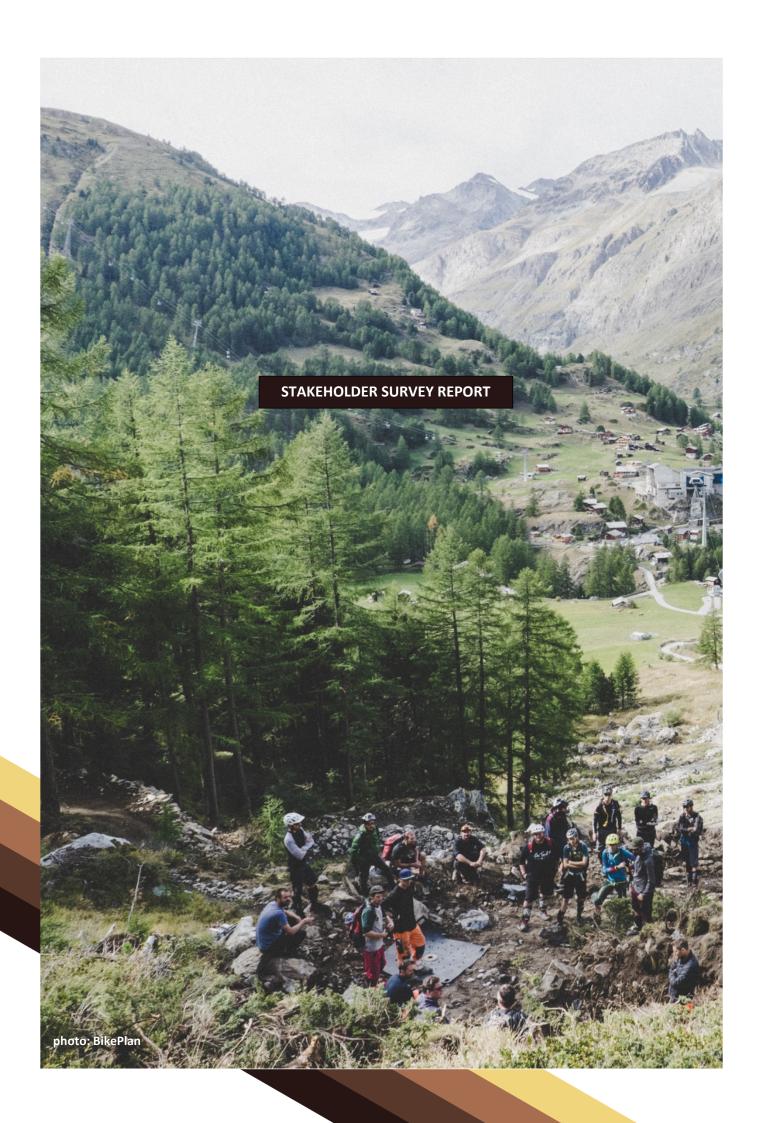




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EXECUTIVE SUMMARY

The mountain bike trail sector survey forms part of the "Developing Intereuropean Resources for Trail builder Training (DIRTT)" project, funded under the ERASMUS+ programme, which aims to develop an educational framework and professional training programme for the mountain bike trail sector. In total, 121 survey respondents from 16 different European countries provided data suitable for inclusion in this report. The main findings of this report are that there is clear demand within the mountain bike trail sector for certified training, and that particular priority is based on the construction and maintenance sectors. Key themes for training requirements included but were not limited to sustainability, safety, drainage, and documentation.

BRIEF OUTLINE OF METHODOLOGY

The survey was developed to identify the priority areas for training in respect of the design, planning, construction, maintenance, and management of sustainable mountain bike trails. A mixed-methods approach was adopted which combined a quantitative needs analysis with qualitative questions to test the assumptions upon which the needs analysis was predicated. The skills and competencies addressed within the quantitative questions were derived from existing guidelines and frameworks, and from the expertise of all partner organisations. The survey was created and delivered using Qualtrics software and made available in both English and Portuguese. Responses to qualitative questions were exported to NVivo 12 (QRS International) for thematic analysis.

QUANTITATIVE ANALYSIS

Respondent demographics and background information

The survey was accessed by 253 participants in total. Of these, 121 respondents provided a response to question 9, "What are the priority training areas for you in relation to the planning, design, construction, maintenance and management of mountain bike trails?" which was used as a filter for inclusion in the analyses. Responses were provided from individuals located within 16 different European countries and the distribution of these responses is shown in Figure 1.

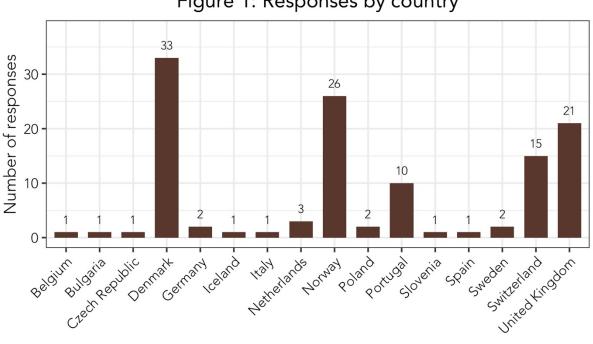


Figure 1: Responses by country



All areas of the trail building sector that the DIRTT project is targeting, i.e. planning, design, construction and maintenance were well represented with a large proportion of respondents being involved within all of these areas (Figure 2).

Other 26 All of the above 59 Maintenance Construction · Design: Planning 44 20 60 Number of responses

Figure 2: Respondents involvement by sector

Respondents n = 121

The survey captured responses from across a wide range of roles within the sector. Trail designers, trail experts, trail crew managers, construction managers and volunteers were the most heavily represented groups. However, twenty-one different roles were captured within the survey responses and all of these included multiple people. The exact distribution of respondent's roles is shown in Figure 3 overleaf.

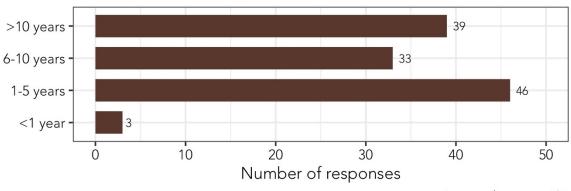
2 National Park/Protected Area manager Sports officer 3 Lift operator Civil engineer Regional Manager • Land Owner/manager (private) -Environmental engineer Municipality/Government recreation manager or policy officer Land Owner/manager (public) -16 Other (please specify) Race organiser 18 GIS/mapping specialist 19 Tourism professional Spatial planner Trail crew trainer Machine operator -Volunteer/non-professional trail builder Construction manager -Trail crew manager 55 Trail expert Trail designer 20 40 60 0 Number of responses

Figure 3: Respondents specific role(s)

Respondents n = 121. Note: multiple roles selected by some respondents.

Around one third (32%) of respondents reported over ten years of experience in the trail building sector, with slightly less reporting 6-10 years of experience (27%). The most popular response was 1-5 years of experience (38%), while only 2.5% reported less than one year's involvement in the sector suggesting a decline in generation of new roles within the sector. Overall, this data suggests that the industry as a whole is relatively young, with a majority (68%) having less than ten years of experience in the industry. See figure 4 overleaf for full details.

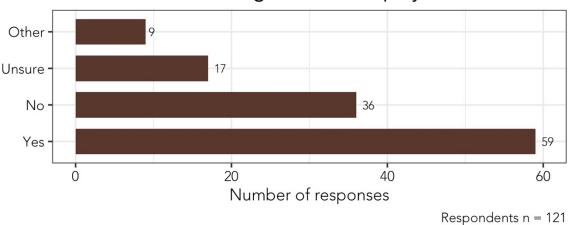
Figure 4: Length of involvement within sector



Respondents n = 121

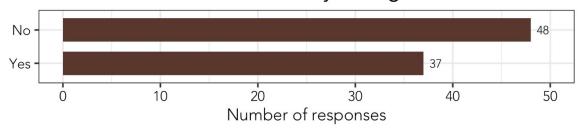
Almost half (49%) of respondents indicated regular review of employee training needs within their organisation as shown in Figure 5. No regular review of training needs was reported in 30% of respondents, with an even proportion of participants in voluntary roles across all responses.

Figure 5: Does your organisation regularly review the training needs of employees?



Interestingly, a majority of respondents (56%) believe there is not sufficient training available to meet the needs of their organisation (Figure 6 below) meaning only 44% of respondents believe sufficient training is available.

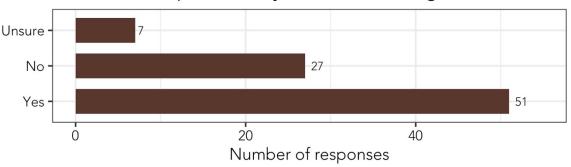
Figure 6: Do you believe sufficient training to be available to meet the needs of your organisation?



Respondents n = 85

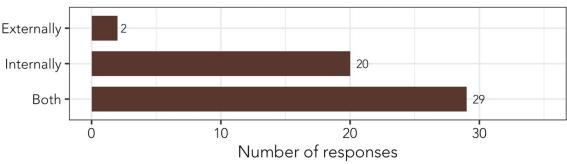
Most (60%) respondents reported the provision of in-house training within their organisation, with 32% receiving no in-house training and 8% unsure (see Figure 7 below).

Figure 7: Does your organisation currently provide any in house training?



In most cases, training was provided both internally and by external private providers (57%; Figure 8). Internal only training was provided to 39% of respondents and just 4% reported external only training provision.

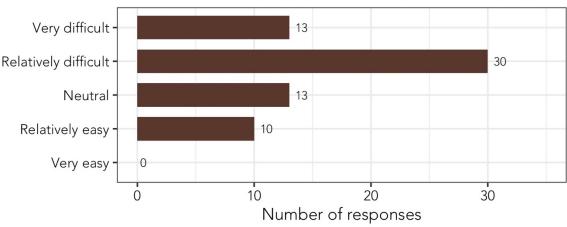
Figure 8: Is training delivered internally or through an external private training provider?



Respondents n = 51

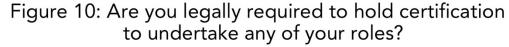
The majority of respondents found it difficult to recruit employees with appropriate skills and competence, with no respondents finding this very easy and only 15% believing this to be relatively easy (Figure 9).

Figure 9: Ease of recruiting skilled/competent employees



Certification

Responses to the five questions relating directly to certification revealed that the majority (75%) of participants are not legally required to hold certification (Figure 10) with a breakdown of response by country presented in the table 1 below. All respondents from Bulgaria (n=1), Italy (n=1), and Slovenia (n=1) reported legal requirement for certification to complete roles within their organisation, but as sole respondents from their respective countries, this data should be interpreted with caution. Indeed, Denmark had the most responses of a single nation (n=33) yet only one respondent indicated legal requirement of certification. Legal requirement of certification therefore appears to vary nation by nation and further may be role dependent.



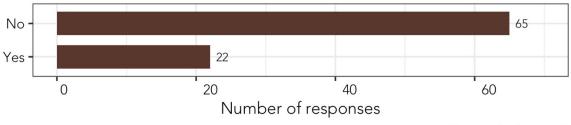


Table 1: Nationality of respondents indicating legal requirement of certification to undertake any roles within their organisation.

Country	Responses indicating certification required
Bulgaria	1
Denmark	1
Italy	1
Netherlands	1
Norway	5
Poland	1
Portugal	3
Slovenia	1
Switzerland	1
United Kingdom	6

Many participants also felt that there is a lack of non-mandatory certification available (Figure 11). The vast majority of respondents (79%) felt that the introduction of additional certifications would lead to an increase in the quality and sustainability of mountain bike trails (Figure 12).

Figure 11: Are there any non-mandatory certifications available in relation to any of the roles our organisation undertakes?

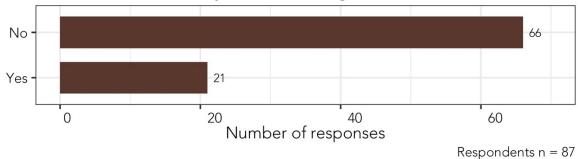
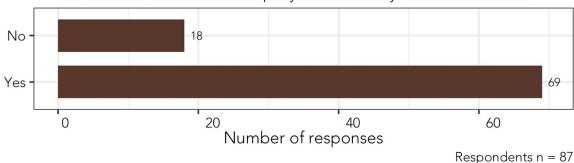


Figure 12: Do you think the introduction of additional certifications (mandatory or voluntary) within the sector would increase the quality and sustainability of mountain bike trails?





As shown in Figure 13, a majority (54%) of respondents considered linking training provision to an industry recognised certification to be very important or extremely important. Only 13% of participants considered linking training with certification not to be important at all. Accordingly, a vast majority of respondents (73%) suggested they would prioritise training that leads to certification (Figure 14).

Figure 13: How important is it to you that any training provision is linked to an industry recognised certification?

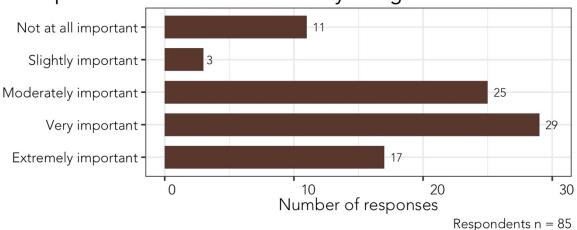
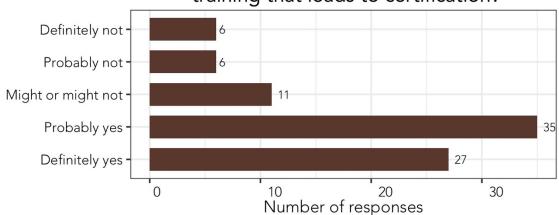
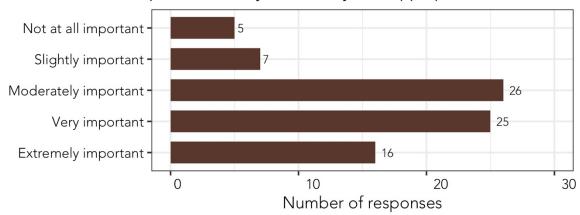


Figure 14: Would you be likely to prioritise training that leads to certification?



