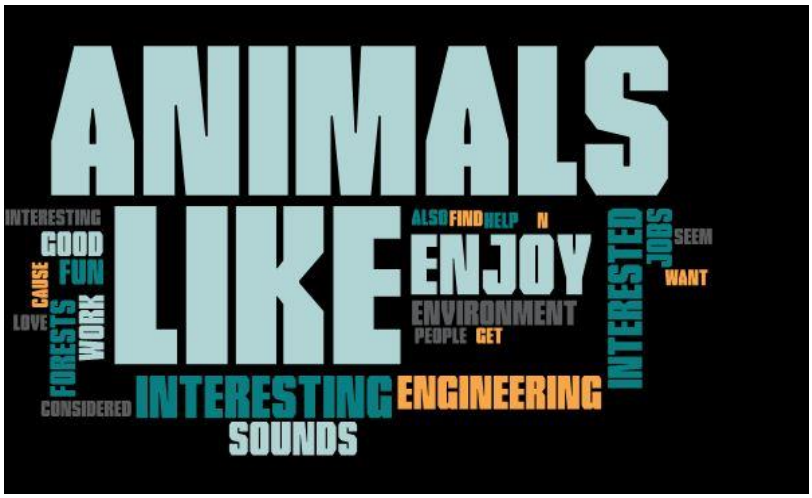
Job	Yes (%)	No (%)	Not sure what the job involves. (%)
Tree surgeon	4	89	6
Forest worker	4	89	6
Forest Officer	2	91	7
Mechanical Engineer	19	75	6
Zoologist	27	70	3
Cartographer	1	95	4
Countryside Ranger	10	87	3
Agricultural engineer	7	87	5

Overall there were no significant differences, in any occupation category, between the case study school sites when looking at careers associated with forestry. A small number of pupils, who had indicated that they were considering a specific job type, tended to identify an interest in more than one job type. i.e. one pupil selected: Tree surgeon, Forest officer, Countryside ranger and Agricultural engineer. Another one selected; Tree surgeon, Forest officer, Zoologist. There was overall more interest in related jobs such as; Mechanical engineer (19%) and Zoologist (27%).

After selecting particular jobs, pupils were asked to provide reasons why they had an interest the jobs and the results, as previously, have been used to generate a word cloud of the most common responses (Figure 3), animals and engineering being most frequently mentioned, with environment also appearing. The most frequent use of animals, unsurprisingly, applied to those who indicated an interest in zoology and

countryside ranger and the engineering from those with an interest in mechanical engineering. The interest in mechanical engineering reflects the aspiration shown by a large number of pupils in going on to study engineering beyond school (Chart 4, page 15). However, while this may be an indication of interest, it does not reflect an intention of entering a forestry occupation. Further research investigating awareness or knowledge of forest engineering would be beneficial.

Figure 3: Word cloud generated from reasons for interest in forestry related jobs.



As well as asking the pupils for reasons why they were interested in forestry related jobs, they were also asked to give a reason if they were not interested in the job categories related to forestry identified above. While they offered various reasons, most of the pupils felt that the types of jobs ‘did not interest them’, or ‘sound boring not what I enjoy’.

> *’they don't seem like something I would enjoy doing’*
>
> *they would bore me and I have no interest in them, these specific jobs don't sound interesting to me, I feel that I would get bored after a while.*
>
> *‘These professions personally do not interest me, as I enjoy studying about animals and humans, rather than plants.’*
>
> *‘I don't get excited when I think about cutting down a tree’*
>
> *As I am not interested in this side of work. I believe I am more suited to the business side rather than labour*

However, given that many of the pupils appeared to have little knowledge or understanding of the range of activities undertaken in forestry, or the diverse applications of forestry and woodland, it is interesting to speculate why, or how, they come to hold these views. There is a sense coming through the data that the "traditional" lumberjack image of forestry is what permeates young people's perceptions.

A small number had not had any information or heard about most of the jobs

> *I wasn't familiar with the jobs until now*
>
> *I haven't thought about or heard about them*
>
> *I didn't know that most of these jobs existed*
>
> *These are jobs I have not previously considered, though I have no aversion to potentially working in these roles in future.*
>
> *Haven't really thought about working in a forest as a career*
>
> *haven't heard of them*

A few of the pupils mentioned that potential pay was an issue i.e. Not enough money, the pay is poor, therefore the jobs were not attractive to them.