Many participants (52%) considered appropriate certification of a subcontractor to be very important or extremely important, with 33% reporting moderate importance. 6% of respondents placed no importance on appropriate certification of a subcontractor, which is interesting considering 13% of respondents did not consider certification as a result of training to be important for their own organisation.

Figure 15: When working with or sub-contracting to other organisation, how important is it to you that they hold appropriate certification?

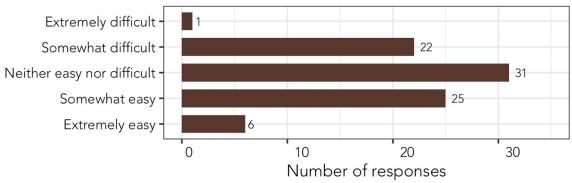




Cross-sector working

36% of participants reported working with other stakeholders in the sector to be neither easy nor difficult, with a fairly even distribution finding such work to be somewhat difficult (26%) or somewhat easy (29%). Only one respondent suggested that working with other stakeholders was extremely difficult.

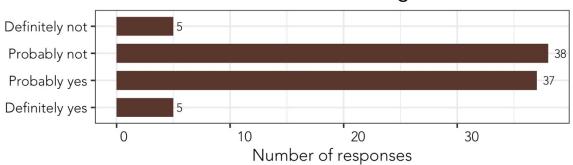
Figure 16: From your experience, how easy is it to work collectively with other stakeholders in the sector?



Respondents n = 85

When participants were asked if they felt that different stakeholders have a common understanding of the sector, opinion was split almost exactly evenly (49% probably yes or definitely yes, 51% probably not or definitely not; Figure 17 below).

Figure 17: Do you feel that different stakeholders have a common understanding of the sector?



Further investigation revealed that those holding environmental engineer or race organiser roles were most likely to find the common understanding across the sector to be insufficient. Conversely, those holding roles as municipality/government recreation manager/policy officers, national park/protected area managers, and landowners (public and private) were more likely to report sufficient perceived common understanding of the sector.

A vast majority (85%) of participants feel that there is insufficient common understanding of the process of mountain bike trail construction and maintenance (Figure 18). An overwhelming majority (96%) also believe that the mountain bike trail sector would benefit from guidelines in relation to trail design, construction, and maintenance (Figure 19).

Figure 18: Do you feel that there is currently sufficient common understanding of the process of mountain bike trail construction and maintenance?

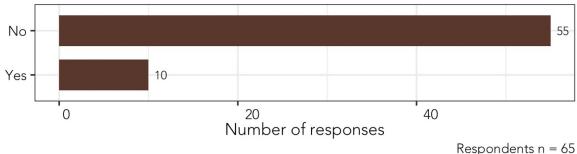
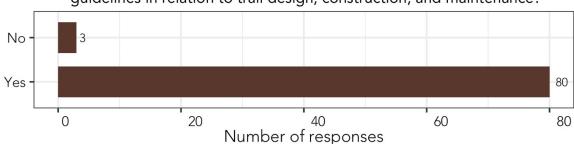


Figure 19: Do you think the mountain bike trail sector would benefit from guidelines in relation to trail design, construction, and maintenance?





Training needs analysis methodology

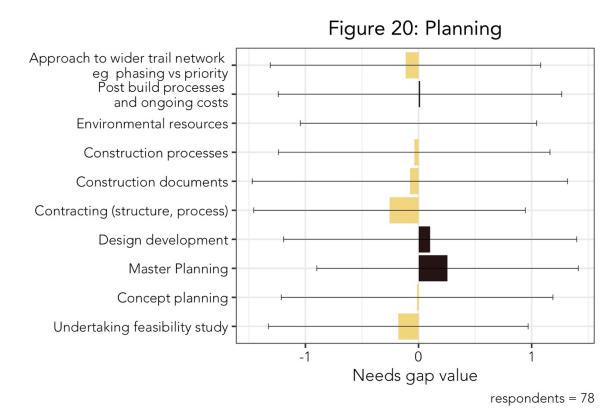
The training needs analysis section of the survey required participants to initially provide a rating of their current perceived competence against a range of skills and then to provide a rating of the perceived importance of that skill for them/their organisation. Participants were directed (via display logic) to the relevant questions according to their response to question two (involvement in the trail building sector). 52 skills were included for analyses, identified by stakeholders in the DIRTT project. All ratings were provided on a 4-point categorical scale: good, average, poor, none for the current competence and very important, moderately important, slightly important, not at all important for training need. To identify the priority areas for training, scores were converted to a numerical value and the score for current competence were deducted from the scores for importance to provide a mean value for training need. Therefore, positive values (black) indicate a need for training in this area while a negative value (sand) indicates that, overall, respondents believe themselves to be sufficiently competent. Additionally, a frequency distribution was calculated for each response option to check whether mean skills-gap values were potentially being skewed by a relatively small number of extreme values. Finally, training needs analysis results were filtered by professional or voluntary roles within the mountain bike trail building sector.



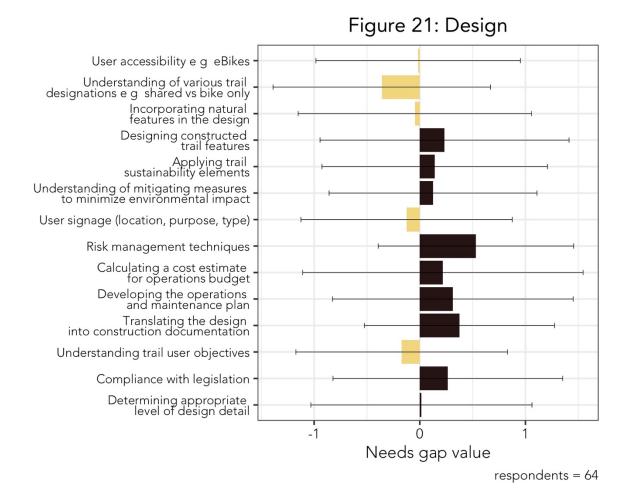
PROFESSIONAL TRAINING NEEDS ANALYSIS RESULTS

There were 78 responses provided to the questions relating to planning, 64 to design, 64 to construction and 74 to maintenance. Professional participants indicated sufficient perceived competency in only 14 of 52 skills (27%) with an average score of -0.03 in planning, 0.11 in design, 0.3 in construction and 0.35 in maintenance.

Planning



The mean values for planning topics suggest there are three clear priority areas for training: post-build processes and ongoing costs; design development; and, master planning. However, a number of other topics received scores which were zero or only marginally negative, in particular – environmental resources, concept planning, and construction processes (Figure 20).



The training needs analysis for the design related topics revealed there to be nine areas where respondents would benefit from training and five where they felt sufficiently competent (Figure 22 above). In order of priority these were:

- 1. Risk Management techniques
- 2. Translating the design into construction documentation
- 3. Developing the operations and maintenance plan
- 4. Compliance with legislation
- 5. Designing constructed trail features
- 6. Calculating cost estimate for operations budget
- 7. Applying sustainable trail elements
- 8. Understanding of mitigating measures to minimise environmental impact
- 9. Determining appropriate level of design detail.

Construction

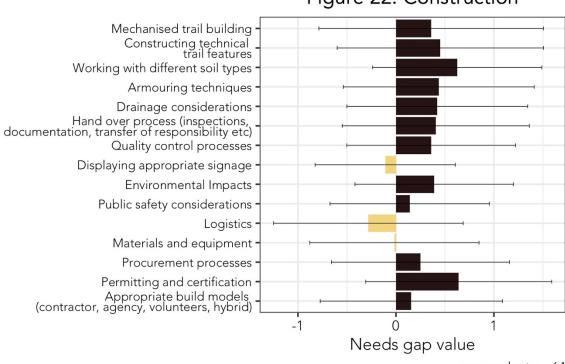


Figure 22: Construction

respondents = 64

The training needs analysis for the construction related topics showed three areas where perceived competence exceeded perceived importance. The twelve remaining topics where participants felt they would benefit from further training are, in order of perceived priority:

- 1. Permitting and certification
- 2. Working with different soil types
- 3. Constructing technical trail features
- 4. Armouring techniques
- 5. Drainage considerations
- 6. Hand over process (inspections, documentation, transfer of responsibility etc)
- 7. Environmental Impacts
- 8. Quality control processes
- 9. Mechanised trail building
- 10. Procurement processes
- 11. Appropriate build models (contractor, agency, volunteers, hybrid)
- 12. Public safety considerations

Maintenance

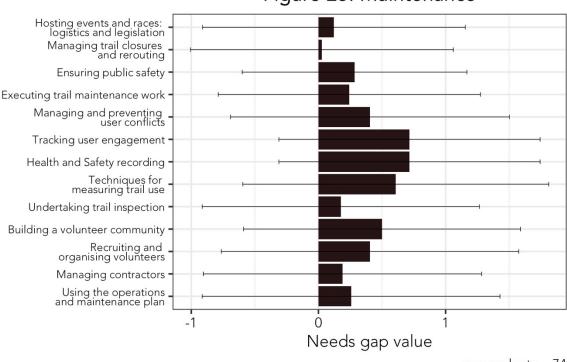


Figure 23: Maintenance

respondents = 74

Mean values for trail maintenance and management shows that there is a need for training on all topics in this area with all skills-gap values exceeding zero. In order of priority, these were:

- 1. Health and Safety recording
- 2. Tracking user engagement
- 3. Techniques for measuring trail use
- 4. Building a volunteer community
- 5. Recruiting and organising volunteers
- 6. Managing and preventing user conflicts
- 7. Ensuring public safety
- 8. Using the operations and maintenance plan
- 9. Executing trail maintenance work
- 10. Managing contractors
- 11. Undertaking trail inspection
- 12. Hosting events and races: logistics and legislation
- 13. Managing trail closures and rerouting



VOLUNTEER TRAINING NEEDS ANALYSIS RESULTS

A total of 44 respondents from 7 countries identified themselves as volunteers. A breakdown of respondents by country is shown in table 2 below. A small range of responses is presented here in comparison to the professional responses, as to be expected with a smaller sample size. This should be considered when interpreting the results, alongside a large number of responses originating from participants based in Denmark.

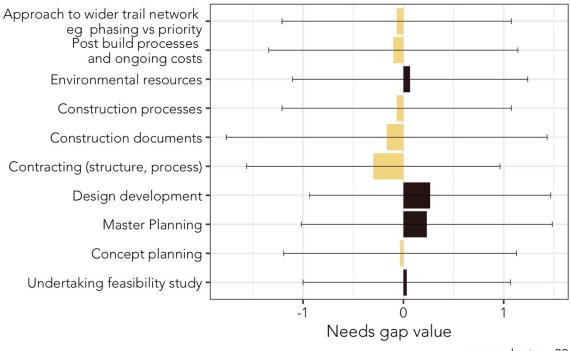
Table 2: Geographic distribution of respondents holding voluntary roles.

Country	Respondents holding voluntary roles
Denmark	22
Netherlands	1
Norway	7
Portugal	3
Sweden	1
Switzerland	3
United Kingdom	7

Of these volunteers, many worked in several areas: 30 worked in planning, 25 in design, 26 in construction and 29 in maintenance. Training needs analysis data for volunteers in each area are presented in the following sections.

Planning

Figure 24: Planning (volunteers)



respondents = 30

Volunteers identified six areas of competency within planning topics as indicated in green above. The remaining four topics were therefore reported as areas requiring further training, two of which are the same topics indicated as a skill gap in the non-volunteer group (design development and master planning. In order of priority, the four topics for training were:

- 1. Design development
- 2. Master planning
- 3. Environmental resources
- 4. Undertaking feasibility study

Design

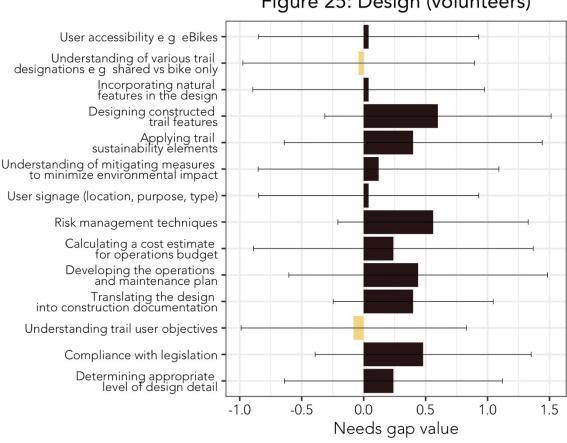


Figure 25: Design (volunteers)

respondents = 25

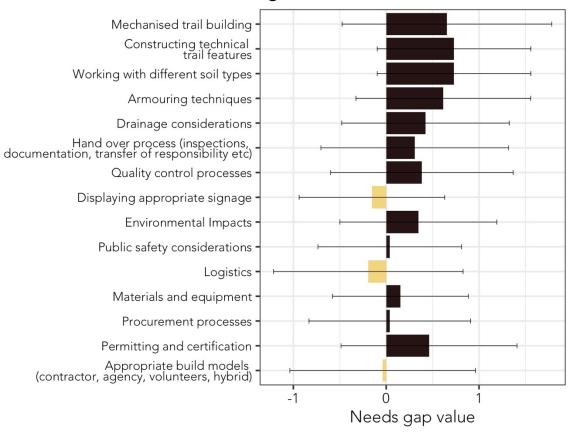
Volunteer respondents reported feeling sufficient competency in only two topics related to design – understanding of various trail designations and understanding trail user objectives. These topics were also reported as competencies among the professional respondents. The 12 areas where training was perceived necessary were, in order of priority:

- 1. Designing constructed trail features
- Risk management techniques
- 3. Compliance with legislation
- 4. Developing the operations and maintenance plan
- 5. Translating the design into construction documentation
- 6. Applying trail sustainability elements
- 7. Determining appropriate level of design detail
- 8. Calculating a cost estimate for operations budget
- 9. Understanding of mitigating measures to minimize environmental impact

- 10. User signage (location, purpose, type)
- 11. Incorporating natural features in the design
- 12. User accessibility e.g. e-Bikes

Construction

Figure 26: Construction (volunteers)



respondents = 26

Volunteers involved in the construction sector reported adequate competency in three areas, two of which (logistics and displaying appropriate signage) are shared with professionals in the construction sector. The 12 areas identified for further training are, in order of priority:

- 1. Working with different soil types
- 2. Constructing technical trail features
- 3. Mechanised trail building
- 4. Armouring techniques
- 5. Permitting and certification
- 6. Drainage considerations

- 7. Quality control processes
- 8. Environmental Impacts
- 9. Hand over process (inspections, documentation, transfer of responsibility etc)
- 10. Materials and equipment
- 11. Procurement processes
- 12. Public safety considerations





Maintenance

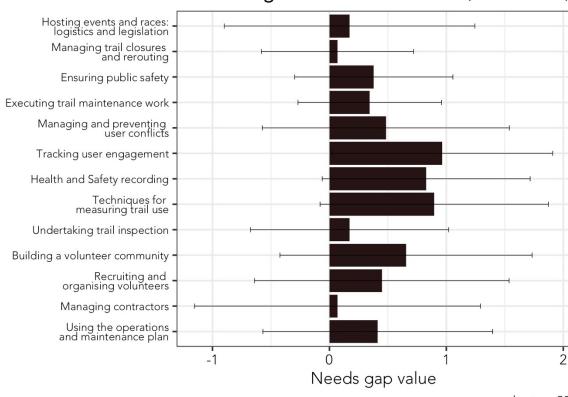


Figure 27: Maintenance (volunteers)

respondents = 29

In the maintenance sector volunteers reported similar requirements to the professional respondents, indicating they felt sufficiently competent in no areas of trail maintenance. The three highest priority topics for further training are tracking user engagement, techniques for measuring trail use, and health and safety recording. This is surprising as volunteers were expected to display their highest competency in maintenance areas, so further analysis was conducted. Frequency distribution of perceived competencies in these topics showed a relatively normal distribution for most topics, while distribution for perceived importance was skewed towards 'very important' for all topics (see appendix). Therefore, it is suggested that overall current perceived competency in maintenance tasks is not notably worse in comparison to other areas. Instead, maintenance is ranked of greater importance than the other areas presented, and as a result volunteers strive to improve further in this area.

QUALITATIVE ANALYSIS

The survey contained several qualitative questions which were designed to test any assumptions regarding the specific skills and competencies that stakeholders in the mountain bike trail building sector may perceive as important. The first qualitative question was presented in advance of the quantitative needs analysis section to remove any potential for bias. The responses were subjected to a thematic analysis which identified a total of 20 themes. Five of these were referenced fewer than 5 times and have been discarded and the remaining fifteen themes are presented in Table 3. Full descriptive information of the reference to each theme is contained within the appendices.

Table 3. Emergent themes and number of respondents referencing these

Theme	Number of references
Maintenance	18
Sustainability	17
Basic Principles	16
Safety	15
Environmental Considerations	14
Flow / Fun	13
Tools & Machinery	12
Drainage	10
Management	10
Soils	10
Consents / Approvals	8
Holistic process	7
User Experience	7
Volunteering	7
Qualifications	5
	ı

The results of the qualitative analysis showed good agreement with the needs gap values previously reported and that nearly all themes referenced were covered in the specific skills gap analysis reported previously. Maintenance was shown to be the most frequently mentioned theme, referenced 18 times by respondents followed closely by sustainability with 17 references, which reflects the skills gap value results. Basic principles was a relatively broad category which predominantly included responses which related to design, planning, construction and maintenance in general terms and without any specific skills or competencies. Interestingly, flow and fun emerged as a unique category and 13 respondents specifically mentioned that training in relation to the creation of flow and fun trails was a priority. This is distinct from the user experience category which primarily related to understanding how to match the trail to the intended user,

SUMMARY OF RESULTS

In summary, the results of this survey show that there is a clear demand for certified training in the mountain bike trail building sector. A majority of stakeholders indicated that sufficient training is not currently available to meet the needs of their organisation, and that introducing certified training in the sector would increase the quality and sustainability of mountain bike trails. As a result, a majority of stakeholders also indicated that they would be likely to prioritise training which leads to certification within the sector.

When considering cross sector working, stakeholders reported a feeling of insufficient common understanding of the process of trail construction and maintenance, again noting that guidelines in relation to these topics would benefit the trail sector. These findings are echoed throughout the following training needs analysis, where construction and maintenance topics were consistently highlighted as priority areas for training. Indeed, both professional and voluntary respondents felt sufficiently competent in only 3 of 28 skills falling under construction and maintenance. Full details of these topics are available in the training needs analysis section on page X, though the results suggest that all topics encompassed here should be a key area of focus for training. This finding was once again supported by results of the qualitative analysis where maintenance was the most referenced theme, followed by sustainability. Drainage and soils appear to be of particular importance, each referenced

specifically 10 times. Respondents reported insufficient perceived ability in topics relating to sustainability and environmental considerations across planning, design, and construction, again highlighting a particular demand for training in these areas throughout the trail building process. Planning training needs analysis returned the highest level of perceived competency, however master planning and design development became recurring themes for training need in both professional and voluntary roles within the sector.

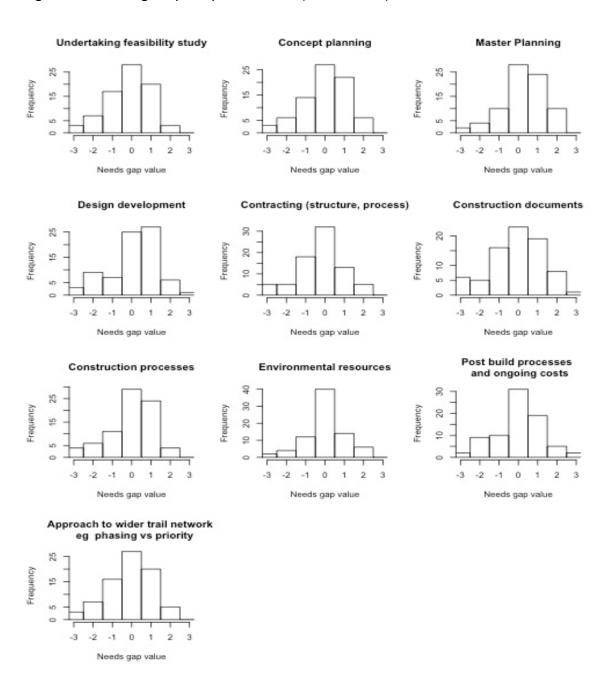
Safety and risk management techniques were both highlighted as key areas for training in both training needs analysis and qualitative reporting, with safety referenced 15 times and risk management techniques ranking as the highest priority training need during the design phase. Documentation and legislation topics followed a similar pattern with 8 references of the documentation and approvals theme from the qualitative results. This is supported by large training needs values reported across all five topics relating to legislation and documentation throughout design, construction and maintenance, highlighting the requirement for appropriate training in these areas.

Volunteer respondents largely reported similar training need topics, but with larger training needs values than professional counterparts. While not entirely surprising, this highlights the need for education of voluntary workers in the sector to ensure consistent quality across the board. It should also be noted that management was referenced 10 times by respondents, suggesting that professional trail builders may benefit from management training to aid coordination of staff, both voluntary and professional.

In conclusion, there is a strong demand for certified training in the mountain bike trail building sector that is not currently available in order to increase the quality and sustainability of mountain bike trails. There are a wide range of training needs across all stages of trail building reported, with construction and maintenance topics highlighted as the highest priority for training needs.

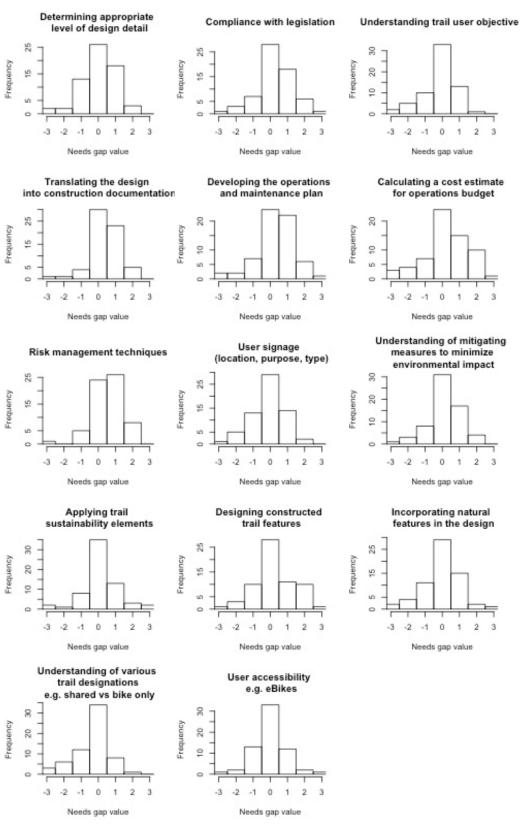
Apendix – stakeholder survey

Figure 28: Planning frequency distribution (Professional)



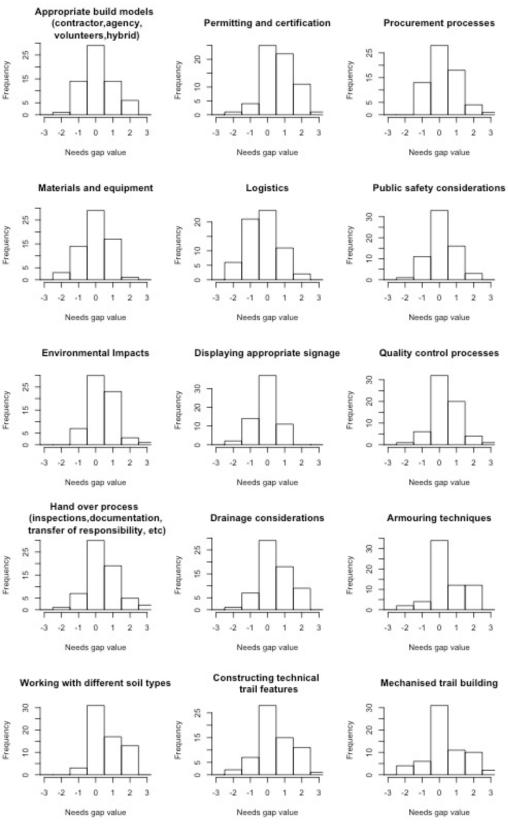
The frequency distribution reveals the data to be largely normally distributed (Figure 28) throughout all questions.

Figure 29: Design frequency distribution (professional)



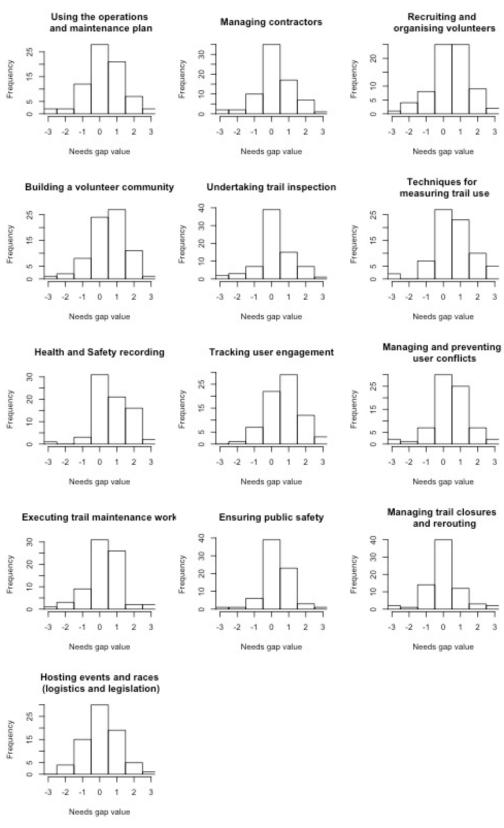
The frequency distribution reveals the data to be largely normally distributed (Figure 29) throughout all questions.

Figure 30: Construction frequency distribution



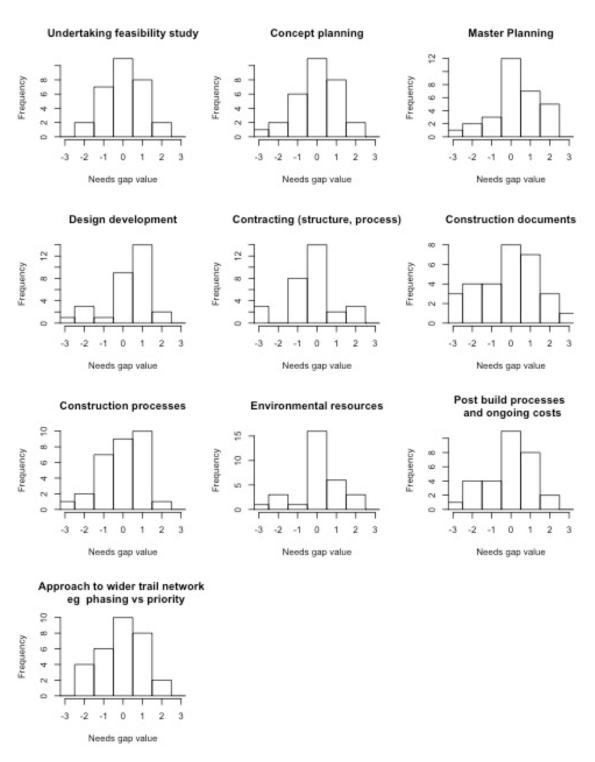
The frequency distribution reveals the data to be largely normally distributed (Figure 30) throughout all questions

Figure 31: Maintenance frequency distribution (professional)



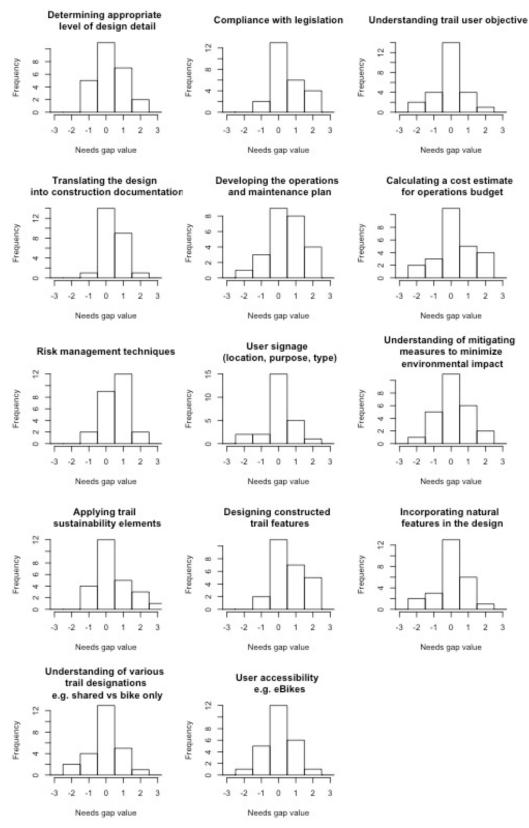
The frequency distribution reveals the data to be largely normally distributed (Figure 31) throughout all questions.