Student case study

The student case study draws on students from two Universities in Scotland that completed the online questionnaire between February and August 2018. Again, the return rate from these two Universities was quite disappointing and two further Universities with forestry degree courses that had been approached and agreed to distribute the questionnaires, did not return any data. While the link to the survey was provided to these Universities, communication proved problematic and it is not clear whether the contact person did distribute the link to the students.

Nevertheless, while the return rate from the students who did complete the questionnaire was small, the data does provide further evidence which closely mirrors and supports the findings from the school student data.

The following charts gives the gender and age break down of the case study group

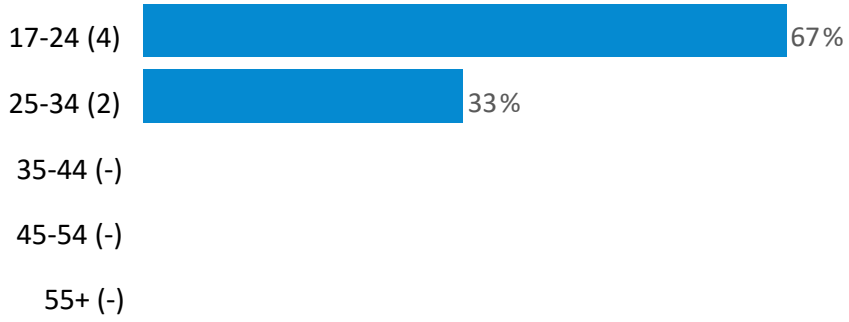
Demographics

Chart 7: Gender breakdown of Higher Education student respondents.

It is interesting, and perhaps encouraging, to note that four of the six student respondents were female. Forestry is usually perceived to be, and is, a male dominated profession but, as a Stuart Goodall, Chief Executive of Confor, stated in the foreword to a recent report by Eleanor Harris (Harris, 2016), " Several of the most significant posts in the sector are held by women." and "The fact remains that forestry provides excellent career opportunities for both men and women in Scotland"

Chart 8 displays the age distribution of the student respondents with most of them being in the "typical" student age band of late teens/early twenties, with two of the respondents being more mature students in the 25-34 age band.

Chart 8: Age distribution of Higher Education student respondents.



Academic background of students

The students currently on a forestry related course were asked what subjects they had chosen to study at S5 and S6. These choices are made beyond the compulsory age of education and are therefore the student's own choice of subjects usually selected on achieving entry level at S4, interest and possible further education requirements.

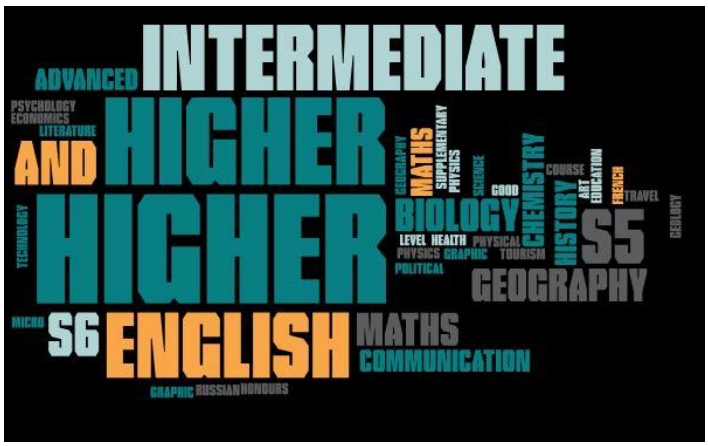
Their responses are provided in full below.

Table 5. Forestry students' subject choices in S5 and S6 secondary school

Student	Subjects taken in S5 and S6
1	English intermediate 2 Art intermediate 2 French intermediate 2 Maths intermediate 1 Travel and Tourism intermediate 1
2	Higher biology, higher geography, higher English, higher physical education and intermediate 2 maths
3	English higher, biology higher, geography higher and health and good technology higher
4	Maths Higher S5, Physics Higher S5, Chemistry Higher S5, History Higher S5, Graphic
5	Communication Higher S5, Geography Higher S6, English Higher S6, Chemistry Advanced Higher S6, Geology (supplementary course) S6
6	Honours level English literature, Political Science, Russian History, Micro Economics, Advanced higher- maths Higher- biology, physics, maths, psychology, English, geography, graphic communication

Perhaps, as might be expected, the choices of subjects were predominantly from the STEM area plus English, as can be seen illustrated in the word cloud below (Figure 4).

Figure 4: Word cloud generated from FE/HE students' subject choices in S5 and S6.