Figure 32: Planning frequency distribtuion (volunteers)



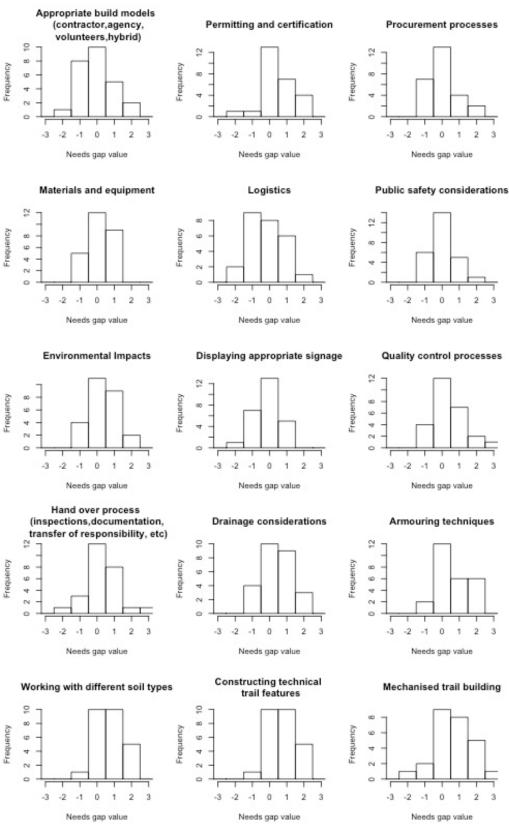
The frequency distribution reveals the data to be largely normally distributed (Figure 32) throughout all questions.

Figure 33: Design frequency distribution (volunteers)



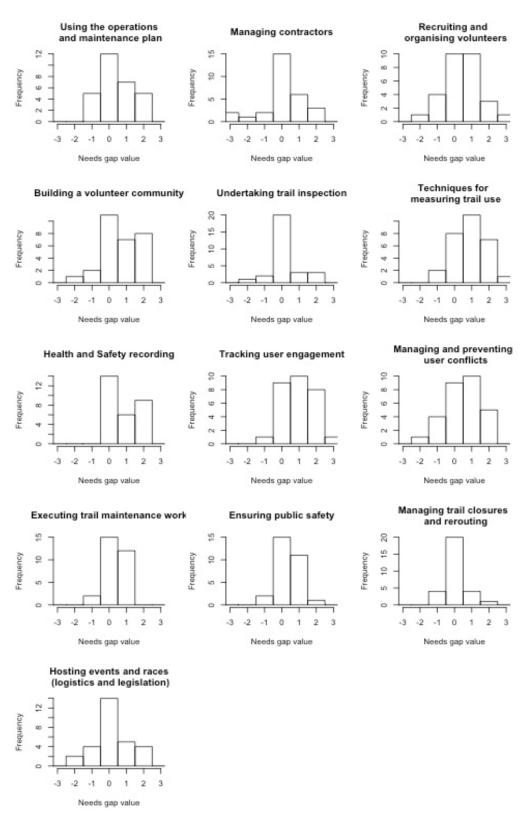
The frequency distribution reveals the data to be largely normally distributed (Figure 33) throughout all questions.

Figure 34: Construction frequency distribution (volunteers)



The frequency distribution reveals the data to be largely normally distributed (Figure 34) throughout all questions.

Figure 35: Maintenance frequency distribution (volunteers)



The frequency distribution reveals the data to be largely normally distributed (Figure 35) throughout all questions.

Figure 36: Frequency distribution of volunteer maintenance competency ratings

Perceived competency of volunteers in various topics related to management. 1 = 'good', 2 = 'average', 3 = 'poor', 4 = 'none'.

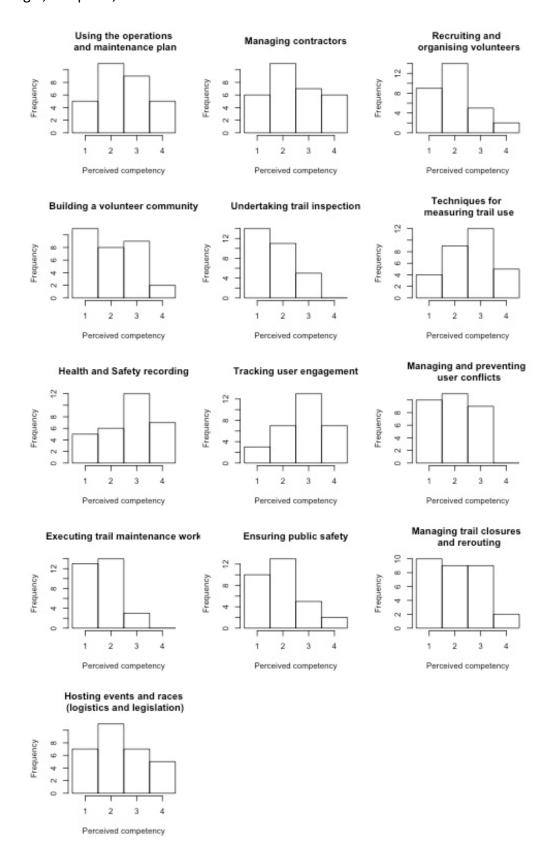
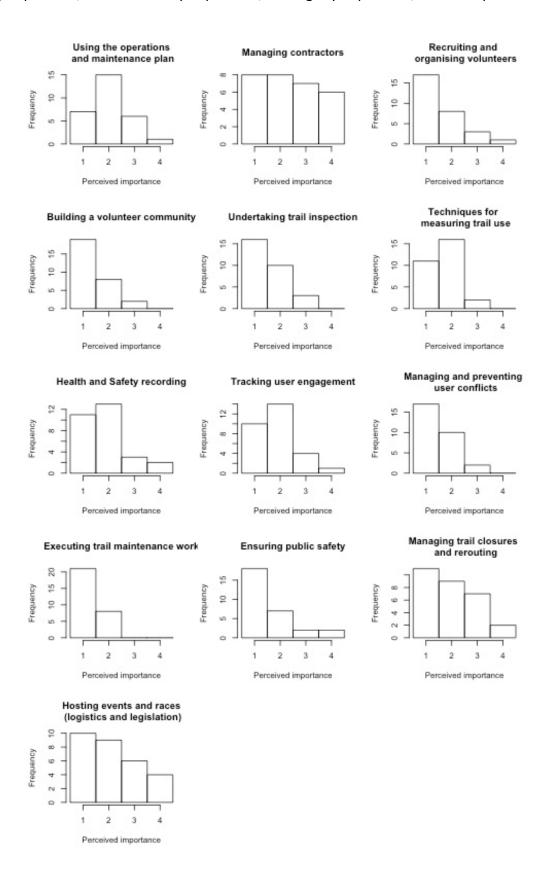
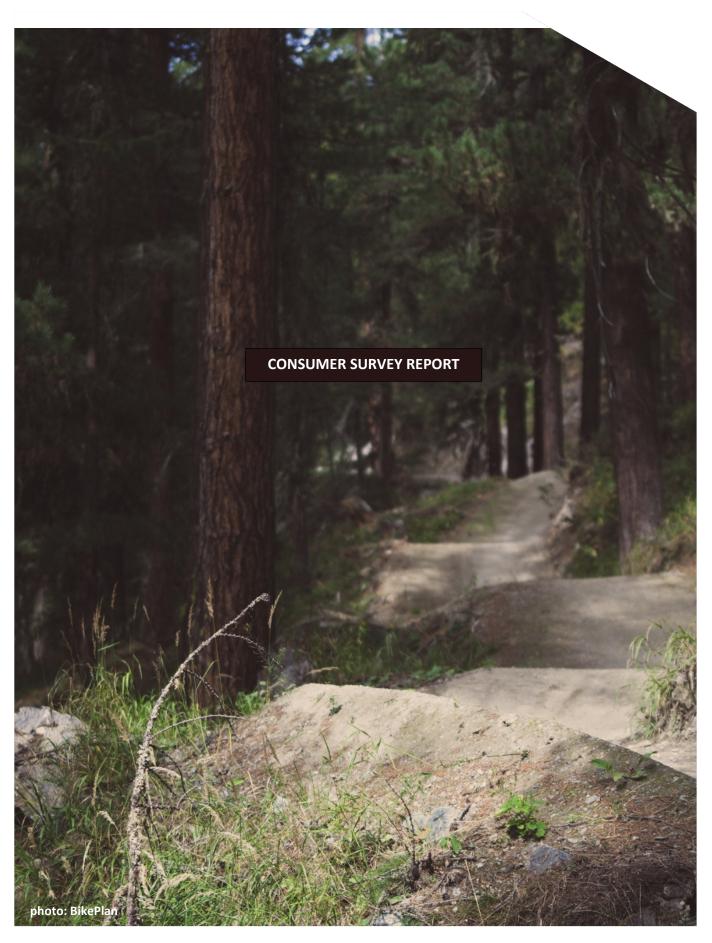


Figure 37: Frequency distribution of volunteer maintenance importance ratings. Perceived importance ratings from volunteers relating to various topics related to management. 1 = 'very important', 2 = 'moderately important', 3 = 'slightly important', 4 = not important at all'.





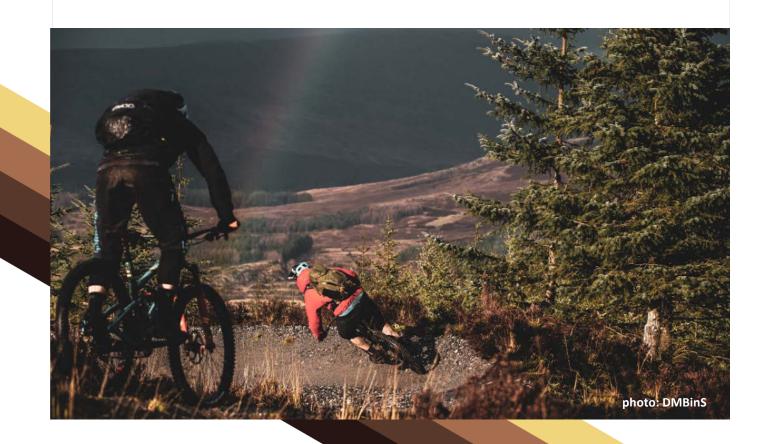


EXECUTIVE SUMMARY

The mountain bike trail user survey forms part of the "Developing Intereuropean Resources for Trail builder Training (DIRTT)" project, funded under the ERASMUS+ programme, which aims to develop an educational framework and professional training programme for the mountain bike trail sector. In total, 4324 survey respondents (gender: 21% female, 78% male, 0.1% transgender, 0.1% other; age: 16-18yrs = 3%, 19-25yrs = 7%, 26-35 years = 26%, 36-45yrs = 33%, 46-55yrs = 23%, >55yrs = 8%) from 28 different European countries provided data suitable for inclusion in this report. The main findings of this report are that most mountain bikers ride easier single track trails or more difficult single track trails, with connection to nature, descents, optional/multiple lines, and surface quality being ranked consistently high among all trail types. Mountain bikers also feel connected to nature and would like to protect nature with many putting environmental concern above trail quality in most areas. However, this is not always reflected in the actions or expectations of respondents where some education may be required to align their intentions with their actions. Lastly, many riders recognise the importance of voluntary trail maintenance, and further that those who are not able or willing to volunteer would be willing to pay for trail maintenance and construction.

BRIEF OUTLINE OF METHODOLOGY

The survey was developed to identify the priority areas of motivation and behaviour, trail user objectives and preferences, and trail sustainability. The behaviours and motivations, end user objectives and trail sustainability topics addressed within the quantitative questions were derived from existing guidelines and frameworks, and from the expertise of all partner organisations. The survey was created and delivered using Qualtrics software and made available in Italian, German, English, French, and Portuguese. The survey was distributed using online platforms only. Recruitment was not possible in person due to the global coronavirus pandemic. Accordingly, the survey is likely to only have reached those already engaged with mountain biking to some degree, thus excluding a majority of beginner riders. The effect of this methodology is detailed further in the results and summary.





QUANTITATIVE ANALYSIS

Respondent demographics and background information

In total, 4,324 survey respondents from 28 different European countries accessed the survey and provided data for this report. Distribution of these responses by country are detailed in Figure 1 below.

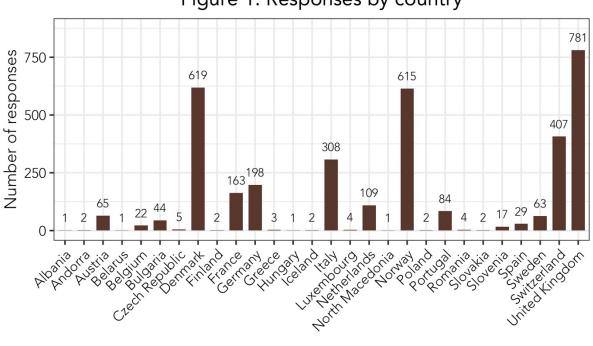


Figure 1: Responses by country

One third (33%) of participants indicated an age of 36-45 years, just over one quarter (26%) were aged 26-35 years and just less than one quarter (23%) were aged 46-55 years, meaning a majority of respondents (72%) were aged 26-55 years old. Considerably fewer participants were aged 16-18 years (3%), 19-25 years (7%), or over 55 years (8%).

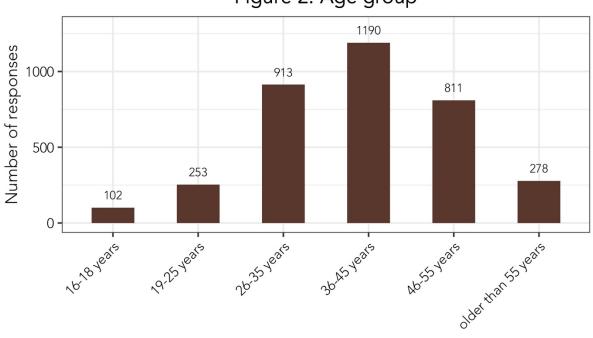
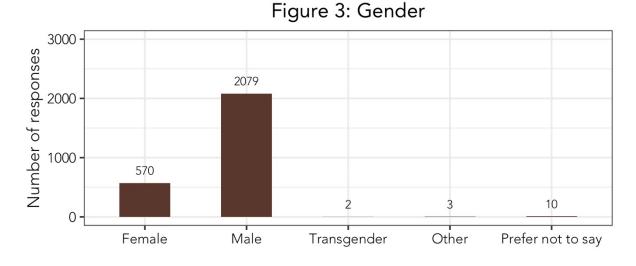


Figure 2: Age group

Respondents n = 3547

A majority of respondents identified as male (78%), with 21% of respondents identifying as female. Two participants indicated identifying as transgender, three as other, and ten referred not to say, as shown in figure 3 below.



Riding experience

A majority of respondents (53%) reported having more than 10 years of riding experience and a further 22% had been riding for 5-10 years, as shown in figure 4 below. Conversely, only 6% of respondents had been riding for less than 2 years and 19% for between 2 and 5 years, suggesting a skew towards more experienced riders.

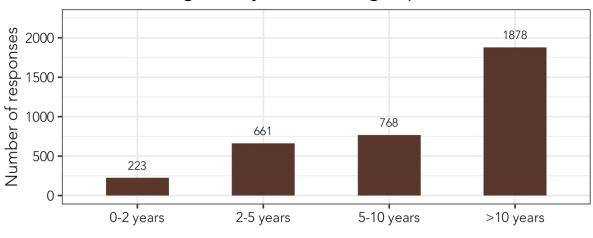


Figure 4: years of riding experience



Summer is indicated as the most popular time to ride, with more than half of respondents (54%) indicating they ride more than 10 times per month and a further 34% riding 6-10 times Unsurprisingly, winter is the least popular season to ride, with 18% of respondents indicating they do not ride at all during winter and a further 45% of respondents only riding 1-5 times per month, as illustrated in figure 5 below. Riding frequency in spring and autumn is very similar, with a majority of participants riding more than 6 times per month.

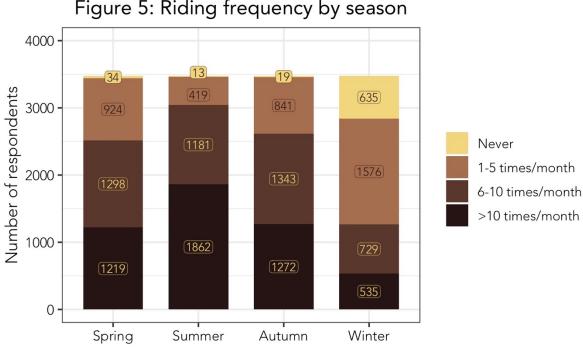
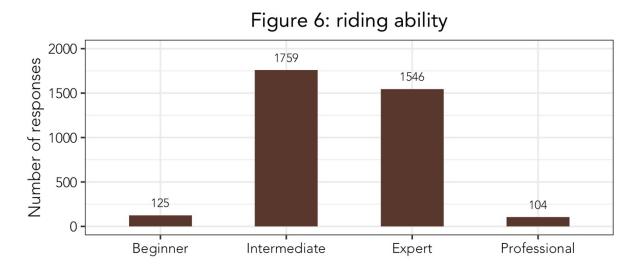


Figure 5: Riding frequency by season

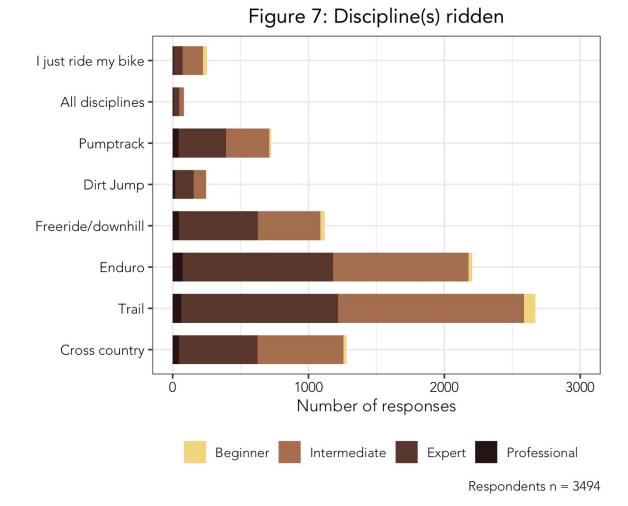
Respondents n = 3475

Half (50%) of respondents consider themselves to be intermediate riders, with slightly fewer considering themselves expert riders (44%). There were far less considering themselves to be beginner riders (4%) and professional riders (3%), as shown in figure 6 below.



Care should be taken when interpreting further data due to the skew towards intermediate and expert riders.

Trail riding was the most popular single discipline selected by participants selected by 76% of respondents. Enduro was the next most popular choice, selected by 63% of respondents as shown in figure 7. Only 2% of respondents indicated participating in all mountain bike disciplines, and 7% selected 'I just ride my bike'.



3430 participants selected 'beginner', 'intermediate', or 'expert' for their riding ability, meaning they were then asked if they would like to progress their riding ability. A vast majority of respondents (n = 3075; 90%) wish to progress their riding ability while 349 (10%) riders are satisfied with their current level of ability. As shown in figure 8, 98% of beginner riders, 85% of intermediate riders and 94% of expert riders wish to progress their riding ability.

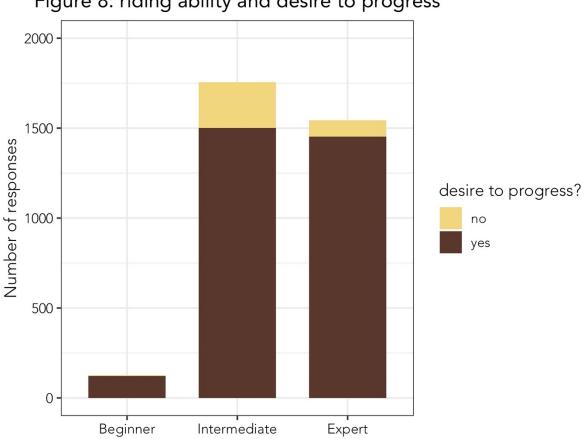


Figure 8: riding ability and desire to progress

1268 respondents (36%) reported participating in competition while 2261 respondents (64%) indicated they did not participate in competition. A breakdown of the level of competition indicated by respondents is shown in figure 9 below. Note that multiple answers were allowed.

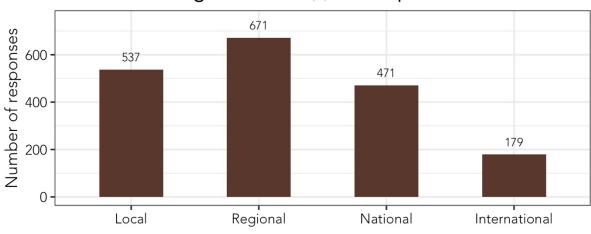
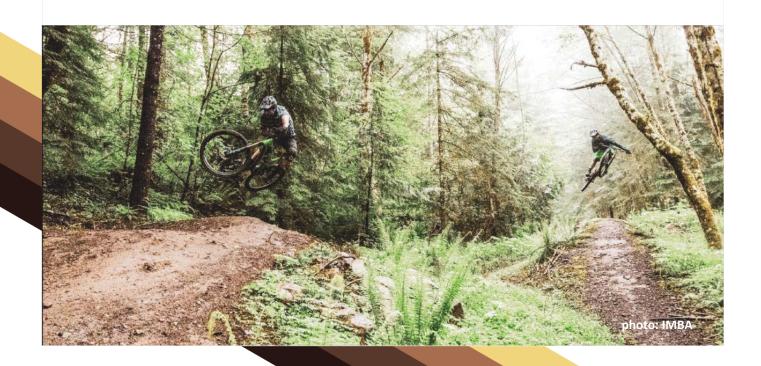


Figure 9: Level(s) of competition



Trail user objectives and preferences

Exercise, connection to nature, play, challenge, and escape and solitude were the 5 most popular motivations to ride indicated by participants (selected by 69-83% of respondents). Least popular were efficiency, education, and risk, selected by only 5-14%% of participants, as shown in figure 10.

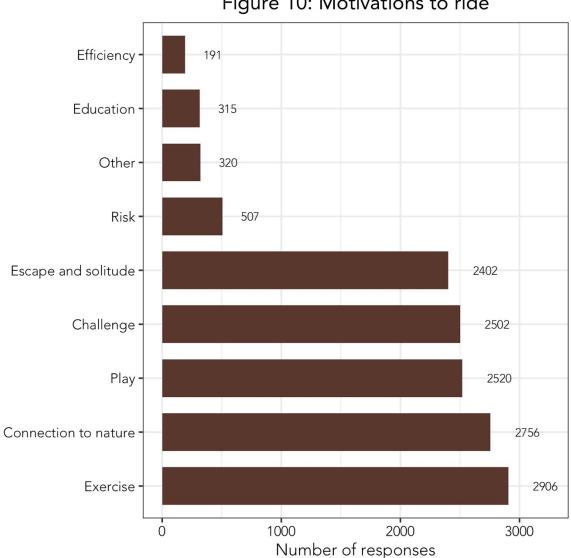


Figure 10: Motivations to ride

A vast majority (94%) of respondents reported participation in other sports, with the most popular being alpine skiing/snowboarding (48%) and hiking (47%). Full details are shown in figure 11 below. Note multiple responses allowed.

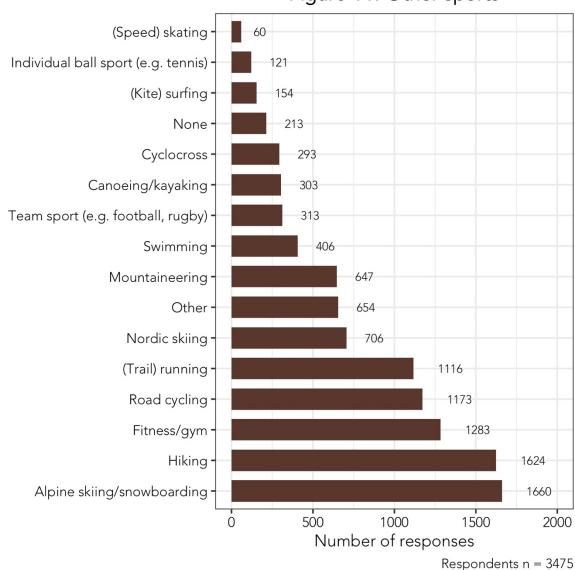


Figure 11: Other sports

A majority of participants (65%) indicated riding purpose-built trails was important or very important to them. Riding purpose-built trails was not that important for 28% of respondents, while only 201 respondents (6%) suggested this was not important at all. Details are shown below in figure 11.

Very important

Important

Not that important at all

0 500 1000 1500 2000

Number of responses

Figure 12: How important is it to ride purpose built trails?

Many participants reported access to purpose trails to be very easy (31%) or somewhat easy (40%). Conversely, 22% of respondents indicate accessing purpose-built trails to be somewhat difficult and 5% report accessing purpose-built trails as very difficult. Further break down by country is available in Appendix 1 and 2. Without accounting for small volumes of total responses by country, Iceland, Poland, and Slovakia appear to have easiest access to purpose built trails while Greece, Hungary, and North Macedonia report the most difficult.

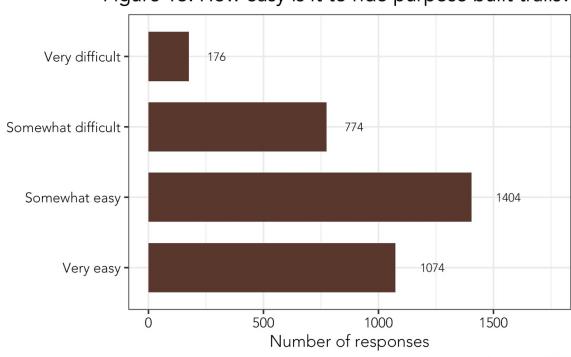
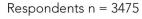


Figure 13: How easy is it to ride purpose built trails?







Half of participants (50%) indicated 'always' riding easier singletrack trails and nearly half reported 'always' riding more difficult trails (47%). Flowy trails were the most popular type of trail to ride 'sometimes', but not 'always'. Very difficult trails had the highest proportion of respondents indicating they 'never' or 'rarely' rode them (19% and 32%, respectively).