There appeared to be little or no coverage of aspects of forests or forestry covered in the subjects that the student studied at school. One student commented that geography touched on the rainforest/ slash and burn but was more focused on agriculture.

Social background Family

The students were asked to identify the type of occupation undertaken by their parents. Two of the students had one parent in an occupation that was related to forestry i.e. 'Sawmill treatment plant operator' and 'Forestry lecturer'. The others had

parents that undertook a range of occupations that could broadly be categorised as modern professions and middle management and semi routine manual. Thus, while the parental occupation may have been influential in two cases, there appears to be no direct link between the parental occupation and the choice of study of most of the students.

Choice of course

The courses that the students had chosen ranged from HND in Forestry, BSc(Hons) Forest Management with Arboriculture and Urban Forestry to Environmental and Forest Management. The reason for making the choice of course ranged from predetermined choice of career with a view to future progression:

> *'To be able to work my way up through the industry'.*
> *'Interest in forestry and desire to work in the industry,*

To a more indirect choice determined by other factors:

> *'I fell into it - I wanted to do environmental science but I'm awful at chemistry so forestry suited me better.'*
> *'Need to specialise my geography undergraduate degree was too vague to really get into the environmental sector despite volunteering.'*

When making the choice of career, and subsequent study, there appeared to be two significant factors that influenced the students' choice:

- Information about the course from the university
- School careers advisor, family, (family in forestry), friends, (friend working in the forestry sector)

In addition, some of the students had undertaken other forms of training prior to accessing their current course such as.

> *'Yes, I did a HNC in countryside and environmental management before doing forestry. I was also interested in environmental studies with archaeology.'*
>
> *'Yes, attempted to acquire a few jobs in environmental consultancy, and was interviewed several times but generally told I lacked some experience.'*

‘ While volunteering with a small woodland company, that gave me training in environmental education and basic wood crafts’

The students were asked to try and identify when they first became interested in forestry? Again, there were a range of responses, but they centred around family influences when they were younger and liking the outdoors;

‘Family connection and a love for the outdoors’,

‘*When I was much younger, going on hikes with my grandfather*.’

‘*Have always had an interest as part of my outdoors related hobbies, and my interest in wider environmental management.*’

Most of the students, if not all, expressed a liking for being outdoors and that forestry provided career opportunities for:

‘a good outdoors-based career.’

‘*Forests are a space I enjoy in my free time and wanting to work outdoors with tangible results.’*

One student commented that it would give them the opportunity to link;

‘*policy and science in a way no other field does.’*

Interestingly, while these students had embarked on further study with the view to making a career in forestry, and one might expect them to have a broader view of the different dimensions of forestry, the timber harvesting operations appeared to be of the greatest interest. The students stated that of the roles available in forestry those that interested them were ‘*Harvesting manager’, “Harvesting Contracts Management*” and “*Harvesting Machines*”. While these roles were focussed on harvesting these students saw their roles in the management, or perhaps engineering, side of harvesting operations. Some of the students also expressed an interest in what might be seen as more related to environmental management and biodiversity, suggesting that they were interested in *the natural regeneration of native Scottish pinewoods* and *policy implementation and creation of new woodland*. However, while there was some indication of more diversification of future job roles, harvesting and management of harvesting were the dominant interests as illustrated

by their aspirations for the type of jobs they would like to do after completing their course:

> '*Harvesting manager',*
>
> '*Get a job within harvesting - hopefully as a contracts manager. Find a job and work towards chartered status.',*
>
> '*I hope that I will be a harvesting manager but I'm quite happy doing contracts management. It's all the bits of the job without the stress of buying timber.'*

Two of the students mentioned jobs that would involve the environment and nature:

> '*I would like to be a wildlife or environment ranger/forester', 'working in a natural park.'*

Career Guidance

While at the outset the intention had been to interview the career guidance teachers in all the case study schools, arranging time to do so proved to be problematic and so data collected from guidance teachers was limited. However, two of the guidance teachers did talk with the researcher by telephone and provided some insight into the way in which career opportunities were presented to pupils. This can be summed up as fairly "generic" and "opportunistic". The generic aspect relates to general skills development, such as writing a CV and consideration of further study and career opportunities through websites such as *My World of Work*. Getting pupils to consider their specific strengths and interests and using that in considering future study and employment.

The opportunistic element of career guidance relied heavily on availability of external providers who were willing to come and talk to pupils. These were usually undertaken by external organisations either contacting the school and asking if they could come and speak to school pupils, an example being the army, or with someone in the school happening to have an external contact willing to come in. There was no clarity in the way in which speakers were invited into the schools. In the North-East, where the study schools were located, visits from external organisations or companies usually took the form of oil and gas related career opportunities.

Conclusions

The research provided the opportunity to develop and pilot tools for the collection of data regarding aspirations in general and specifically in relation to forestry careers. These tools have now been tested and found to be relatively straightforward to use with participants. They provide validated tools for collecting a range of data to address the research questions and could form the basis, with modification where required, of more extensive research if this was required.

The findings provide an insight into the perceptions of young people at secondary school and university forestry students about forestry and forestry careers.

The findings are from the four case studies and thus represent those participants' views. However, they also provide an understanding of how forestry is perceived as a career choice by young people.

The scope of the study was limited by the numbers participating, however the case study design provides an insight into the perceptions and experiences of young people at secondary school and university in making a start to address the research questions. While the findings are from four case studies, and as such represent the participants views specific to those contexts, they do provide a potential depiction of the wider community perceptions and views of forestry as a career.

General aspirations of pupils from the case study schools suggest that the most common career choices are engineering, other modern and traditional professions. These three broad occupational areas provide a context for pupils' choices when they are considering other possible careers such as forestry. The predominance of engineering is possibly linked to occupations associated with the geographical area, the North East of Scotland, namely the oil and gas industry.

The research attempted to explore the extent that young people in upper secondary school are aware of the opportunities for forestry as a career. The data indicates that there is little or no awareness of career opportunities in forestry and the dominant perception of occupations is one of 'timber cutting'. This chimes with (Leslie et al., 2006) findings that students' view of forestry is largely associated with felling trees and operating sawmills, rather than social and environmental activities.

When asked to indicate if they were interested in a range of possible careers associated with forestry the majority of those surveyed were not thinking about

advancing a career in occupations directly linked to forestry such as; Forest worker. Forest officer, Tree surgeon. However, several pupils did indicate that they were considering occupations that possibly could have links to forestry careers but not necessarily direct occupations within the Forestry Commission, such as, zoologist, engineering and Countryside ranger.

At school events, such as careers fairs, induction days/ parents' evenings for senior phase pupils (S4-S6), the emphasis was on occupations such as engineering, modern and traditional professions, and college and university courses associated with those occupations. It was not clear whether schools contacted organisations or organisations contacted schools, however, there clearly is the possibility for organisations to be proactive and contact schools if they wanted a presence at such events.

There appeared to be two significant factors that influenced the forestry students' choice of course and possible career:

Family (working in forestry), friends (working forestry), school careers advisor.

Information about the course form the university.

Career aspirations of the students emphasised harvesting and wood production with little or no mention of multi-purpose forestry.

Those thinking of career in forestry said they were influenced by family members or a general interest in the outdoors which usually started at an early age.

Recommendations/Suggestions

While this was a small-scale study using only four case study schools and responses from a small number of forestry students and career guidance teachers, it does, nevertheless confirm studies which have been concluded elsewhere, but not in Scotland. In this respect it confirms in a Scottish context some of the findings of the Royal Forestry Society Forestry Skills Study for England and Wales (RFS, 2017a) and also their study of current and future skills in the forestry sector (RFS, 2017b). What becomes clear is the lack of awareness or understanding of the diversifying range of job and career opportunities currently and potentially available in the forestry sector.

There is a need for forestry related organisations to examine ways in which they can be more proactive in communicating information to young people. This is perhaps important given the message of expansion being suggested in the Scottish Government's consultation on the forestry strategy for 2019-2029. What also is apparent from the data is that key influencers such as immediate family and friends, as well as career guidance teachers, need to have more information about forestry and forestry related jobs, which goes beyond the immediate timber harvesting and industrial model of forestry to encompass the more diverse range of opportunities which arise from multipurpose forestry.

To this end this study suggests that some of the issues and opportunities for action found in the RFS study also apply in Scotland, this study also added to some of these with other reflections. These include:

1. Investigate ways in which the Forestry Commission Scotland or forestry organisations can best focus careers presentations in targeted schools.
2. Considering ways in which to improve the attractiveness of the forestry sector to school leavers as a careers option.
3. Look at ways to encourage more female school students to enter forestry as a profession, and similarly look at ways to encourage male school students to engage with land and environment disciplines.
4. Consider ways in which the profile of wood and forestry operations can be raised in schools for example by more widely adopting initiatives like the Natural Partners Programme currently delivered at Moray House School of Education to encourage greater awareness amongst STEM teachers.
5. Raise awareness of the range of forestry activities amongst the general public. This might be, for example in events such as those organised through the NPP programme, or similar initiatives.