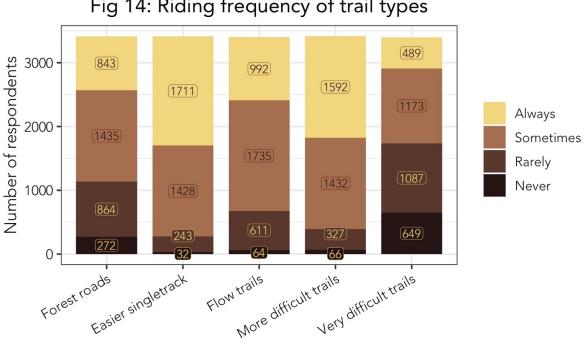
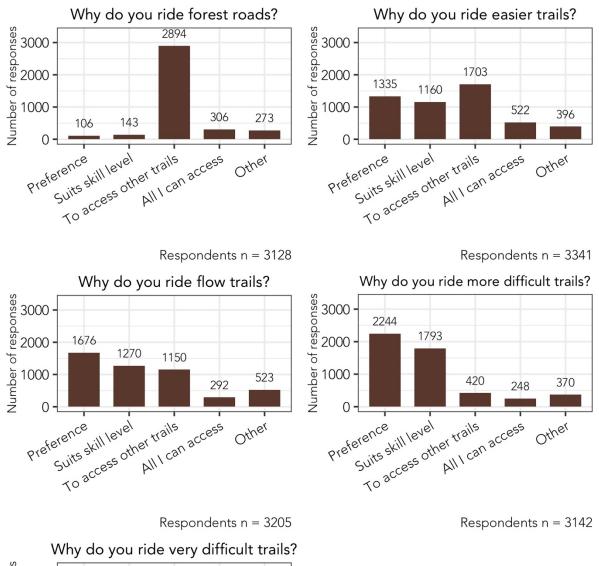


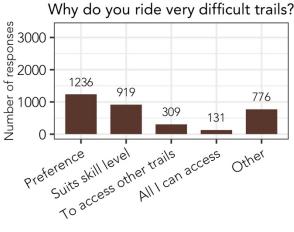
Fig 14: Riding frequency of trail types

Respondents n = 3414

The reasons for riding different trail types are presented in figure 15 overleaf. The main reason for riding forest roads was primarily to access other trails which was selected by 93% of participants. As the difficulty of a trail increases, users are less likely to use it to access other trails and instead use it because it is their preference and/or it suits their skill level.

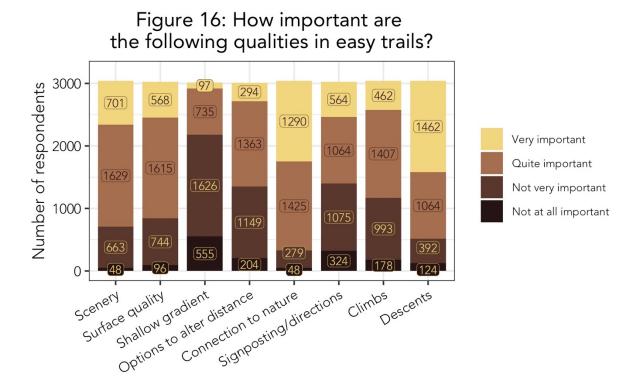
Figure 15: why do you ride certain types of trails?



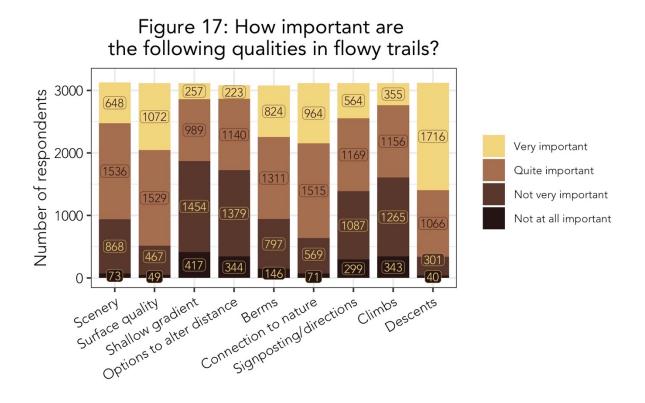




Descents and connection to nature were indicated as the most important qualities in easier trails as shown in figure 17 below. Perhaps surprisingly, shallow gradient was indicated to be 'not at all important' or 'not very important' by a majority of users, making it the least important quality in easier trails. Some difference of opinion is apparent regarding signposting and directions, with roughly equal proportions of respondents considering it an important or unimportant quality. A separate figure including only the data of beginner riders is available in Appendix 3, where findings are largely similar to those presented below.

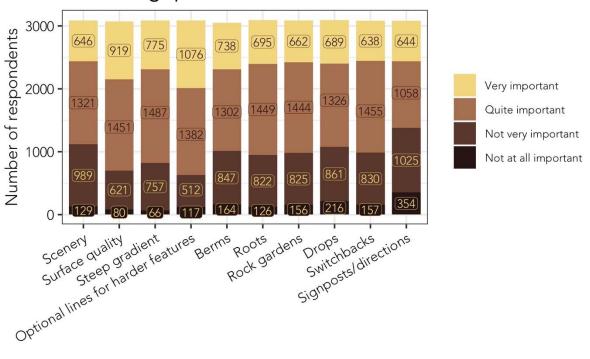


By far the most important quality in flowy trails was reported as descents, with 90% of users suggesting descents are quite or very important. Surface quality, connection to nature, berms, and scenery were also regarded as important qualities by a majority of respondents. Similarly to easier trails, many respondents suggested shallow gradient was not an important feature of flowy trails and opinion was again split on the importance of signposting/directions. Further details are provided in figure 17 below.



Optional features for harder lines was the most important quality when riding more difficult trails followed closely by surface quality. The remaining qualities shared a roughly even importance to respondents with the exception of signposts and directions where opinion was split once again, as indicated in figure 18 below.

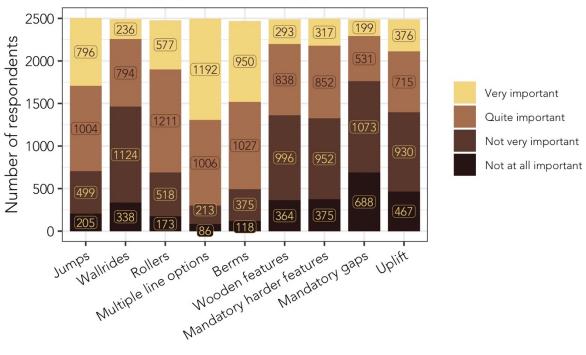
Figure 18: How important are the following qualities in more difficult trails?





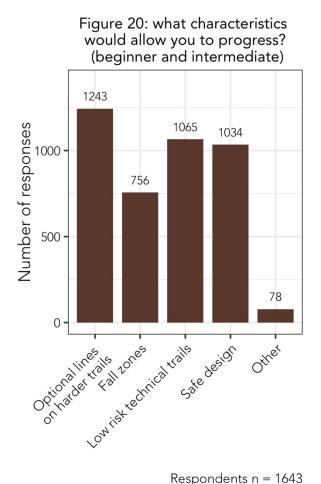
Multiple line options was identified as the most important quality on very difficult trails, followed closely by berms, rollers and jumps. Mandatory gaps and wallrides were not important qualities for a majority of riders. Opinion was split relatively evenly on the importance of wooden features, mandatory harder features, and uplift as indicated in figure 19 below.

Figure 19: How important are the following qualities in very difficult trails?





Respondents that had selected 'beginner' or 'intermediate' riding ability were then asked which trail characteristics they felt would allow them to progress. Optional lines with harder features was the most popular characteristic with selection by 76% of participants, followed by low risk technical trails (65%), safe design (63%) and fall zones (46%) as shown in figure 20). Respondents that had selected 'expert' or 'professional' riding ability were then asked which trail characteristics they felt had allowed them to progress. Access to more advanced trails was the most popular response (78%) followed by optional lines on harder features (71%). Fall zones were the least popular trail safety characteristic selected by those who has progressed to expert or professional ability, selected by only 15% of participants.



allowed you to progress? (expert and professional) 1170 1061 1000 807 764 500 230 114 Access to note that better

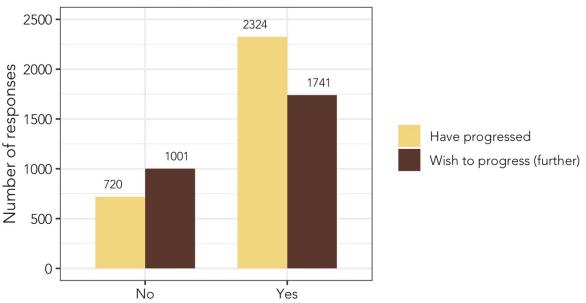
Figure 21: what characteristics

Respondents n = 1643

Respondents n = 1501

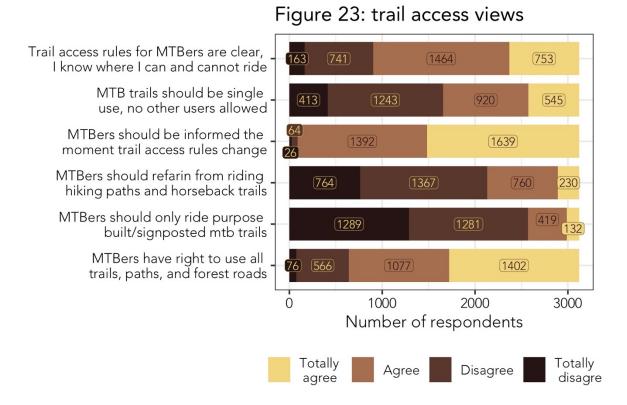
When asked if they had access to trails suitable to facilitate progression, a significant proportion of riders (37%) indicated having insufficient access to facilities. Conversely, of those that had already progressed, only 22% had progressed with insufficient trail facilities available to them, as indicated in figure 22. The groups are not mutually exclusive, therefore some participants may be included in both data sets (e.g. intermediate rider that has progressed from beginner level but wishes to progress to expert level).

Figure 22: do/did you have access to trails that facilitated progression of riding ability?



Total respondents n = 5786

When asked about different trail access views, most (81%) riders disagreed with the statement that mountain bikers should only ride purpose-built/signposted mountain bike trails. Accordingly, most riders (68%) disagreed that mountain bike riders should refrain from riding hiking paths and horseback trails. Almost all riders (97%) agreed that mountain bikers should be informed the moment that trail access rules change, and 79% agreed that mountain bikers have the right to use all trails, paths, and forest roads. 47% of riders did, however, agree that mountain bike trails should be single use. Full details are provided in figure 23 and further results broken down by the 9 countries with most respondents are available in appendix 4.



When asked to rank their trail access options in order of preference, the most popular first choice (selected by 48% of respondents) was purpose-built mountain bike tracks and shared use of other recreational trails. Shared use of all recreational trails and forestry roads was the second ranked option, followed by single use trails only for mountain bike riders, and lastly by time zoning of access, as shown in figure 24 below.

Time zoning: full access for mountain bikers at fixed hours and/or days

Single use: MTBers are only allowed to use mountain bike trails

Shared use of all recreational trails and forestry roads

Purpose built MTB tracks and shared use of other recreational trails

1654

1122

444

1122

445

1129

1136

1136

1172

1166

1475

First

choice

0

Figure 24: trail access preferences

1000

2000

Third

choice

Number of respondents

Second

choice

3000

Fourth

choice

Trail-Toleranz:
Diesen Weg benutzen Wanderer und Biker gemeinsam.

Trail-Tolerance:
Hikers and bikers are sharing this trail.

photo: Davos/Klosters

As shown in figure 25 below, 27% of respondents never ride illegal trails and always check and follow access rules. 16% of respondents never realised that mountain biking on certain trails/in certain areas is illegal, for which a country specific breakdown of respondents is presented in table 1 overleaf. Of the remaining 57% that are aware they ride illegal trails, 36% ride them now and then and 21% ride them often.

I have never realised that mountain biking on certain trails/ 489 in certain areas is illegal Often: 656 Now and then 1121 Never, I always check 823 and follow access rules 500 1000 0 Number of responses Respondents n = 3089

Figure 25: Do you ride illegal trails?



Table 1: Country distribution of those who were not aware that mountain biking on certain trails or in certain areas is illegal

	Total from country	Respondents that never realised that mountain biking on certain trails/in certain areas is illegal		
Country		Number from country	Percentage from nation	Percentage of respondents in survey
Iceland	2	1	50.0	0.2
Czech Republic	5	2	40.0	0.4
Bulgaria	44	14	31.8	2.9
Portugal	84	22	26.2	4.5
Norway	615	159	25.9	32.5
Luxembourg	4	1	25.0	0.2
Romania	4	1	25.0	0.2
Italy	308	66	21.4	13.5
United Kingdom	781	123	15.7	25.2
France	163	24	14.7	4.9
Spain	29	4	13.8	0.8
Denmark	619	36	5.8	7.4
Sweden	63	3	4.8	0.6
Switzerland	407	19	4.7	3.9
Belgium	22	1	4.5	0.2
Germany	198	9	4.5	1.8
Austria	65	2	3.1	0.4
Netherlands	109	2	1.8	0.4

Those that had indicated riding illegal trails were further asked about their reasons for riding illegal trails, the results of which are shown in figure 26 below. Of the options provided, the main reasons for riding illegal trails were 'there are not enough legal trails in my area' (41%), 'I do not see the harm if ridden at times when conflict is unlikely' (36%), and 'most legal trails are not very attractive for mountain bikers' (30%).