In summary the key issues appear to be around exploring all potential avenues for raising awareness of the range of possibilities presented by forestry, perhaps providing additional focus on the multipurpose dimensions of forestry linked to more topic issues such as climate change, bioenergy, health and well-being and community engagement.

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Appendix 1 Secondary School Student Questionnaire (Open ended text boxes removed and some resizing for formatting purposes)

The aim of this survey is to gain an understanding of how young people make career choices. The questionnaire should take about 15 minutes to complete. By completing this survey, you are agreeing to the information provided being stored and used for research purposes. All the data will be stored in the secure research servers of the University of Aberdeen. Information will be treated as confidential and no individuals will be identified in any reports.

Q1 Are you happy to participate? (this is a compulsory question for ethics approval)

- Yes Go to N3
- No Go to N4

About you

Q2 Gender?

- Female
- Male
- Prefer not to say

Q3 What School do you attend?

Q4 What year are you?

- S3
- S4
- S5
- S6

Q5 Which subject areas would you like to study at school in the following year? Please select all as appropriate.

- [ ] English
- [ ] Maths
- [ ] Geography
- [ ] History
- [ ] Biology,
- [ ] Chemistry,
- [ ] Physics
- [ ] Sports/PE
- [ ] Business Management
- [ ] Social Sciences
- [ ] Engineering
- [ ] Art & Design
- [ ] Computing & IT
- [ ] Music
- [ ] Drama
- [ ] Catering & Hospitality
- [ ] Construction
- [ ] Care
- [ ] Motor Vehicle Maintenance
- [ ] Beauty Therapy & Hairdressing

Other subject areas please specify

Q6 Looking at the list below, have you ever done any of the following in school time?

- [ ] Discussed what job you want to do when you are older
- [ ] Been taught how to write a CV
- [ ] Taken part in exercises about the world of work
- [ ] Learnt interview techniques
- [ ] Learnt how to look for a job

Have written a statement for university or college application

Q7 Have you listened to or spoken with a visitor to the school who talked about different types of jobs? If yes please list who they were and what jobs they talked about?

Q8 Have you visited a work place with the school? If yes please please list type of work place.

Q9 Have you been on a work placement for a week or more? If yes please say what.

Q10 What type of job would you like to do in the future (tick all that apply)?

- [ ] Modern professional occupations such as: teacher – nurse – physiotherapist – social worker – welfare officer – artist– musician – police officer (sergeant or above) – software designer
- [ ] Clerical and intermediate occupations such as: secretary – personal assistant – clerical worker – office clerk – call centre agent – nursing auxiliary – nursery nurse
- [ ] Senior managers or administrators (usually responsible for planning, organising and coordinating work, and for finance) such as: finance manager – chief executive
- [ ] Technical and craft occupations such as: motor mechanic – fitter – inspector – plumber – printer – tool maker – electrician – gardener – train driver
- [ ] Semi-routine manual and service occupations such as: postal worker – machine operative – security guard – caretaker – farm worker – catering assistant – receptionist – sales assistant
- [ ] Routine manual and service occupations such as: HGV driver – van driver – cleaner – porter – packer – sewing machinist -messenger – labourer – waiter/waitress – bar staff
- [ ] Middle or junior managers such as: office manager – retail manager – bank manager – restaurant manager – warehouse manager – publican
- [ ] Traditional professional occupations such as: accountant – solicitor – medical practitioner – scientist – civil/mechanical Engineer

Q11 If you are planning to go to University/College what kind of course would you like to study?

- [ ] Engineering
- [ ] Health & Medicine
- [ ] Sport, Leisure & Sport Science
- [ ] Admin, Management & Business
- [ ] Science & Mathematics
- [ ] Computing & ICT
- [ ] Law
- [ ] Art & Design
- [ ] Social, Caring & Advisory Services
- [ ] Performing Arts
- [ ] Hairdressing & Beauty
- [ ] Arts & Social Sciences
- [ ] Animals, Land & Environment
- [ ] Construction
- [ ] Communications & Media
- [ ] Hospitality, Catering & Tourism
- [ ] Finance
- [ ] Garage Services
- [ ] Sales & Marketing
- [ ] Not sure yet

Other please specify

Q12 Who are you most likely to speak to about what to do when you leave school? (MARK ALL THAT APPLY.)

- [ ] Mother, father or other guardian
- [ ] Brother(s) or sister(s)
- [ ] Friends or relatives about my age
- [ ] Adult friends or relatives
- [ ] A teacher at school
- [ ] A school guidance teacher
- [ ] A careers adviser
- [ ] An Employer
- [ ] No one yet

Other please specify

Q13 Who have you talked to, to get information about work you may be interested in when you finish your education? (MARK ALL THAT APPLY.)

- [ ] Mother, father or other guardian
- [ ] Brother(s) or sister(s)
- [ ] Friends or relatives about my age
- [ ] Adult friends or relatives
- [ ] A teacher at school
- [ ] A school guidance teacher
- [ ] A careers adviser
- [ ] An Employer
- [ ] No one yet

Other please specify

Q14 Have you undertaken any outdoor education while at school? If so what.e.g field trips, visits etc

Q15 Do any of your lessons take place outside of the classroom? If yes please say what they are and where they take place.

Q16 Have you heard of Forestry Commission Scotland? If yes can you describe what they do.

Q17 When you think of forestry what is the first thing that comes to mind?

Q18 What types of jobs would be undertaken in a Forest. Please list all you can think of?

Q19 Have you considered any of the following jobs; MARK ALL

	Yes	No	Not sure what the job involves

Tree surgeon; Keep trees healthy by carrying out work including planting, care and hazard checks.	○	○	○
Forest worker; Carry out practical tasks in forests and woodlands to help care for and protect the environment. Keep trees healthy by carrying out work including planting, care and hazard checks.	○	○	○
Forest officer; Look after an area of forest to produce timber and conserve the woodland environment for people to enjoy.	○	○	○
Mechanical engineer; Design and test components and machines like wind turbines, water pumps	○	○	○
Zoologist; Study animals, their habits and the places they live	○	○	○
Cartographer; Research, design and publish maps on paper and online that people can use to find their way around.	○	○	○
Countryside ranger; Do practical work to look after the countryside and conserve wildlife. Help visitors enjoy the natural environment.	○	○	○
Agricultural engineer; Help farmers tackle their environmental problems with specialist equipment, land improvement projects and new agricultural techniques	○	○	○

Q20 If you have ticked yes for any of the jobs above, please explain why.

Q21 If you have ticked no for any of the jobs above, please explain why.

Q22 If you have ticked unsure for any of the jobs above, please explain why.

Q23 Would you consider a Land-based/Environment" occupation. If so what?

Thank you for taking part in the survey

Appendix 2 FE/HE Student Questionnaire (Open ended text boxes removed and some resizing for formatting purposes)

There has been, in recent years, worldwide concern raised over the fall in the numbers of students undertaking forestry courses in universities. Given concerns with attracting young people to careers in forestry, and the need to understand the life and educational experiences that influence career choices with respect to forestry, this study looks at the personal experiences that may have influenced views of forestry as a career.

By completing this survey you are agreeing to the information provided being stored and used for research purposes. All the data will be stored in the secure research servers of the University of Aberdeen. Information will be treated as confidential and no individuals will be identified in any reports.

Q1 Are you happy to participate? (this is a compulsory question for ethics approval)

Yes Go to Q2

No Go to N3

About you.

Q2 Gender Male Female

Prefer not to say

Q3 How old are you?

17-24

25-34

35-44

45-54

55+

Q4 What secondary school did you attend?

Q5 Please list subjects and level of subjects taken at school in S5 and S6, (e.g English Higher, S5.)

Q6 Were there specific subjects at school that covered aspects of forests or forestry? If so, please give details.

Q7 What are or were the occupation of your parents?

Q8 What is the name of your degree course?

Q9 Name of institution you are studying at?

Q10 Why did you choose your current degree course?

Q11 What were the main influences in taking this degree course?

Q12 Did you talk to anybody about your choice of degree course? If so, please give details.

Q13 Had you considered any other training /education options before starting your degree course? If so, please give details.

Q14 When did you first become interested in forestry?

Q15 Why did you become interested in forestry?

Q16 What aspects of forestry are you most interested in?

Q17 What do you plan to do after completing your degree course?

Q18 In ten years' time what job do you think you will be doing?

Q19 Do you have any other comments?

Thank you for taking the time to complete the survey. If you have any questions about this survey please contact: Dr Kevin Stelfox. Kevin.Stelfox@abdn.ac.uk