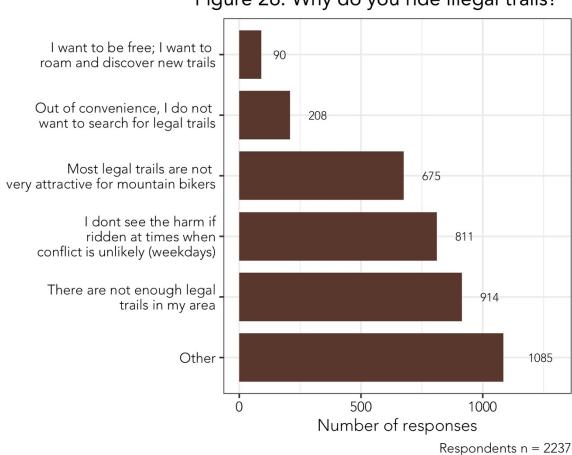


Figure 26: Why do you ride illegal trails?

When asked how often certain scenarios occur when riding illegal trails, around one third (32%) of participants reported no negative consequences every time they ride illegal trails (figure 27). Although almost all riders (97%) have never received a fine, at some point in time many had experienced a discussion/warning from land manager/ranger/official (34%), other users blocking the trails and having a discussion with them (38%), or other users making negative comments (64%).

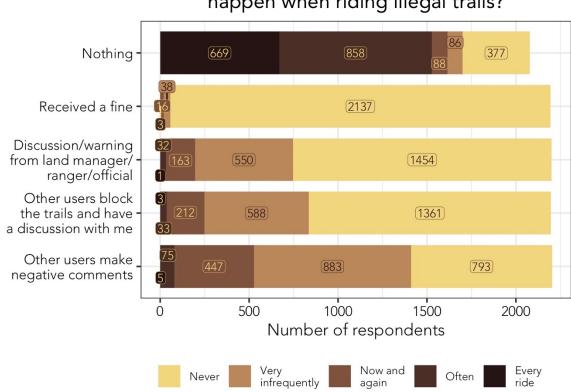
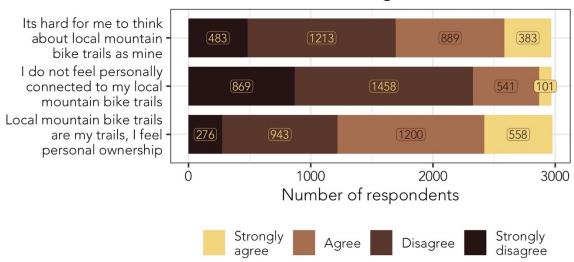


Figure 27: How often do the following scenarios happen when riding illegal trails?

Trail sustainability

A majority (78%) of respondents reported disagreed that they do not feel connected to their local mountain bike trails (figure 28). Accordingly, a majority of riders (59%) agreed that they felt personal ownership of their local mountain bike trails.

Figure 28: to what extent do you agree with the following statements?





A vast majority of participants agreed that their use of trails and access to trails has increased their appreciation of nature (95%), increased their willingness to protect nature (93%) and that they have taken direct actions to protect nature when out riding trails (90%). Full results are presented in figure 29 below.

I would like to do more to protect 349 189 nature but I havent really changed my behaviours My use of and access to trails has led me to change my behaviours -891 to reduce my environmental impact I have taken direct actions to 14 protect nature when out riding 1354 (1333) 288 trails (e.g. collecting litter) My use of and access to trails has increased my willingness (1496) to protect nature My use of trails and access to trails has increased my (1665) appreciation of nature 0 1000 2000 3000 Number of respondents Strongly Strongly Agree Disagree disagree agree

Figure 29: to what extent do you agree with the following statements?

A majority (61%) of riders reported riding wet/muddy trails sometimes but taking care to prevent trail damage as much as possible. Only 5% reported not riding wet/muddy trails because they do not want to damage the trails too much and 6% reported that they do not like riding in wet conditions at all (figure 30).

No, because I dont want 148 to damage the trails too much No, I dont like to ride 178 in wet conditions at all Yes, the trails are always 316 wet, so I dont have an option Yes, wet and muddy trails 538 are a lot of fun Sometimes, but I will try to prevent trail damage 1809 as much as possible 500 1000 1500 2000 Number of responses

Figure 30: Do you ever ride wet/muddy trails?

When asked if they had ever volunteered for trail work themselves, 37% of respondents indicated that they had not. This means 63% of respondents have volunteered for trail work at some point. Of those that had volunteered, most had volunteered 1-3 times per year or more than 6 times per year (figure 31). Further breakdown shows an increasing likelihood to complete voluntary trail work as riding experience increases, as shown in table 2 below.

Yes, >6 times per year

Yes, 6-4 times per year

Yes, 2-3 times per year

Never

Never

170

528

170

541

Yes, once a year

Never

Never

1109

Number of responses

Figure 31: Have you ever volunteered for trail work yourself?

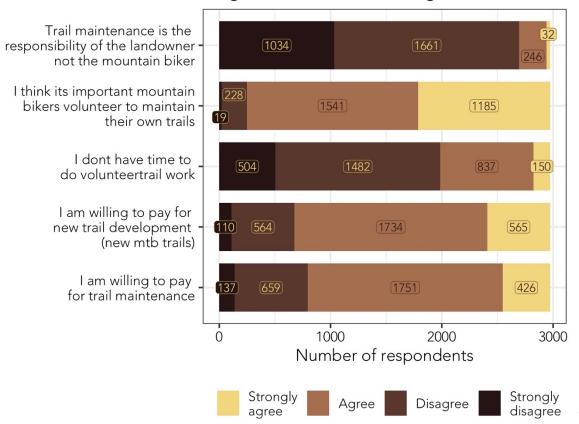
Table 2: Breakdown of those that have not completed voluntary trail work by years riding experience.

Years riding	Total number of	Proportion that have never volunteered for trail work	
experience	respondents	Number	Percentage
0-2 years	223	109	49
2-5 years	661	278	42
5-10 years	768	228	30
>10 years	1878	494	26



Most participants (91%) disagreed that trail maintenance was the responsibility of the landowner, and accordingly a similar proportion (92%) agreed that it is important for mountain bikers to volunteer to maintain their own trails. Although 33% report that they do not have time to do volunteer trail work, 77% agree that they are willing to pay for new trail development (new mountain bike trails) and 73% are willing to pay for trail maintenance (figure 32). As access laws and liabilities can vary by country, a breakdown for the nine countries with the largest response rates (n > 80) is available in appendix 5.

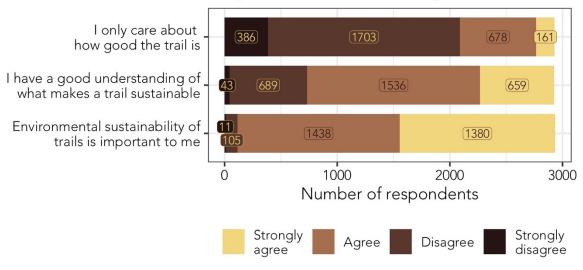
Figure 32: to what extent do you agree with the following statements?





As shown in figure 33, almost all (96%) participants agreed that environmental sustainability of trails is important to them, though only 75% agreed that they have a good understanding of what makes a trail sustainable. A minority but still substantial proportion of riders (29%) agree that they only care about how good the trail is.

Figure 33: to what extent do you agree with the following statements?





SUMMARY OF RESULTS

The main aim of this report was to support the trail building stakeholder survey by detailing the demands of the end user (the mountain bike rider) with particular regard to trail characteristics from both an enjoyment and environmental sustainability perspective. The main findings of quantitative analysis showed that many riders value connection to nature as a main motivation to ride and consequently that they value the creation of environmentally sustainable trails.

In terms of facilities, riding purpose-built mountain bike trails is important to most riders. Easier single track and more difficult trails are the most frequently ridden trail types, followed by flowy trails, forest roads and lastly by very difficult trails. Forest roads are ridden almost exclusively to access other trails, and as trail difficulty increases users are less likely to use it to access other trails and instead ride it because it suits their skill level and/or it is their preference. Though perhaps obvious, this shows that when planning a trail network, it is important to ensure that trails of the lowest technical difficulty can be actually accessed by those with the lowest technical difficulty.

When asked about desirable trail qualities, descents, optional/multiple lines and surface quality were ranked very highly throughout. Notable difference of opinion arose around signposting and directions on all types of trail, an area which may require further investigation. Almost all riders would like to progress, yet only 37% of riders feel like they can access facilities which would allow them to progress. This suggests a demand for trails which offer optional lines for harder features, low risk but high technicality – further supported by finding that 'risk' is not a popular motivation to ride. Fall zones also appear to be desirable to many of those wishing to progress, but this finding is not reciprocated in those that have already progressed. This suggests that fall zones may offer a false sense of security in the eyes of more experienced riders, though this should not detract from the potential of fall zones to reduce the extent of potential injury.



Throughout all trail types, connection to nature remains an important or very important quality for a majority of users. This is further supported by a majority of riders feeling personally connected to their mountain bike trails, though a lesser proportion report feeling ownership of their local trails. Almost all users report a desire to protect nature, with many having taken direct action to protect nature when out riding and many reporting that their use of and access to trails has increased their appreciation of nature. Although 29% of respondents report only caring about how good a trail is to ride, 25% also report not understanding what makes a trail sustainable, perhaps highlighting requirement of some rider education regarding what environmental sustainability consists of in practice. Indeed, good intention among respondents is indicated with 96% of respondents claiming that environmental sustainability of trails is of importance to them. In a practical application, it appears that mountain bikers will support trails constructed or altered to meet environmental constraints provided a suitable explanation or rationale is provided.

A similar theme emerges regarding trail access, where the respondents to this survey indicated that their first choice for trail access is purpose-built mountain bike tracks and shared use of other recreational trails. However, 57% of riders are also aware that they have ridden illegal trails at some point in time and a further 16% of riders did not know that riding in some areas could be illegal. Many reported riding illegal trails because they do not feel there are enough legal trails in their area, they do not see the harm if ridden at times when conflict is unlikely, and/or because most legal trails are not very attractive for mountain bikers. Conflicts with other users or officials are reported more frequently than receiving a fine when riding illegal trails, perhaps meaning that no tangible deterrent is provided for many users of illegal trails. This suggests that the end user experience of legal trails is exceeded by the end user experience of illegal trails in some areas, though it is not clear if riders have considered the potential negative effect on the environment their actions may have. This further strengthens the case for improved legal trail facilities, further highlights the requirement to educate riders on the environmental consequences of their actions may also advocate an investigation to the environmental sustainability of illegal trails.

Despite a large majority (92%) of mountain bikers suggesting that it is important for mountain bikers to volunteer to maintain their own trails, 37% indicated that they had not volunteered for trail work at any point, with 33% suggesting they do not have the time. Taken together,

these findings suggest mountain bikers show a desire to protect nature and a willingness to undertake the work themselves, but that for many, time constraints prevent themselves from doing so. A potential solution is offered whereby 77% of riders suggest they are willing to pay towards new trail developments and that 73% are willing to pay for trail maintenance, again suggesting that those that cannot donate their time may be willing to make financial contribution to trail construction and maintenance.

The results of this survey should, however, be interpreted with caution due to the inherent bias within the sample provided. As survey distribution was limited to online only due to the global coronavirus pandemic and concurrent social distancing rules, it is likely that the online platforms used to share the survey were more likely to be frequented by those already involved in mountain biking to some degree. This is highlighted by the tendency for respondents to have been involved in mountain biking for more than ten years and further that many of these respondents compete to some degree. As such, these demographics are not likely to be representative of the entire mountain biking population and certainly leave the beginner population underrepresented within the current findings. As the majority of respondents are those already engaged with distribution platforms such as their relevant national governing body, it also goes some way to explain the abnormally high percentage of those indicating completion of voluntary trail work. Lastly, while perhaps beyond the scope of the current project, the clear gender imbalance presented here highlights the case for further development of gender equality and diversity within mountain biking.

Overall, this report shows that most mountain bikers feel connected to nature and would like to protect nature with many putting environmental concern above trail quality in most areas. However, this is not always reflected in the actions or expectations of respondents where some education may be required to align their intentions with their actions. Lastly, many riders recognise the importance of voluntary trail maintenance, and further that those who are not able or willing to volunteer would be willing to pay for trail maintenance and construction.

Appendix: Consumer survey

Appendix 1: 'Difficult' Trail access split by country. Table below shows percentage of respondents by country indicating trail access to be 'somewhat difficult' or 'very difficult'. Data is ordered by percentage finding trail access 'difficult' or 'very difficult' from high to low.

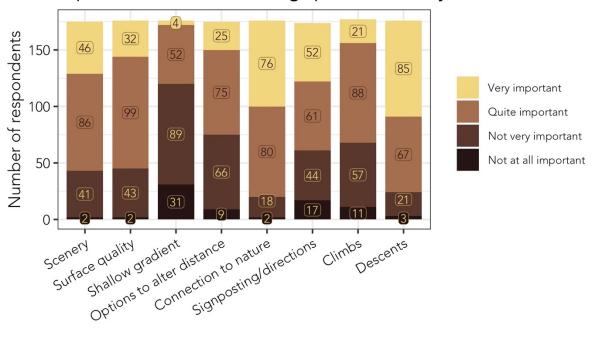
Country	Respondents from country	Those finding trail access 'difficult' or 'very difficult'	
		Number	Percentage
Greece	3	3	100
Hungary	1	1	100
North Macedonia	1	1	100
Belgium	22	14	64
Portugal	84	43	51
Finland	2	1	50
Luxembourg	4	2	50
Norway	615	263	43
Czech Republic	5	2	40
France	163	64	39
Bulgaria	44	17	39
Italy	308	114	37
Spain	29	10	34
Sweden	63	19	30
Germany	198	54	27
Romania	4	1	25
Austria	65	16	25
Slovenia	17	4	24
United Kingdom	781	173	22
Switzerland	407	90	22
Netherlands	109	21	19
Denmark	619	37	6

Appendix 2: 'Easy' trail access split by country. Table below shows percentage of respondents by country indicating trail access to be 'somewhat easy' or 'very easy'. Data is ordered by percentage finding trail access 'easy' or 'very easy' from high to low.

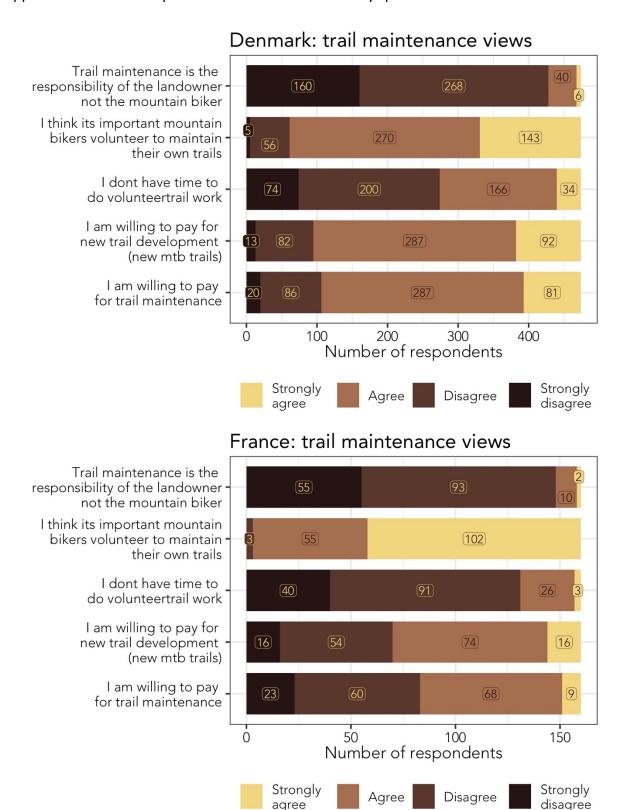
Country	Respondents from country	Those finding trail access 'difficult' or 'very difficult'	
		Number	Percentage
Iceland	2	2	100
Poland	2	2	100
Slovakia	2	2	100
Denmark	619	543	88
Netherlands	109	86	79
Switzerland	407	308	76
United Kingdom	781	590	76
Romania	4	3	75
Austria	65	48	74
Germany	198	140	71
Slovenia	17	12	71
Sweden	63	42	67
Spain	29	18	62
Italy	308	189	61
France	163	98	60
Bulgaria	44	24	55
Norway	615	319	52
Andorra	2	1	50
Finland	2	1	50
Luxembourg	4	2	50
Portugal	84	38	45
Czech Republic	5	2	40
Belgium	22	8	36
	I		

Appendix 3: Revised figure 16 featuring only the data of beginner riders when asked to detail the importance of key qualities in easy trails.

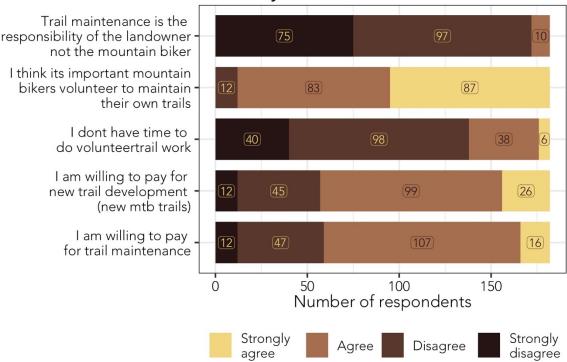
Beginner riders only: How important are the following qualities in easy trails?



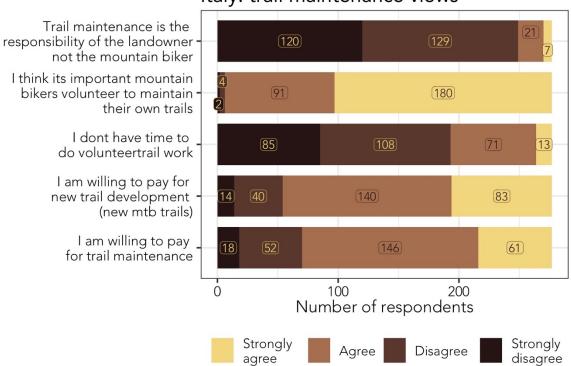
Appendix 4: Trail access preferences divided into country specific results



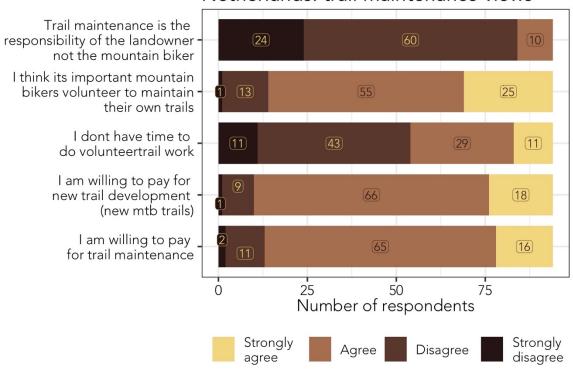
Germany: trail maintenance views



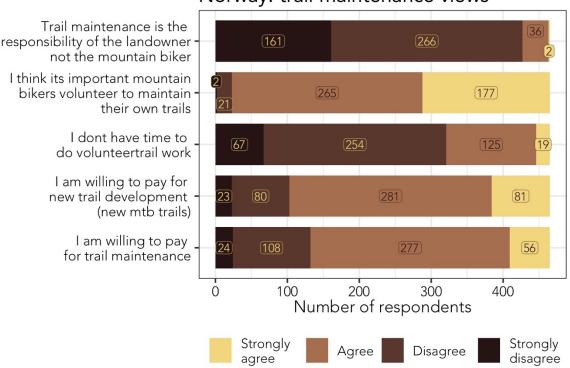
Italy: trail maintenance views



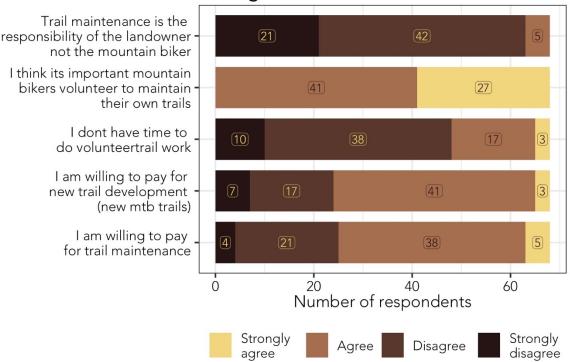
Netherlands: trail maintenance views



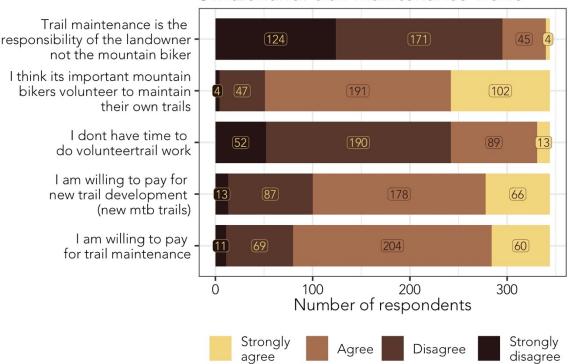
Norway: trail maintenance views



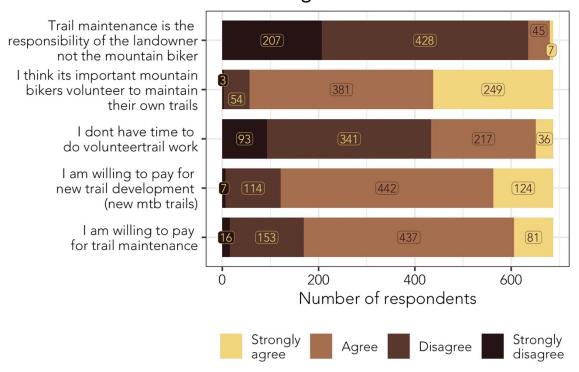
Portugal: trail maintenance views



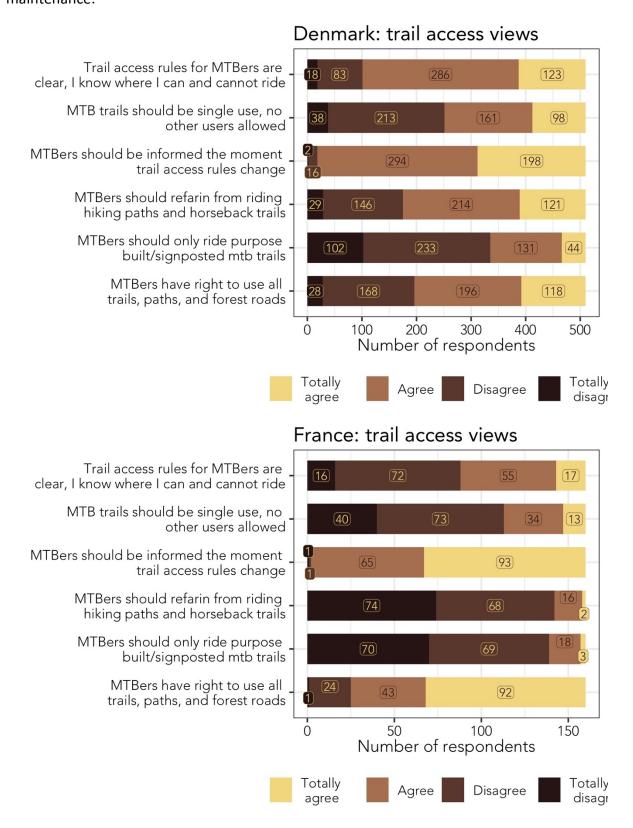
Switzerland: trail maintenance views



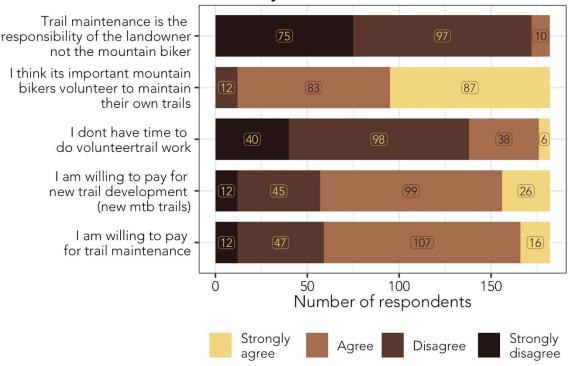
United Kingdom: trail maintenance views



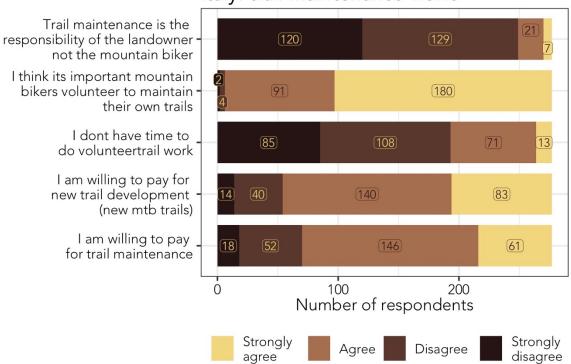
Appendix 5: breakdown by country of agreement with statements regarding trail maintenance.



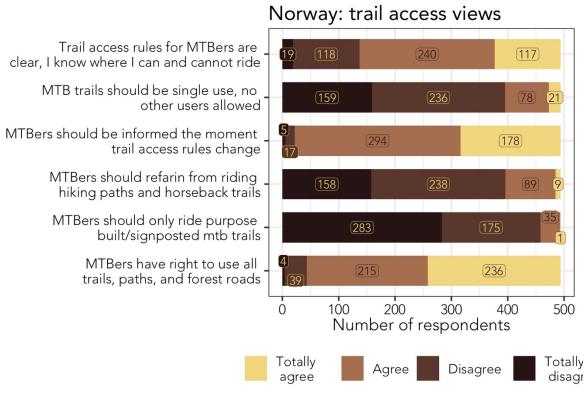
Germany: trail maintenance views



Italy: trail maintenance views



Netherlands: trail access views Trail access rules for MTBers are 54 24 clear, I know where I can and cannot ride MTB trails should be single use, no 24 other users allowed MTBers should be informed the moment (34) trail access rules change MTBers should refarin from riding 36 11 hiking paths and horseback trails MTBers should only ride purpose 11 built/signposted mtb trails MTBers have right to use all 18 trails, paths, and forest roads 25 75 50 0 100 Number of respondents Totally Totally Disagree Agree agree disagr



Portugal: trail access views Trail access rules for MTBers are clear, I know where I can and cannot ride MTB trails should be single use, no 10 other users allowed MTBers should be informed the moment (42) trail access rules change MTBers should refarin from riding 6 hiking paths and horseback trails MTBers should only ride purpose built/signposted mtb trails MTBers have right to use all 32 trails, paths, and forest roads 20 40 0 60 Number of respondents

Totally

agree

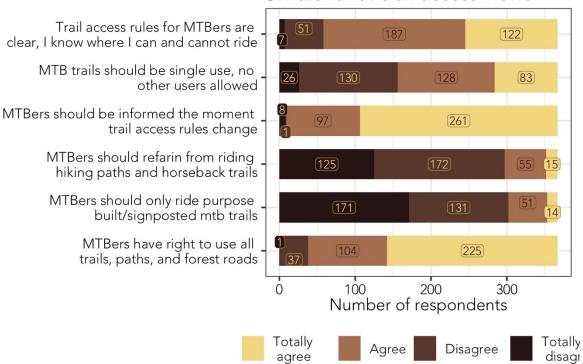
Switzerland: trail access views

Agree

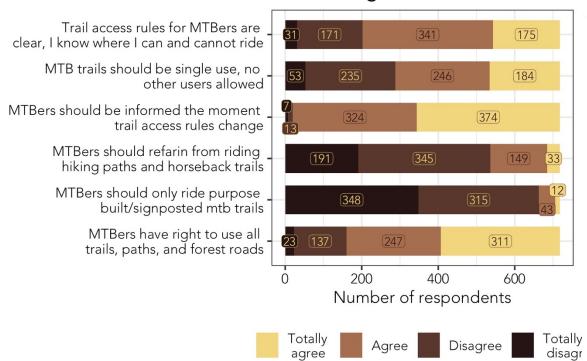
Disagree

Totally

disagr



United Kingdom: trail access views









Project Partners:















