



Dartmoor Healthy Trees Survey and Planting Report

for

Holne Moor, South Dartmoor

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CORYLUS ECOLOGY

Devon office: 19 Dart Mills, Old Totnes Road, Buckfastleigh, Devon, TQ11 0NF
Telephone: 01364 653300 E-mail: info@corylus-ecology.co.uk

Director: H G Wrigley (née Lucking) BSc. MIEEM, BES

Corylus Ecology Ltd Registered in England No 5005553
Registered Office: Henwood House, Henwood, Ashford Kent TN24 8DH
VAT Reg No. 862 2486 14

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1.0 INTRODUCTION

1.1 Corylus Ecology and Evolving Forests have worked with the Foundation for Common Land, in consultation with Dartmoor National Park Authority and Commoners' Associations, to develop a method for undertaking citizen science surveys of open grown trees on Dartmoor's commons. Surveys were carried out on a series of commons across Dartmoor, including Holne Moor in the south of the national park. The site is located at Ordnance Survey grid reference SX67987033 (see Map 1).

Map 1: Site Location Plan



OS licence number - 100050443

1.2 This work has been carried out in relation to a tree regeneration project for several commons on Dartmoor, which forms part of the Our Upland Commons project through the Our Common Cause Partnership. The objectives are:

- To better understand the number, age, distribution and health of individual trees on commons.
- To use data gathered during the survey to inform two tree planting trial projects on Dartmoor.

1.3 This work aims to move away from the often polarised view of trees on Dartmoor, which tends to focus on a debate over forest versus open ground. The work points to an acknowledgement that, naturally, woodland would give way to open ground through an extensive area of open grown trees and smaller wooded patches, based on elevation, ecology and geomorphological changes. The project team's

approach to delivering the project aims has been to view this work as the start of a much longer-term evolution of the edges of the moor: a transition to a more naturalistic relationship between trees and open ground that also engages local communities in a way that instils a wood culture as part of a wider land-use culture.

- 1.4 Our aim is to integrate proposals to increase tree cover on Dartmoor into the purposes of the National Park designation, which include conserving and enhancing the special qualities of natural beauty, wildlife and cultural heritage, and promoting opportunities for understanding and enjoyment. The survey has been designed to give as much detailed information as possible but equally to engage people and help to understand the connection of local people to these areas. The project team would like to thank all of the volunteers who have given up so much of their time to help with the delivery of this survey.
- 1.5 The proposals for increasing tree cover take a number of forms, with the aim of testing ways of encouraging open tree growth in these climatically harsh areas, giving clues to the longer-term and more extensive evolution of the moorland edges across the whole moor.
- 1.6 This work is part of a £3 million project, Our Upland Commons, helping to secure the future of upland commons in England. Ending in December 2024, 12 commons across four parts of the country are involved, including three in Dartmoor National Park. Led by the Foundation for Common Land, Our Upland Commons has been made possible by grants from The National Lottery Heritage Fund, Esmée Fairbairn, Garfield Weston Foundations plus local funders Dartmoor National Park Authority, Devon Wildlife Trust and Dartmoor Preservation Association. This report has been prepared for the exclusive use of the Foundation for Common Land. No part of this report should be considered as legal advice.

2.0 METHODOLOGY

2.1 Phase 1: Desk-based Research and Rapid Assessment

2.1.1 Following a project inception meeting at the Dartmoor National Park Authority (DNPA) headquarters at Parke, and prior to survey work beginning on the ground, early-stage preparatory work was undertaken in order to provide background information for the survey and planting work. This included:

- Building a GIS project based on data provided by the project partners such as DNPA and the South West Partnership for Environmental and Economic Prosperity (SWEEP). This was combined with other information such as Forestry Commission modelling using Ecological Site Classification and climate modelling tools.
- Rapid assessment of the commons to be surveyed to ensure the survey methodology was fit for purpose.

2.1.2 Health and safety systems were put in place and agreed with project partners to ensure the safe delivery of the project outputs. For instance, these systems required volunteers to work in at least pairs and to sign on and off site using a project WhatsApp group specifically for health and safety issues. Insurance was arranged to cover the volunteer activities, with volunteer registration forms and risk assessments designed and approved for use as part of the project.

2.1.3 Discussions were held with other organisations, such as Historic England, regarding experience with volunteer led surveying and digital recording of results.

2.2 Phase 2: Healthy Trees for Tomorrow Survey

2.2.1 Delivery of the survey involved developing a robust and repeatable survey methodology, in consultation with stakeholders, which was suitable for use by volunteers and for covering large and diverse areas including:

- Exposed moorland tops with individual scattered trees;
- Open ground with widely dispersed trees where natural regeneration may be occurring;
- More closely spaced trees leading up to the densely wooded fringes where more extensive natural regeneration may be occurring.

2.2.2 The intention was to balance the requirement for the survey methodology to provide sufficient baseline information to guide any proposals for increasing tree cover, whilst also being easy to record as part of a citizen science project taking place in remote areas. The large areas of land the survey needed to cover, in a very small survey window between leaf emergence and full bracken frond cover, guided the design of the survey method. As a result, the survey was developed to provide a broad picture of current condition and trends rather than a condition survey of every tree on the moor. It can be seen as a cost-effective way of gathering enough data to see trends and be repeatable in the future no matter what the

budget constraints. The combination of photography and survey will be able to be used for future condition trends on a tree by tree basis.

- 2.2.3 Following initial field trials, the survey technique was presented to and discussed with Dartmoor commoners and landowners. Their feedback was used to refine the methodology prior to the start of field survey.
- 2.2.4 A volunteer recruitment drive was undertaken to recruit a group of at least 20 volunteers for the 2022 survey season to look at Holne and Harford/Ugborough Moors, with a second recruitment drive in 2023 to look at Walkhampton Common and Holne Moor. The project was advertised through relevant local Facebook groups (e.g. Plymouth Tree Partnership, Ashburton and Ivybridge Facebook pages, Dartington Noticeboard etc), DNPA's volunteer network and extensive networks of Corylus Ecology and Evolving Forests.
- 2.2.5 Two training sessions were carried out for the volunteer surveyors in 2022: one at Harford Moor Gate and one at Venford Reservoir. The survey areas were subdivided to facilitate allocation of each 'patch' to a pair of volunteers; patches were mapped electronically on QGIS, with paper maps also provided to surveyors. Support was provided to all volunteers (primarily by phone, email and WhatsApp) to help them to carry out the survey.



Volunteer training event



Volunteer training event

- 2.2.6 In 2023 a different approach to gathering survey data was tested. This involved the project team leading a series of survey days in the field, during which time small groups of volunteers worked with staff members to collect information for the trees found in individual compartments of each site. This proved to be a more effective way of surveying with larger volunteer groups but could also be combined with 2022 approach for longer-term surveys.

2.2.7 Survey data gathered by the volunteers and project team were combined with desk-based information to draw up a baseline for open grown trees across the common. The survey area extended from the edge of existing woodlands to open moorland, with identification of recent natural regeneration in these areas. The survey results were recorded and mapped using GIS Cloud in the field (see Appendix 1) and later exported to programmes including MS Excel and QGIS for interrogation. A database was developed containing the full survey results, with attributes recorded including:

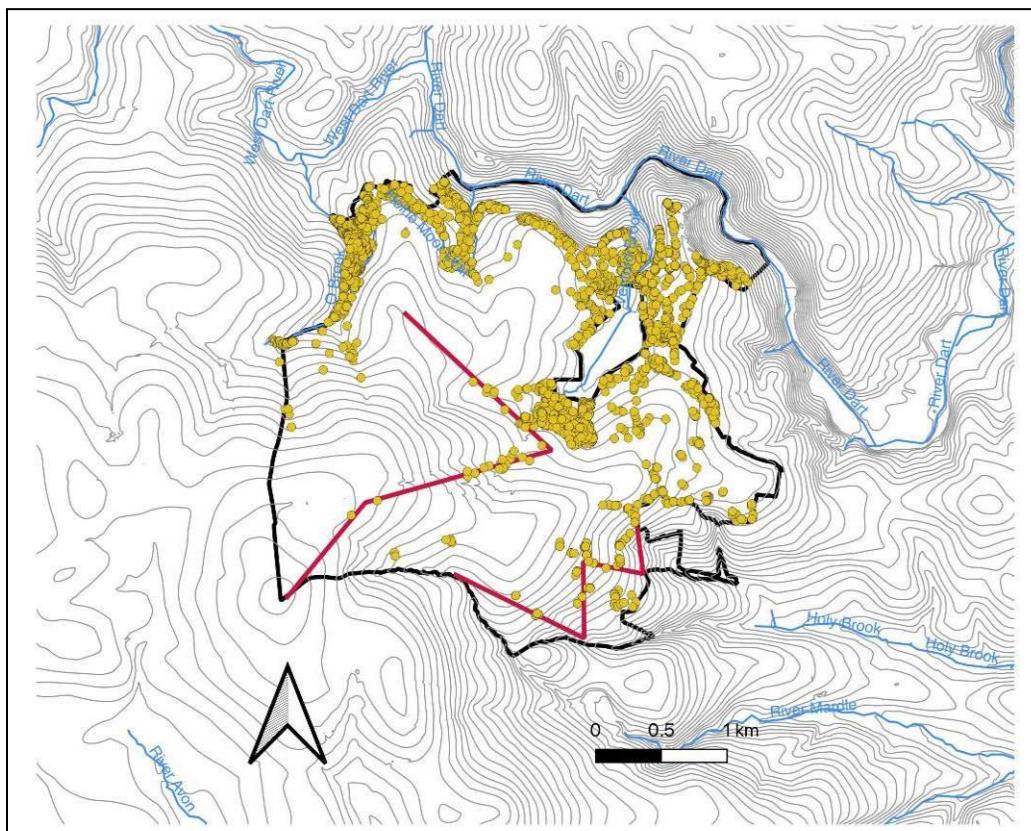
- Location (latitude and longitude);
- Species;
- Altitude;
- Approximate height and stem diameter;
- Growth stage (e.g. sapling, semi-mature, mature, dying);
- Crown shape (e.g. fan, oval, spreading, cone, windswept);
- Health (including signs of any dieback, leaf discolouration, root exposure etc);
- Signs of browsing; and
- Presence of lichens or fungi.

2.2.8 For trees growing in a group of similar trees of the same species, the number of trees in the stand was also recorded. Additional details were recorded for certain attributes, such as ground conditions where saplings were recorded, details of browsing damage, presence of any dead limbs attached or near to the tree, or whether dead trees were standing or fallen.

2.2.9 The level of regeneration on Holne Moor made it impractical and impossible to survey every single tree as per the methodology used for the other commons. As a result, the survey methodology was adapted and a transect surveying approach was employed in order to gather a picture of tree cover across survey compartments and allow extrapolation of survey results. The moor was divided up into ‘compartments’ of similar ground types and 25m wide transacts walked in W patterns on each compartment with staff and volunteers (see Map 2 overleaf).

2.3 Phase 3: Increasing Tree Cover

2.3.1 Following completion of the desk study, it was envisioned that the focus of Phase 3 would likely be on natural regeneration and using natural processes to increase tree cover in areas where trees are likely to successfully establish due to climatic and other conditions. This approach was still considered to be the most appropriate focus for the work following completion of the field survey. The survey results have been cross referenced with information such as the RSPB’s ‘Key Moorland Birds on Your Common’ (RSPB, no date) to help guide the selection of suitable locations for increasing tree cover.

Map 2: Transect Routes

- 2.3.2 Areas for increasing tree cover could focus on transitional areas which form the soft boundaries between different habitat types, primarily woodland and moorland edges, which will usually tend towards woodland over time if protected from grazing/browsing. Such areas are often of high ecological value and have potential to offer opportunities for extending woodland cover in line with current government aims for nature recovery and increasing woodland coverage, subject to consideration alongside relevant constraints.

- 2.3.3 The draft plan for increasing tree cover has been designed by the project team, using the results gathered by the survey volunteers, and will be refined with input from stakeholders and the project funders.

3.0 SURVEY RESULTS AND EVALUATION

3.1 Phase 1 Results: Desk-based Research and Rapid Assessment

- 3.1.1 It was considered that using mobile phones to record survey data would be the most appropriate option for this survey and following investigations into various apps available for this type of survey, GIS Cloud was considered to be the most suitable (see Appendix 1).
- 3.1.2 24 licenses were granted from GIS Cloud for use of their app, free of charge until August 2022 (representing a saving of £1,700). 20 additional licences were purchased in 2023 to enable the continuation of the survey. Using this tool, an app-based survey form was developed, designed to be used in the field, taking automatic GPS references for each survey point and recording key pieces of information for each tree, as well as at least one photograph; the form could be used off-line and would store data for automatic uploading once back in signal.
- 3.1.3 The field testing and site assessments also included meeting the landowner on Walkhampton Common (following a recent project extension to include this area subject to funding), looking at existing tree planting plots near Cadover Bridge, as well as meeting the landowner of Harford Moor, looking at existing trial plots for tree planting and regeneration.



Regeneration plot on Harford Moor



Tree planting plot near Cadover Bridge

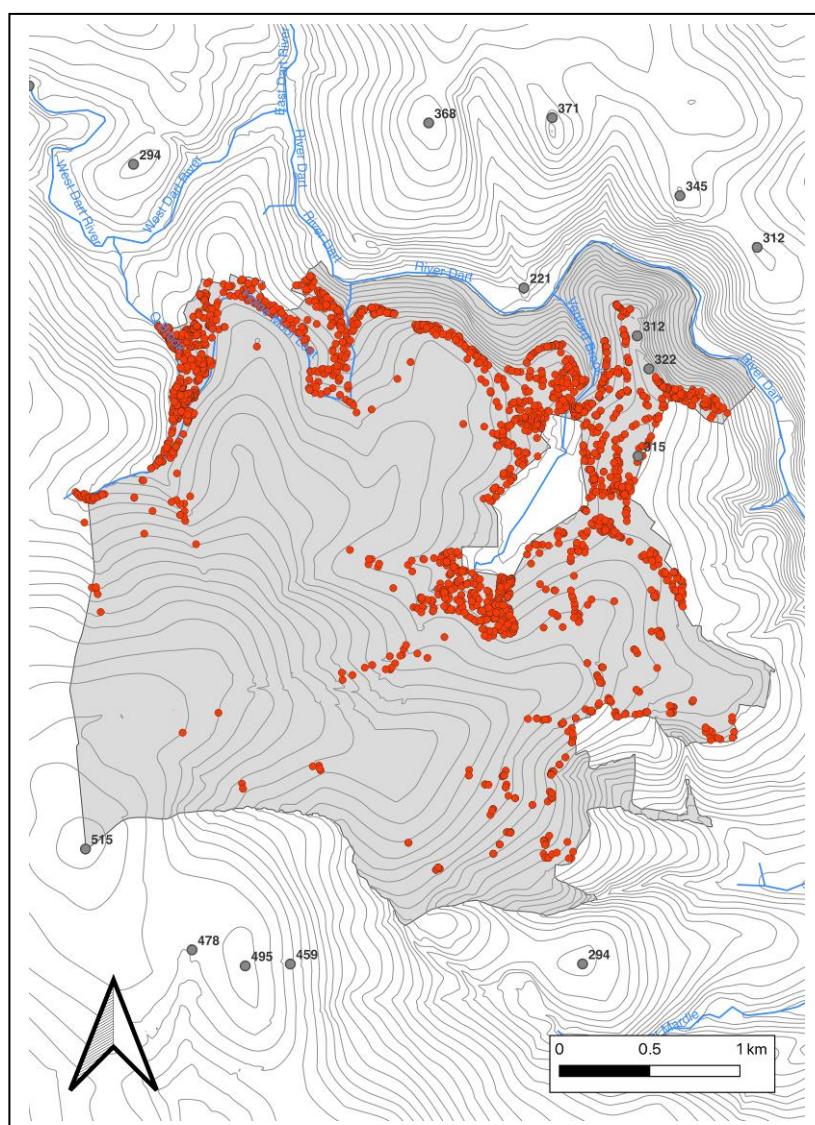
3.2 Phase 2 Results: Healthy Trees for Tomorrow Survey

- 3.2.1 During 2022 and 2023, a total of 4,246 trees have been recorded across Holne Moor. This was achieved by 22 volunteers and five members of the project team, over the course of 39 survey days.
- 3.2.2 Following the adoption of a revised methodology given the volume of trees and level of regen found on Holne, the data provided is representative, but not complete. The black-hatched area on Map 6 was categorised as 'open moor', and the surrounding areas within the boundary of the common 'woodland'

'edge'. The project team estimates that 30% of surveying was completed within the open moor area, and 70% within the woodland edge area.

- 3.2.3 A total of 2,304 data points (either individual trees or groups of similar trees) were recorded across Holne Moor during the survey period from May to July 2022 and 2023 (shown as red dots on Map 3). It should be noted that the survey looked only at trees whose canopy was not contiguous with trees in a woodland block. The majority of the trees recorded were found at the moorland fringes, close to existing wooded areas, Venford Reservoir and/or watercourses. Relatively few mature trees were found on the moorland tops, however, some natural regeneration, particularly rowan, was recorded in these areas.

Map 3: All Trees/Groups of Trees Recorded



- 3.2.4 Of the 4,246 individual trees recorded across Holne Moor, the greatest number were rowan (1,824 trees or 42%), followed closely by hawthorn (1,621 trees or 38%), then birch (234 trees or 6%) and willow (203

trees or 5%). The remaining species – blackthorn (133 trees), holly (98 trees), other (66 trees), hazel (13 trees), beech (10 trees), alder (6 trees) and sycamore (3 trees) – each accounted for less than 5% of the total (see Chart 1a).

- 3.2.5 2,196 trees were found in groups of trees of the same species and with other attributes also being similar within the group. The species with the highest number of trees found growing in groups was rowan (1,333 trees in groups), followed by hawthorn (572 trees in groups), birch (125 trees in groups), blackthorn (121 trees in groups) and willow (96 trees in groups). Considering each tree as a single data point rather than part of a group results in a slightly different breakdown of species (see Chart 1a and 1b), with hawthorn forming the greatest proportion (52%), followed by rowan (27%).

Chart 1a: Breakdown of Tree Species Recorded (for individual trees)

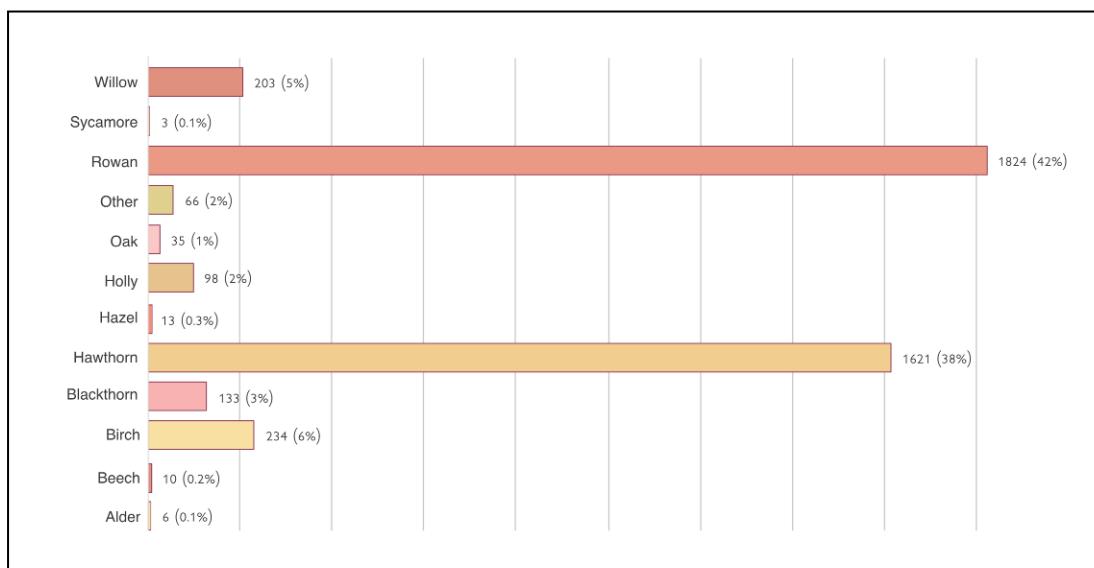
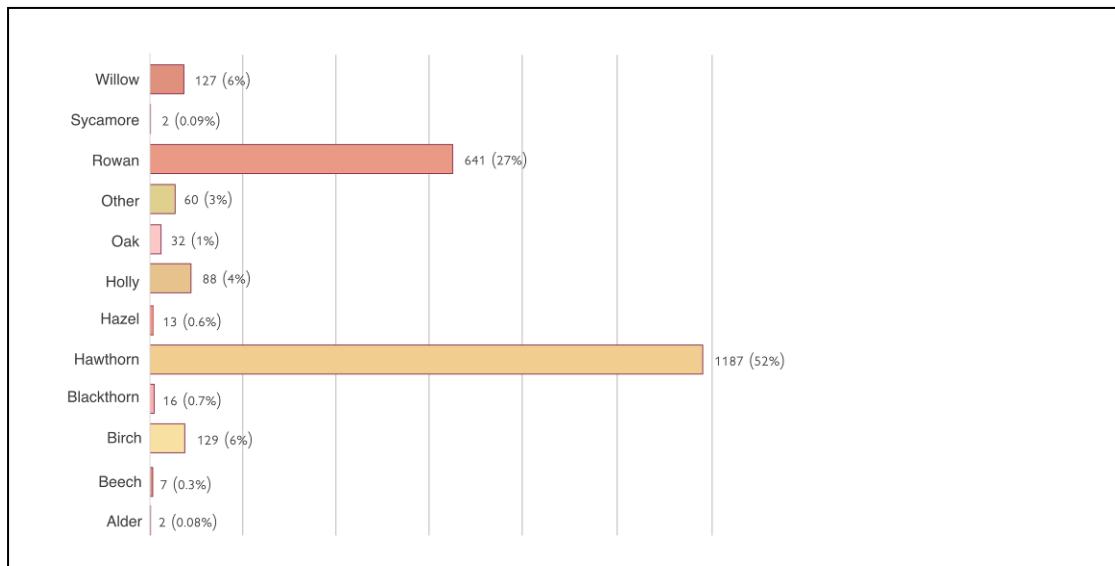


Chart 1b: Breakdown of Tree Species Recorded (for groups and individual trees)



- 3.2.6 In relation to growth stages, for individual trees (Chart 2a), the greatest proportion were semi-mature (1,692 trees or 40%), with around one third mature (1,358 trees or 32%), and around one quarter were saplings (984 trees or 23%). Less than 5% of trees were either dying or dead (106 trees or 2.5% dying and 81 trees or 2% dead). The percentage breakdown of results for tree growth stages is broadly similar when considering individual trees or groups of trees, although mature trees form a slightly greater proportion than semi-mature (see Charts 2a and 2b for comparison).

Chart 2a: Breakdown of Tree Growth Stages (for individual trees)

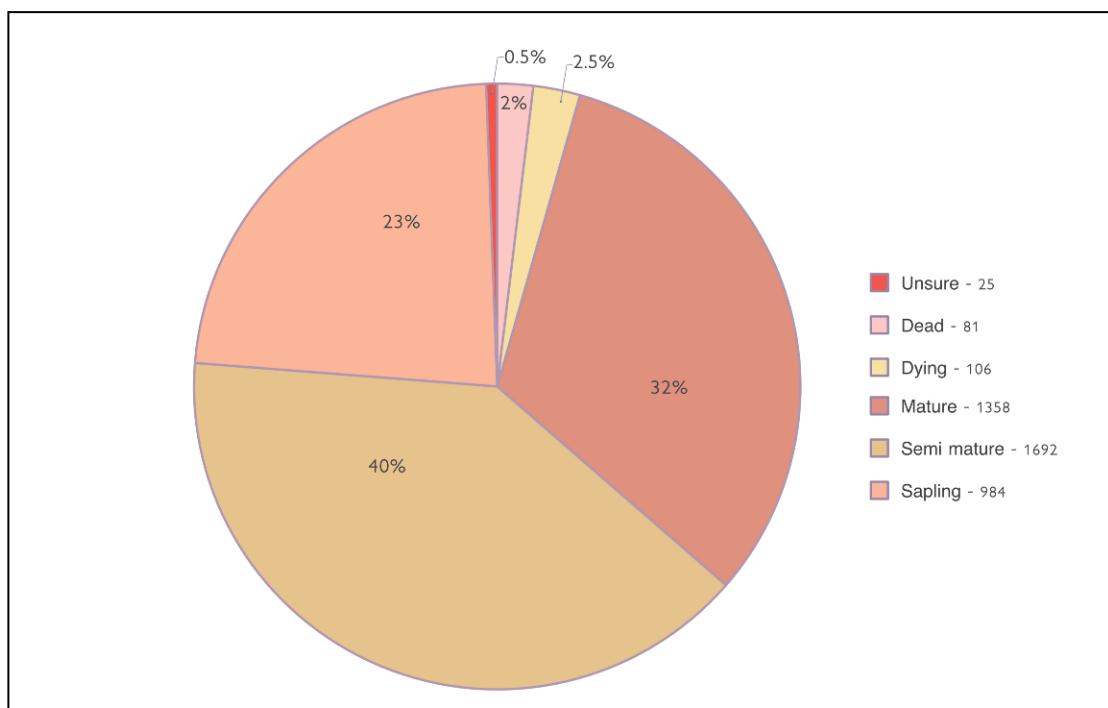
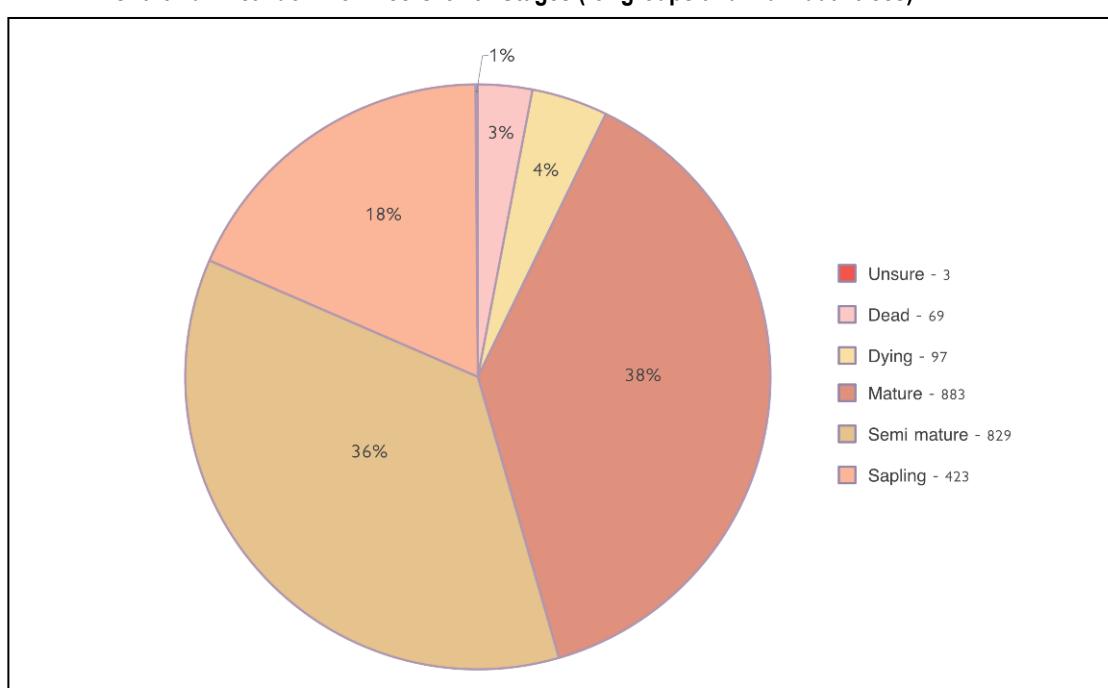
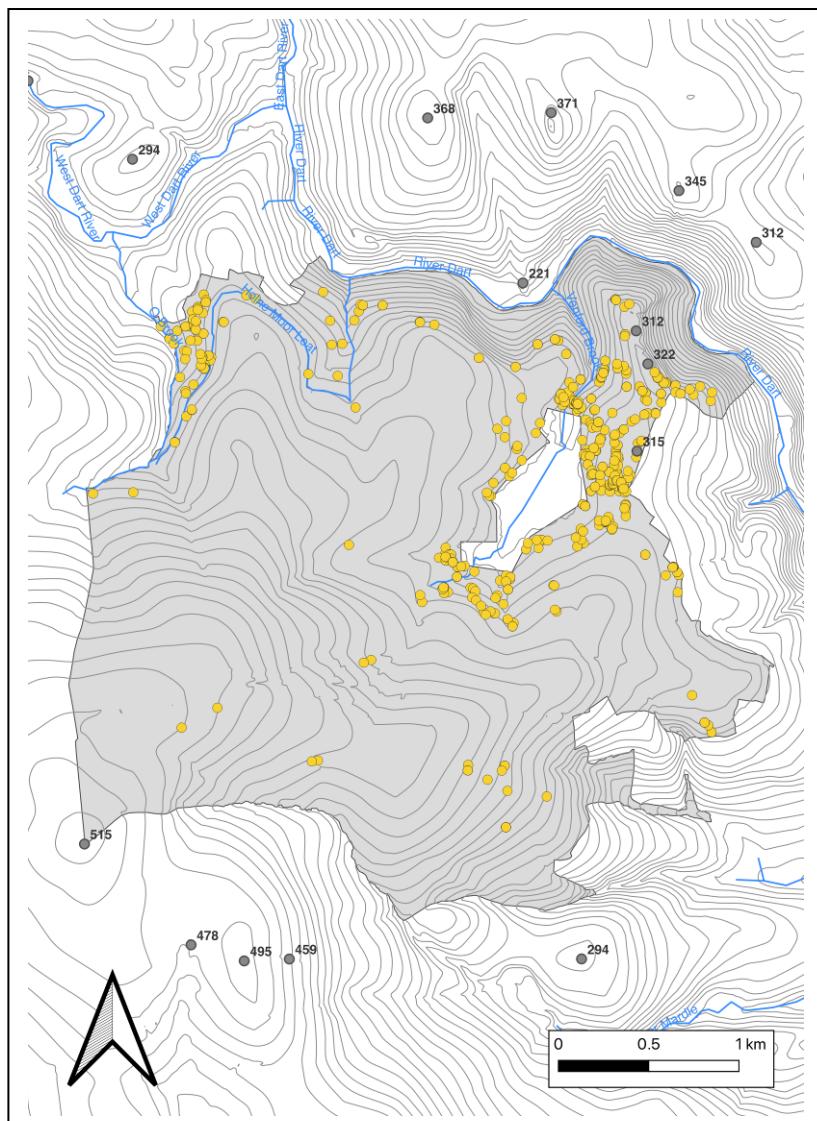


Chart 2b: Breakdown of Tree Growth Stages (for groups and individual trees)



- 3.2.7 Where saplings were recorded (see Map 4), additional details such as whether they were natural regeneration or planted trees, as well as general observations on where they were located, were also noted (see Chart 3). The majority of saplings were recorded as being natural regeneration rather than planted (98% compared to 2% which were considered to have been planted).

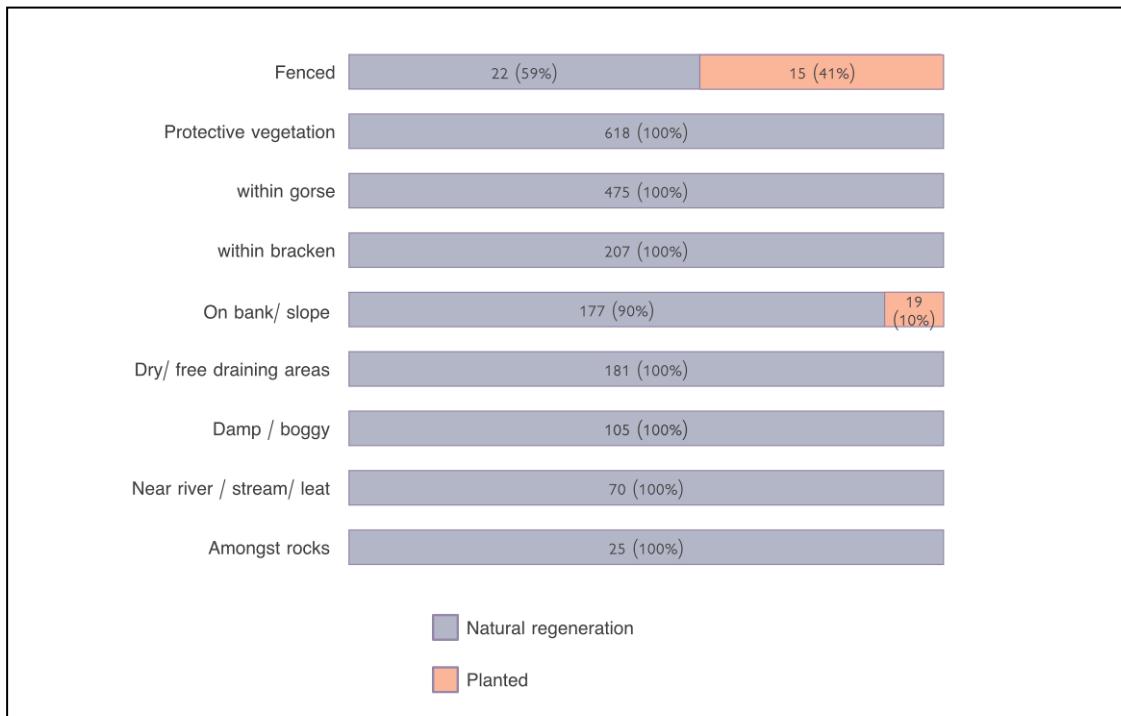
Map 4: Locations of All Recorded Saplings



- 3.2.8 37 of these saplings were noted as being within areas protected by fencing, of which 15 were planted (41%) and 22 were natural regeneration (59%); this equates to around 79% of planted saplings being found within fenced areas, compared to around 2% of the natural regeneration. 618 saplings were recorded within areas of protective vegetation, primarily gorse and bracken, but also brambles and other trees; these saplings were all naturally occurring (amounting to around 64% of the total natural regeneration). Of the saplings found in protective vegetation, 49% included gorse and 21% included bracken.

- 3.2.9 In terms of general habitat information, 196 of the saplings were recorded on banks or slopes, of which 177 were natural regeneration (90%) and 19 were planted (10%). All other attributes were only recorded for naturally regenerating saplings (see Chart 3): 181 were recorded in dry or free draining areas (19% of the natural regeneration), 105 were recorded in damp or boggy areas (11%), 70 near watercourses (7%) and 25 amongst rocks (3%).

Chart 3: Sapling Observations Recorded

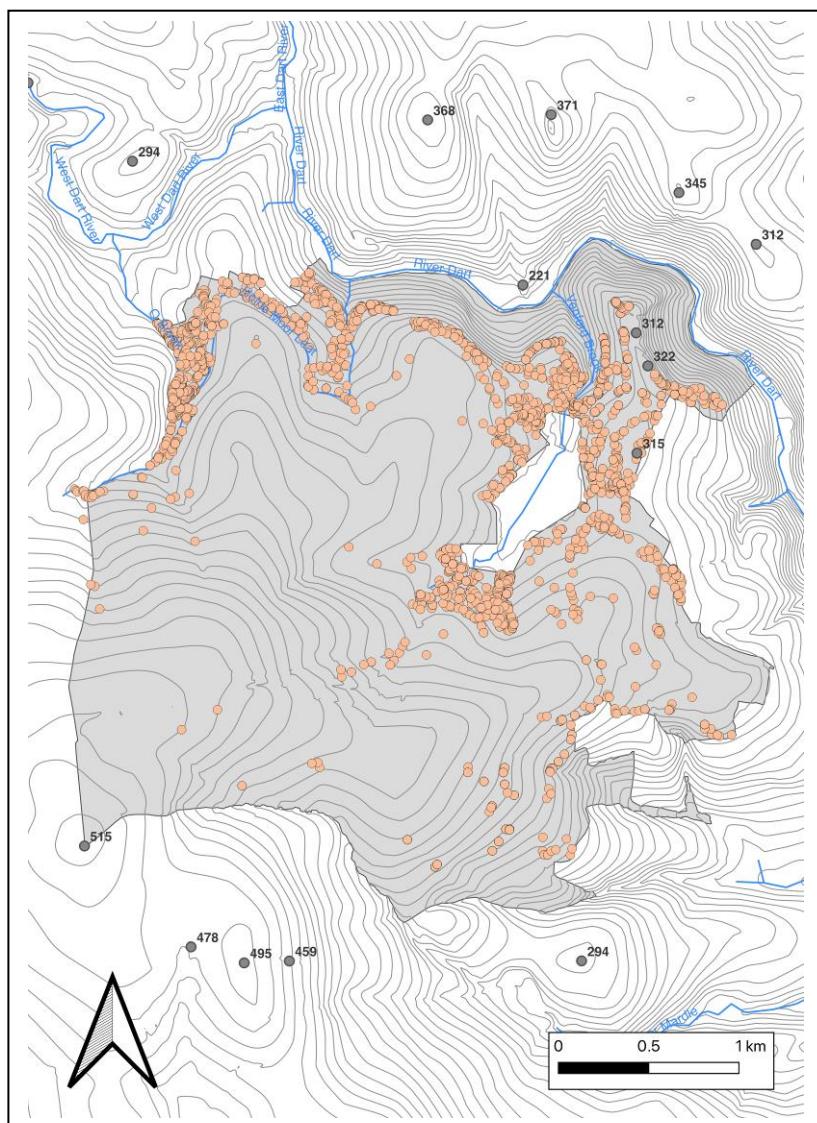


- 3.2.10 3,758 individual trees, or 89% of the total, were considered to be healthy (see Map 5) compared to 488 trees (11% of the total) which were considered not to be healthy. 819 trees (19%) were recorded as having some dieback present, 733 trees (17%) had dead branches or limbs attached, and 243 trees (6%) were recorded as having broken or fallen limbs on the ground nearby. 146 trees (3%) were recorded as having leaf discolouration, 141 trees (also 3%) with root exposure, and 63 trees (1%) with bare ground under the tree. These categories tend to have a large degree of overlap, for example the trees with dieback were also likely to have dead limbs nearby, and trees with bare ground under the tree typically also had root exposure.

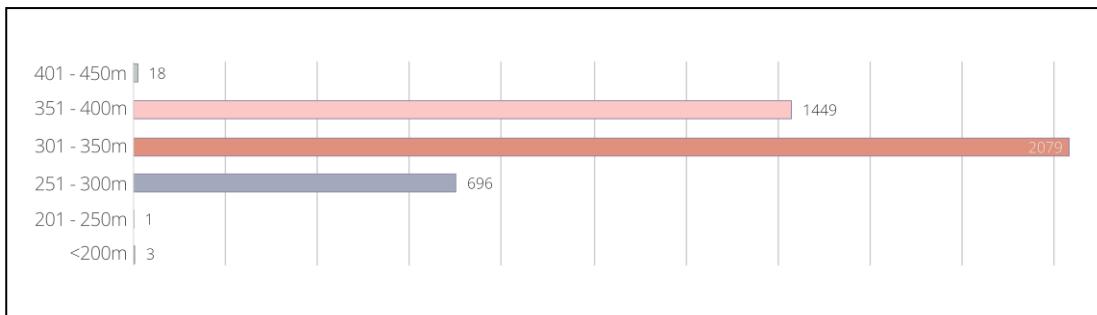
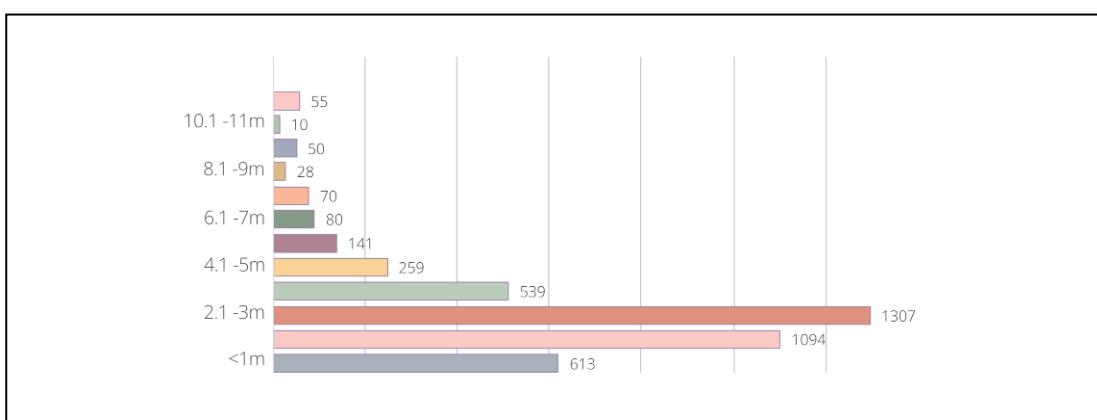
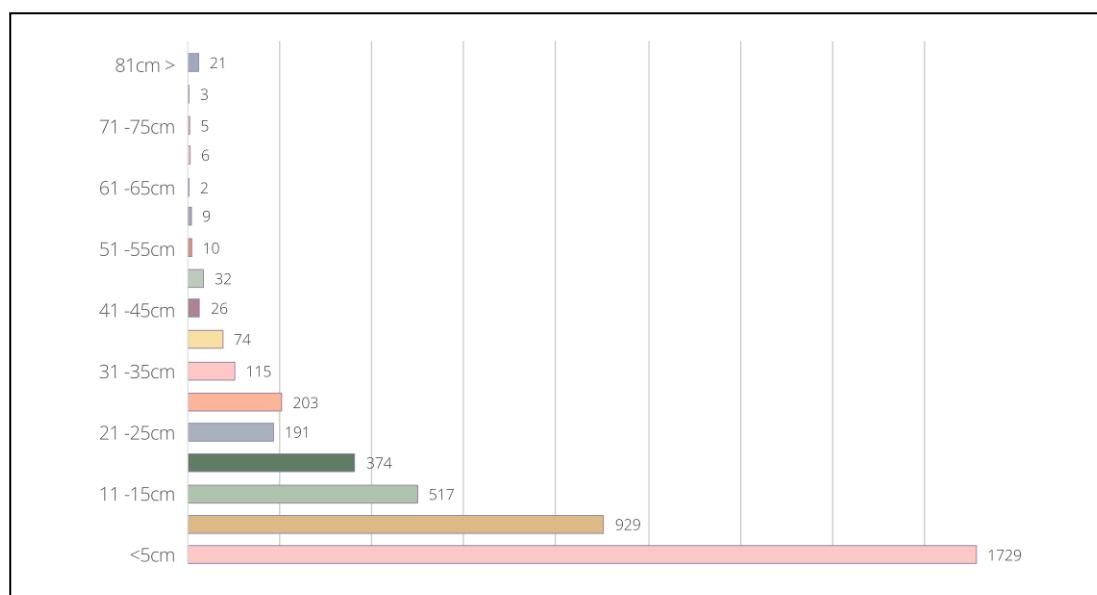
- 3.2.11 2,244 trees (53%) showed no signs of browsing, compared to 2,002 trees (47%) which showed signs of browsing. Regarding saplings in relation to browsing, 477 showed signs of browsing (48% of saplings), of which 476 were natural regeneration (49% of natural regeneration showed signs of browsing) and one was planted (5% of planted saplings showed signs of browsing). Where browsing was recorded, additional detail was included in the survey form; this was a descriptive element, with the reports varying

from 'minor' and 'historic' to 'heavily browsed', 'clear browsing line', 'regular browsing, some extremely recent' and 'causing stunted growth'. However, it should be noted that identifying evidence of browsing is subjective and was often a feature that volunteers found more difficult to confirm.

Map 5: Locations of Healthy Trees/Groups of Trees



3.2.12 A number of other attributes were recorded (see Charts 4-6), including altitude, approximate height and stem diameter, crown shape (e.g. fan, oval, spreading, cone, windswept) and the presence of lichens or fungi. 16% of trees were recorded at an altitude of lower than 300m, 49% of trees between 301m and 350m, 24% between 351 and 400m, and 0.4% of trees above 400m. Estimates of tree height ranged from 0.05m to greater than 12m, with 14% of trees lower than 1m tall compared to 1.5% of trees greater than 10m tall. Stem diameter ranged from 1cm to 200cm, with 0.4% of trees over 1m diameter at breast height (DBH), 1% between 50cm and 1m DBH, 14% between 25cm and 50cm, and the remaining trees less than 25cm DBH.

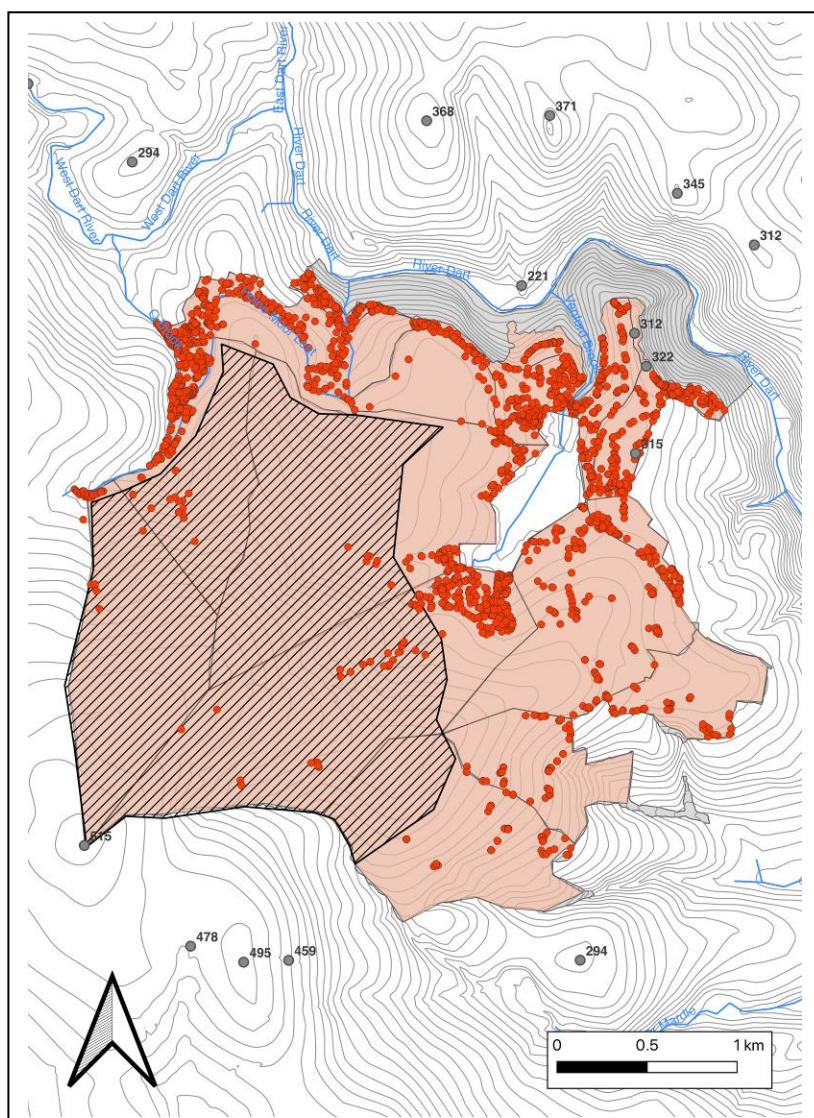
Chart 4: Recorded Altitude (m) of Individual Trees**Chart 5: Recorded Height (m) of Individual Trees****Chart 6: Recorded Stem Diameters (cm) of Individual Trees**

3.2.13 Regarding crown shape, of the individual trees recorded, almost one third of the trees (1,302 trees or 30%) were recorded as spreading, 801 trees (19%) oval, 413 trees (8%) fan, 292 trees (7%) cone, and 224 trees (5%) windswept (see Appendix 2). A further 1,214 trees (29%) were in the category of unclear or not applicable, which includes the 984 saplings recorded (with saplings comprising 23% of the 29% of trees in this category).

3.2.14 Lichens can be broadly grouped into three main types: crustose (encrusting), foliose (leaf-like) and fruticose (branching). 1,718 trees (40%) had all three types (see Appendix 2). 809 had crustose and foliose lichens, 30 had foliose and fruticose, and 15 had crustose and fruticose. 700 trees had only crustose lichens, 35 only foliose and 5 only fruticose. 934 trees (22%) had no lichens recorded. Of those trees with no lichens, 653 were saplings, 202 were semi-mature, 61 were mature and 18 were dead. Excluding saplings from the calculations reduces the trees with no lichens recorded to 7%. In addition, the presence of fungi was also recorded: 65 trees (<2%) were recorded as having fungus present.

3.2.15 Following the adoption of a revised methodology, given the volume of trees and level of regeneration found on Holne Moor, it is important to note that the data provided above are representative but not complete. As part of the transect survey approach that was instead adopted, the area was subdivided into two broad categories, which were described as 'open moor' and 'woodland edge' (see Map 6, with the hatched area representing open moor habitats). The project team estimates that 70% of surveying was completed within the woodland edge area and 30% within the open moor area.

Map 6: Transect Survey Areas



3.2.16 The data points gathered have been extrapolated for each of these prescribed areas and estimates for data points within each area are that the open moor areas would have 100 data points (59 data points recorded plus an additional 70% or 41 data points) and for woodland edge areas 2,968 data points (2,224 data points recorded plus an additional 30% or 685 data points). This would extrapolate out to give a likely total number of data points for Holne Moor of 3,030.

3.3 Survey Evaluation

- 3.3.1 By working with a group of volunteers throughout the summers of 2022 and 2023, Corylus Ecology and Evolving Forests have delivered a survey of open grown trees on several commons on Dartmoor. The survey results for Holne Moor were gathered by 22 volunteers during an estimated 39 days of survey time. This has provided baseline information on the number, age, distribution and health of individual trees on these commons.
- 3.3.2 The majority of Holne was covered by undertaking a tree-by-tree analysis. Two large areas were felt to be similar enough to other areas: one of these was an area of open moor with very little to no trees, the other an area of such extensive regeneration that a full survey would be impossible. For each area a visual inspection gave confidence the results would be very similar to neighbouring areas, however, to be sure, a transect approach was taken to ensure every area was covered. Within each transects of 25m width and in a W shape across these areas every tree was surveyed. The results of these transect surveys were multiplied up to give a result for the whole area and added to the gross results for the whole moor.
- 3.3.3 The technique proved to be an effective way of covering areas at the extreme ends of the tree-cover spectrum and could be used on other areas of the moor. Using the W shape also brings the transect in line with other ecological survey approaches and it is considered the W transect technique can be used to undertake more extensive tree inventory type surveying. It is accepted that the survey will not have recorded every individual tree present on these moors and that there will be a margin of error as this was a citizen science project for which much of the data collected were qualitative. However, despite these limitations, it is considered that these data provide a useful insight into the tree populations on these moors and provide the information necessary for developing proposals for increasing tree cover in these areas (see Section 4).
- 3.3.4 This work was funded by the National Lottery Heritage Fund and other partners, and has been carried out in relation to a tree regeneration project for several commons on Dartmoor, which forms part of the Our Upland Commons project through the Our Common Cause Partnership. The survey has been delivered thanks to the dedicated group of volunteers who gave up their time and effort to collect the data for these areas.

- 3.3.5 Over 4,200 trees have been recorded across Holne Moor. As had been expected, the majority of these trees were found at the moorland fringes, close to existing wooded areas and/or watercourses. Although relatively few trees were recorded across the open moorland tops, the presence of small saplings in the highest areas of the site, at an altitude of almost 500m, is of particular interest.
- 3.3.6 At least 11 tree species were recorded across the survey area. Over 80% of the trees recorded were either rowan (43%) or hawthorn (38%). The other nine species - including birch, willow, blackthorn, holly, oak, hazel, beech, alder and sycamore - were found in comparatively small numbers. Approximately half of the total trees were recorded growing in groups of similar trees, particularly rowan and hawthorn.
- 3.3.7 Almost three quarters of the trees recorded were either semi-mature (40%) or mature (32%), and around one quarter were saplings (23%). A small proportion were dead or dying (<5%). Almost all of the saplings recorded (98%) were considered to be natural regeneration rather than planted. Whilst it is important to note that the survey methodology did not involve an exhaustive coverage of the survey area, the results imply there is a good amount of natural regeneration already occurring across Holne Moor, with almost 1,000 saplings recorded during the survey.
- 3.3.8 Two thirds of natural regeneration and four fifths of planted saplings were found in areas protected from grazing/browsing, whether within fenced areas or areas of protective vegetation. Regarding the natural regeneration, this was primarily through protective vegetation (64%), such as gorse and bracken, rather than fencing (2%). For planted trees the opposite was the case, with most saplings being protected by fencing (79%).
- 3.3.9 A high proportion of the trees recorded were considered to be healthy (89%). A number of features were recorded which could be related to tree health, including signs of dieback, leaf discolouration or the presence of dead limbs; a large degree of overlap was noted for these categories. Almost one fifth of the trees showed some signs of dieback and around one fifth had dead limbs either attached or on the ground nearby. The other attributes were all recorded in lower proportions.
- 3.3.10 Just over half of the trees recorded showed no signs of browsing (53%). This proportion remains similar when looking at saplings only, rather than all trees (52%), and natural regeneration in particular (51%). However, the proportion is comparatively much higher when looking at the number of planted saplings showing no signs of browsing (95%); this appears to align with the fact that a high proportion of planted saplings (79%) are within fenced areas.
- 3.3.11 Various other attributes were recorded, including altitude, approximate height and stem diameter, crown shape and the presence of lichens or fungi. In combination, the data recorded help to build up a picture

of the open grown trees present across the commons of Holne Moor. These data will form a useful baseline for assessing change over time and will be used to inform future management decisions. Repeating this survey in future, perhaps at intervals of 10-15 years, would help to build up a picture of change in tree cover across these moorlands over time.

- 3.3.12 If the survey is to be repeated in future, it is recommended that the recording process is adjusted to reduce the subjective nature of some of the attributes. For instance, with regard to assessing ground conditions and level of browsing, these factors were qualitative and subjective and, in some cases, may not have been entirely obvious to the volunteers. Accounting for this in future surveys would provide a more robust data set and allow additional analysis to be undertaken.

4.0 PROPOSALS FOR INCREASING TREE COVER

4.1 Phase 3: Increasing Tree Cover

4.1.1 Various approaches to increasing tree cover have been considered. These include:

- Natural regeneration, for example leaving fenced areas free of browsing or adjusting the current grazing regime to enable naturally occurring regeneration to become established and to test the efficacy of stored seed already present;
- Conventional planting of ‘whips’ using tubes and stakes and standard spacing;
- Very dense planting of whips/bare root stock that allows the density of planting to act as the protector;
- No till type planting, using collected local seed spread in fenced areas.

4.1.2 Following completion of the survey of open grown trees on Holne Moor, a number of areas have been identified which could potentially be suitable for increasing tree cover. The survey results show that there is already considerable natural regeneration occurring on Holne Moor. The approach for increasing tree cover therefore focusses on encouraging and protecting this natural regeneration, by reducing grazing/browsing pressure in key areas through the use of fencing.

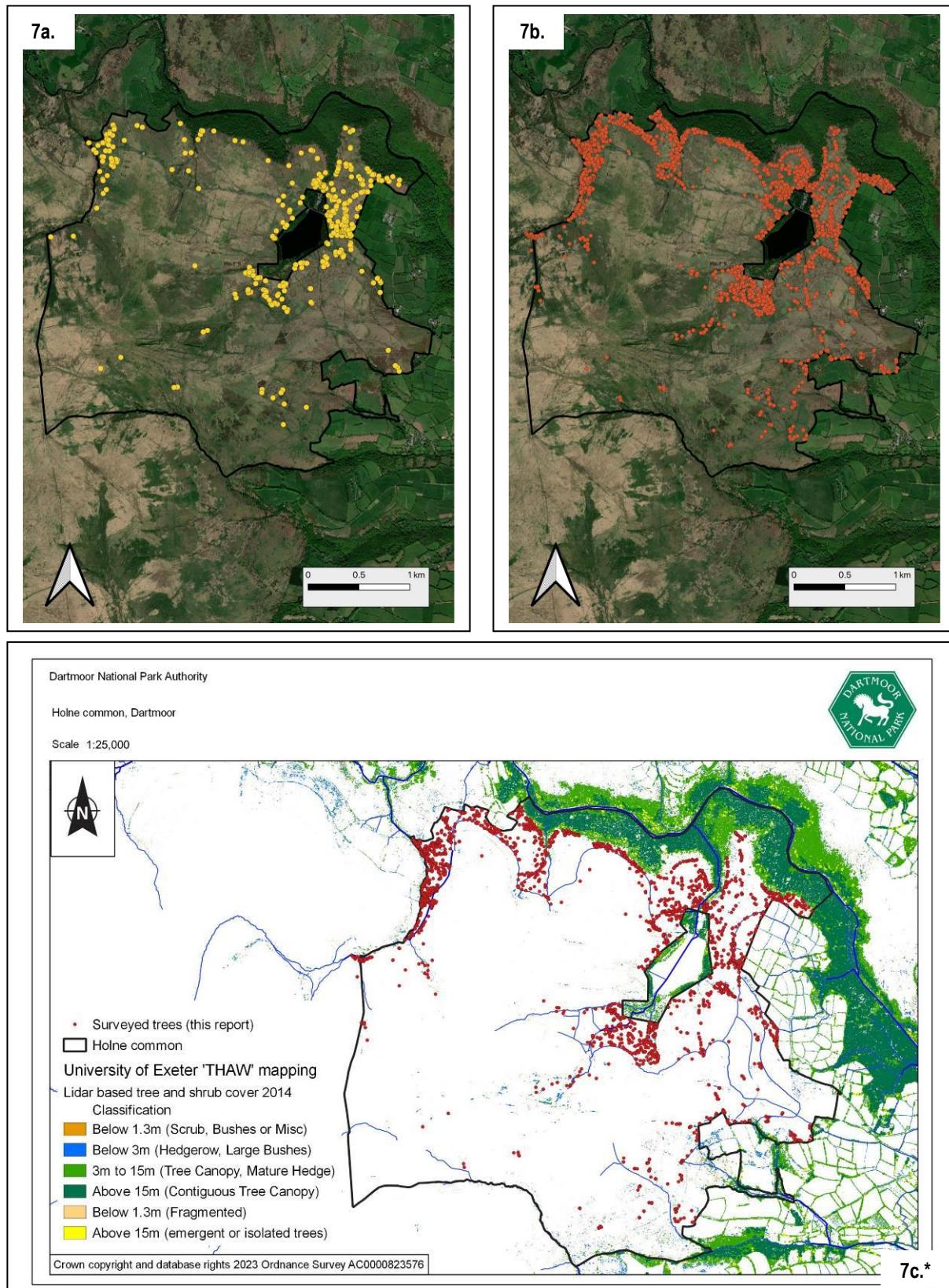
4.1.3 The proposal to encourage natural regeneration has inherent advantages over other methods, including biosecurity benefits; the fact that the trees will be those that are naturally suited to the particular growing conditions in which they are found and of having established root structure and health. In addition, the costs associated with encouraging natural regeneration will be lower compared to planting.

4.1.4 Subject to the necessary consultation and constraints checking, the recommendation is to extend existing areas of tree cover at the edges of the common, for instance in proximity to the River Dart and surrounding Venford Reservoir, further out into the common by the use of protective fencing. The aim would not be to create new areas of woodland, but rather to encourage the regeneration that is already naturally occurring in these areas (Map 7a) and promote the development of additional wood pasture type habitats around the site, with scattered trees present through areas of grassland and moorland. These areas will require ongoing monitoring and management to ensure that the fenced areas do not simply turn into woodland over time.

4.1.5 In order for any increase in tree cover to fit with the management requirements of the site, the proposals will need to be developed with landowners and commoners as well as other stakeholders including DNPA and Natural England. It is understood that discussions are currently underway regarding the renewal of the Higher Level Stewardship agreement for Holne Moor; it is therefore recommended that these be extended to include discussion regarding a potential increase in tree cover. The intention would

be for the areas for increasing tree cover to be complementary in terms of land use and existing features of importance.

Map 7: Potential Areas for Increasing Tree Cover (a. saplings results; b. all data points; c. THAW mapping)



- 4.1.6 It should be noted that this report focusses on where increasing tree cover could be feasible, based on the survey results, and does not look for reasons why particular areas should not be considered. Clearly there will be constraints which mean increasing tree cover may not be a viable option for certain areas; for instance, the above mapping does not include any archaeological or farming constraints. Therefore, stakeholder consultation will need to be carried out, prior to any practical work beginning on the ground, in order to identify any constraints which may impact on the proposals for increasing tree cover.
- 4.1.7 A number of important constraints will need to be considered as part of the consultation process. Holne Moor is a farmed landscape and it is essential that the proposals for increasing tree cover will work in this context. It is known that the majority of the common lies within an area of high nature conservation significance, which is reflected in its inclusion within both a Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI): Dartmoor SAC and South Dartmoor SSSI. A number of important wildlife species are found here, including whinchat and high brown fritillary butterfly, which must be taken into consideration: increasing tree cover in fritillary butterfly areas would not be beneficial as this species requires open sunny habitats; scattered trees may be beneficial in some key bird areas, but this will require specialist input from the RSPB. The area is also of high archaeological importance and the proposals will require specialist input from DNPA on this subject prior to final agreement.
- 4.1.8 The aim would be that increasing tree cover in certain areas would provide numerous benefits in terms of natural capital and ecosystem services. As part of the stakeholder consultation process, it is important that wider issues are considered, such as whether the areas proposed as potentially being appropriate for increasing tree cover are of existing value - for instance ecological, archaeological or agricultural - to which an increase in tree cover would be detrimental.
- 4.1.9 Using the results of the tree survey, in combination with other available information (see Appendix 3) such as the RSPB's 'Key Moorland Bird's on Your Common', proposals for increasing tree cover on Holne Moor will be subject to consultation with stakeholders such as DNPA's Ecologist, Historic Environment Officer and Dartmoor Headwaters Project Officers, the RSPB, Natural England, Butterfly Conservation and Moor Trees. For example, there may be potential benefits for key species such as whinchat, following consultation with the RSPB, as well as for natural flood management by following flowpathways and focussing on riparian areas, following consultation with the Dartmoor Headwaters Officers.

* Note: Mapping output from the [THaW mapping toolbox](#) - developed by Luscombe, David; Gatis, Naomi; Carless, Donna; Brazier, Richard and Anderson, Karen, as a SWEEP project in partnership with the, Forestry Commission, North Devon Biosphere reserve and Dartmoor National Park Authority. Please contact D.J.Luscombe@exeter.ac.uk for data enquires. Data will be available under a CC BY-NC-SA 4.0 license, following publication. © 2021.

- 4.1.10 All necessary consents will need to be put in place before work can begin on the ground. In addition to agreement from landowners, commoners and other stakeholders, this will include measures such as registering with the Rural Payments Agency any change to non-agricultural land, and also seeking consent from the Planning Inspectorate on behalf of the Secretary of State for Environment, Food and Rural Affairs to carry out any works that would prevent or impede access to common land, such as fencing. In certain circumstances¹, where the aim is nature conservation, it is understood that it is not necessary to seek consent for temporary fencing of moorland areas for up to five years.
- 4.1.11 Once the consents are secured, fencing and potentially also guards would be erected around areas where groups of naturally occurring saplings have been mapped. Depending on timings for seeking agreement and consent, it is anticipated that this work could begin on the ground in 2024. Opportunities for seeking match funding for the practical element and ongoing monitoring of this project will also be investigated.
- 4.1.12 It should be noted that, at this stage, the proposal would be to increase tree cover in a small number of trial areas through the protection of natural regeneration, rather than carrying out large-scale tree planting. However, if it were considered appropriate, and subject to the necessary agreement, consents and funding, this preparatory work could potentially be used to input into a wider tree regeneration initiative at a later date.

4.2 Future Management and Monitoring

- 4.2.1 The management objectives and opportunities of any increased tree cover will need to be considered beyond the small-scale trial plan which forms part of the current project. Management approaches will need to have overarching objectives which could include:
- Ensuring the continued widespread and dispersed tree cover on the moor of primarily hawthorn.
 - Connecting or extending existing areas of trees along rivers. One area it is felt trees could make a significant difference is in creating connectivity between established woodlands. This would create an ecological corridor that will contribute to soil health and, in the long-term, allow for natural genetic diversity to be increased in the tree cover.
 - Creating an environment of montane scrub that could include widely dispersed trees leading down in altitude to scrub and further down into river valleys of ribbons of willow/alder and oak woodlands.
 - Investigating how tree cover can work with and enhance grazing potential on the moor.

¹ The area to be fenced off must be less than 1% of the area of the registered common (in combination with other areas if applicable), the work must be done by or with written consent from the landowner and there must be written agreement with Natural England or the Secretary of State requiring the conservation of nature (Gov.uk, 2022).

4.2.2 At the point where planting plans are confirmed, a long-term monitoring plan needs to be put in place. The current project is funded to the end of 2024. Monitoring beyond this time needs to consider:

- Continued monitoring of all saplings and growing conditions in the first five years, ensuring any fencing and other protective measures such as brash piles or growing vegetation (e.g. gorse and bramble) remain in situ and in functional condition and are fulfilling their roles of protecting tree growth.
- Carrying out practical works on the ground to address any issues that are identified through this monitoring programme.
- Monitoring of tree growth over a ten-year period to inform future planting plans.
- Before the end of the five-year fencing period, an assessment needs to be made of any fencing to decide if it can be removed or if an application will need to be submitted for its retention beyond that period. Ideally it should be removed at the earliest point at which the trees are thought to be established enough to withstand environmental threats and grazing.

5.0 CONCLUSIONS

- 5.1 A citizen science survey of open grown trees on several Dartmoor commons, including Holne Moor, has been carried out by a group of volunteers, led by Corylus Ecology and Evolving Forests, working with the Foundation for Common Land. The survey methodology was designed in consultation with Dartmoor National Park Authority and refined following consultation with local commoners.
- 5.2 This work has been carried out in relation to a tree regeneration project for several commons on Dartmoor, which forms part of the Our Common Cause ~ Our Upland Commons project. The work was funded by the National Lottery Heritage Fund and other partners, as part of the Our Upland Commons project led by the Foundation for Common Land.
- 5.3 The aim of this work is to address the core objectives of the project, which are to better understand the number, age, distribution and health of individual trees on commons and to inform two tree planting trial projects on Dartmoor. For Holne Moor, the methodology was adapted in 2023 to give a broader coverage of the area by surveying transects of some of the areas rather than an exhaustive search. There are a number of limitations of this type of survey but it is considered that the core objectives have been met. The findings of the survey have been used to develop proposals for increasing tree cover on Holne Moor, which are now available for further consultation with stakeholders.
- 5.4 The survey recorded over 4,200 trees across Holne Moor during 39 days of survey time carried out by 22 volunteers. At least 11 tree species were recorded across the survey area, with the majority being either rowan or hawthorn. The other species recorded were found in low numbers, including birch, willow, blackthorn, holly, oak, hazel, beech, alder and sycamore. Around half of the trees were recorded growing in groups of similar trees.
- 5.5 Almost three quarters of the trees recorded were either semi-mature or mature, compared to around one quarter of the recorded trees being saplings. A small proportion were dead or dying. Two thirds of natural regeneration and four fifths of planted saplings were found in areas protected from grazing/browsing.
- 5.6 A high proportion of the trees recorded were considered to be healthy and just over half showed no signs of browsing. Various other attributes were recorded, including altitude, approximate height and stem diameter, crown shape and the presence of lichens or fungi.
- 5.7 There is much additional analysis and interpretation that could be made from the data which have been collected; therefore, the raw data will be made available to the Holne Commoners' Association and other stakeholders, although it is important that the limitations of this survey should always be borne in mind.

- 5.8 Given the extent of natural regeneration compared to other areas surveyed, the proposal for increasing tree cover on Holne Moor focusses entirely on the protection of naturally occurring regeneration. This would be achieved through the use of fencing in areas to be agreed with relevant stakeholders. The proposals will be refined, if necessary, following consultation. Working with nature, through encouraging natural regeneration rather than importing trees, will mean environmental good practice can be followed and biosecurity can be maximised.
- 5.9 The citizen science surveys undertaken on Holne Moor, in addition to those on Harford and Ugborough Moors and Walkhampton Common, have provided a unique insight into the southern part of the moor. We would recommend that, if possible, areas on the east and north of the moor be considered for future surveying as both areas offer differing habitats and environmental conditions. This would give a fuller picture of the state of trees on the moor and allow a more complete analysis of future potential.

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and

Mapping output from the [THaW mapping toolbox](#) - developed by Luscombe, David; Gatis, Naomi; Carless, Donna; Brazier, Richard and Anderson, Karen, as a SWEEP project in partnership with the, Forestry Commission, North Devon Biosphere reserve and Dartmoor National Park Authority. Please contact D.J.Luscombe@exeter.ac.uk for data enquires. Data will be available under a CC BY-NC-SA 4.0 license, following publication. © 2021.

APPENDICES

Appendix 1 – Survey Form

13:40 ⓘ

Healthy Trees survey ⓘ

GPS Show on map

Accuracy: 11m

Volunteer username
Example name

Date
Choose date ⏺

Common name
 Ugborough
 Harford
 Holne

Number of trees
 Single stem
 Multi stem/ Coppice
 Group

Photo of tree
Place your meter stick against the trunk. Standing back a few paces take a photo that allows full view of the tree - base to canopy

Send Queue Map Settings

13:40 ⓘ

Healthy Trees survey ⓘ

Species

- Alder
- Beech
- Birch
- Blackthorn
- Hawthorn
- Hazel
- Holly
- Oak
- Rowan
- Sycamore
- Willow
- Other

Crown shape
Please refer to your Survey Guide for images

- Spreading
- Oval
- Fan
- Cone

Send Queue Map Settings

13:40 ⓘ

Healthy Trees survey ⓘ

Height estimate (m)

Stem diameter estimate (cm)

Health
Please tick all that apply

- Healthy
- Fungus present
- Dieback present
- Leaf discolouration
- Root exposure
- Bare ground under tree
- Dead branch(es)/ limb(s) - attached
- Broken/ fallen/ dead limbs nearby
- Dead - on the ground
- Dead - standing

Presence of lichens
 Crustose

Send Queue Map Settings

Appendix 2 – Additional Results Tables

Sapling Detail

	Regeneration			Planted			Total
	No.	%	No.	%			
Total	965	98	-	19	2	-	984
Fenced	22	59	2	15	41	79	37
Protective vegetation	618	100	64	0	0	0	618
Within gorse	475	100	49	0	0	0	475
Within bracken	207	100	21	0	0	0	207
On bank/slope	177	90	18	19	10	100	196
Dry/free draining areas	181	100	19	0	0	0	139
Damp/boggy areas	105	100	11	0	0	0	105
Near river/stream/leats	70	100	7	0	0	0	70
Amongst rocks	25	100	3	0	0	0	25

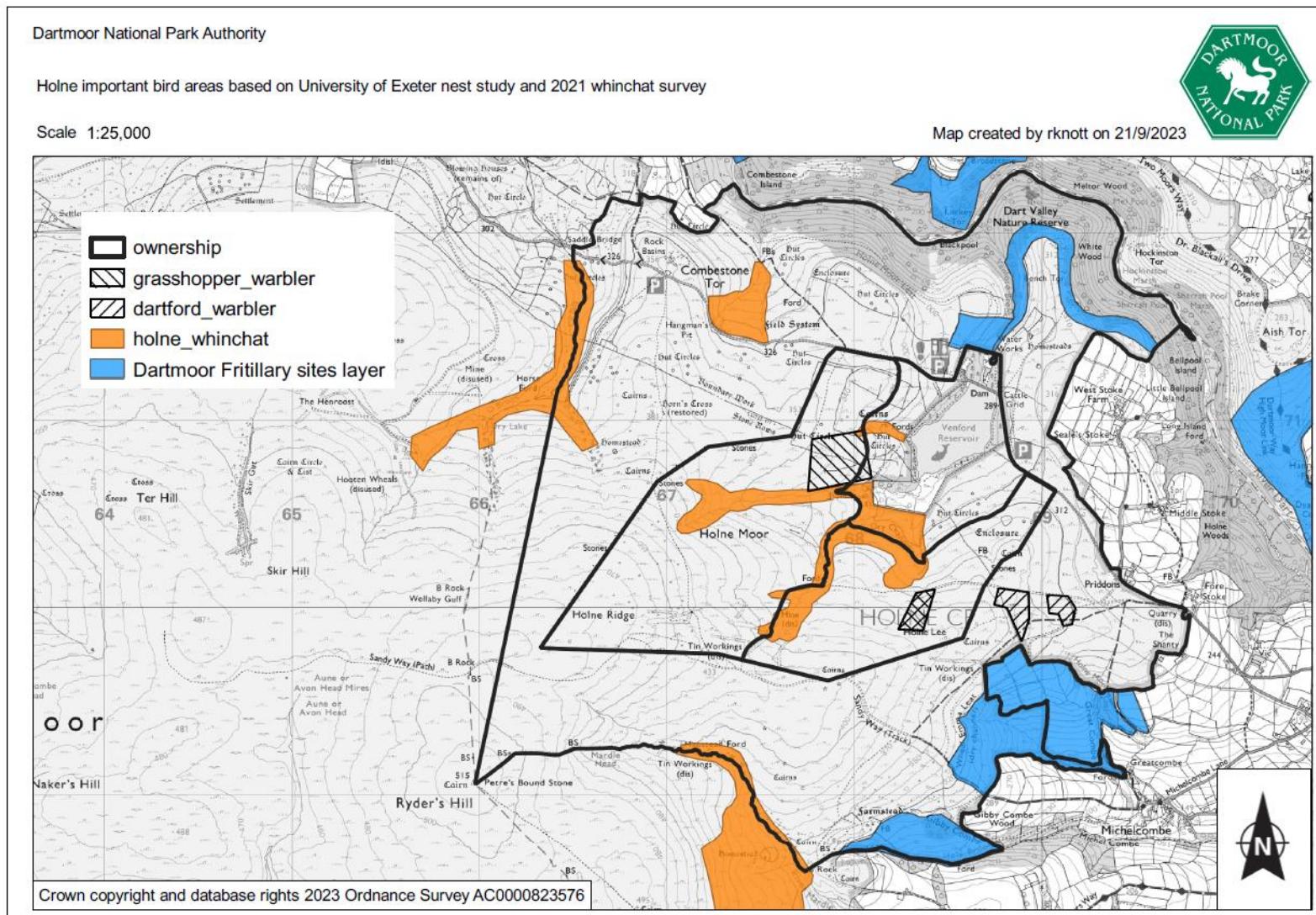
Table of Crown Shape

	Number	Percentage
Spreading	1,302	30
Oval	801	19
Fan	413	8
Cone	292	7
Windswept	224	5
Unclear / N/A	1,214 (saplings 984)	29 (saplings 23)

Table of Lichens/Fungi

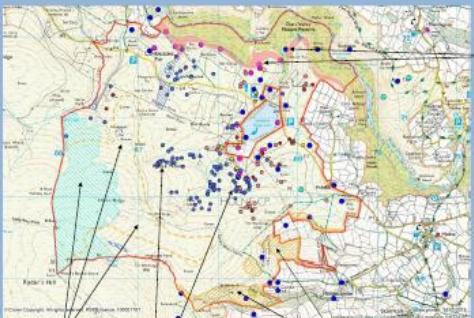
	Type	No. of types of lichen	No. of trees	Percentage	Notes
Lichens	Crustose, foliose & fruticose	3	1,718	40	
	Crustose & foliose	2	809	19	
	Foliose & fruticose	2	30	1	
	Fruticose & Crustose	2	15	0	
	Crustose	1	700	16	
	Foliose	1	35	1	
	Fruticose	1	5	0	
	No lichens	0	934	22	653 saplings, 202 semi-mature, 61 mature, 18 dead
Fungi	-	-	65	2	

Appendix 3 – Key Bird and Butterfly Areas



KEY MOORLAND BIRDS ON YOUR COMMON

HOLNE MOOR



The blanket bog and higher, open slopes support Skylark.

The irregular topography of the old tin streaming gullies offers shelter and the small damp combe and wet flushes with varied vegetation structure, support a high diversity of bird species including the declining Whinchat (small dark blue circle), a key species on this Common. Reed bunting also like the rank habitat in stream valleys.

The range of habitats present in Gibby Combe & Great Combe (gorse heath, scattered trees, bracken slope and acid grassland) suggest the combes may support a diverse bird community. Cuckoo frequent this area of the Common at the moorland fringe.

Stonechat and Meadow Pipit are widespread across the Common, nesting wherever suitable vegetation structure occurs. Stonechat & Linnet are associated with stands of more mature western & European gorse whilst Meadow Pipit selects areas of tussocky grassland & younger heathland habitat.

Recent surveys indicate that Dartmoor is fast becoming a crucial stronghold for many birds that are declining nationally and throughout lowland Devon.

It is the rich mosaic of habitats that attracts species to Dartmoor. These include the wide expanses of open heathland and blanket bog on the high moor, species-rich mires and wet pastures in the valleys, sheltered scrub and bracken slopes and woodland edge habitat at the fringes.

Despite supporting a healthy population of some species, Dartmoor's birds face challenges too. In some areas habitat remains sub-optimal, and there are also external factors to consider such as economic and public pressure, atmospheric pollution and climate change. Species at the edge of their breeding range are particularly vulnerable. It is therefore even more important that we provide the best habitat we can in order to build a resilient system for the future. Farmers and other landowners are a crucial part of ensuring this happens.



Potential to support the Dartford warbler? The UK represents the northernmost extent of its European range with breeding confined to southern England. It is reliant on heathland habitat with dense, bushy gorse or heather cover. It is entirely insectivorous and vulnerable to periods of very cold weather. The Devon population expanded in the 1980's, colonising east Dartmoor, including Holne Moor (turquoise circle on map above), but numbers crashed in the cold winters of 2009 & 2010, although recovered slightly since then.



STONECHAT

DARTMOOR IS A KEY STONGHOLD
RESIDENT all year. FOUND ON: heaths, moors, coasts within areas of low scrub & strongly associated with gorse. NEST well concealed on the ground in gorse, heather, bracken, bramble, often on low banks or slight breaks in slope.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---

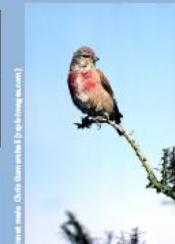


REED BUNTING

INCREASING ON DARTMOOR
RESIDENT all year. FOUND IN in boggy, damp habitats; valley mires, wet rushy meadows, occasionally in young conifer plantation. NESTS in rank, tall grass, sedges, rush tussocks - occasionally in bushes & small trees. (e.g. willow scrub).

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---



LINNET

WIDESPREAD BUT DECLINING: DARTMOOR MAINTAINS A GOOD POPULATION
RESIDENT/PARTIAL but drops to lower land in winter; some birds migrate to France & Spain. Found on gorse clad heath with rough grasses & thorn trees; usually at moorland edge. NESTS in gorse & small trees up to 2m and occasionally in bramble. Song perches important.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---



TREE PIPIT

DARTMOOR IS A KEY STRONGHOLD
MIGRANT of heathlands and FOUND AT woodland edges, in clearings, on bracken slopes and in conifer clearfell. NESTS on the ground deep in grass tussocks, under dead bracken, bilberry and bramble adjacent to open ground.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---



MEADOW PIPIT

DARTMOOR IS A KEY STRONGHOLD
RESIDENT on Dartmoor all year. FOUND ON moorland, rough pasture & blanket bog in low, continuous heath and coarse grassland vegetation. NEST on the ground well hidden in grass tussock, heather or western gorse. Key host of the cuckoo.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---



WHINCHAT

SOME DECLINE BUT DARTMOOR STILL A KEY STRONGHOLD
MIGRANT of moors, heaths, long grasslands and bracken slopes. NEST on the ground well hidden under small bushes, bracken (both live and the litter) and grass tussocks. Perches, whether small trees, bracken stems or the remains of burnt gorse are an important feature of their habitat.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---



YELLOWHAMMER

NATIONAL & DEVONWIDE DECLINE BUT SOUTH AND EAST DARTMOOR REMAIN A STRONGHOLD
RESIDENT in UK all year in mixed farmland and on gorse-covered moorland fringe with scattered trees. NESTS on the ground at the base of hedges, gorse bushes and small trees under dead bracken and bramble. Song perches important.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---



CUCKOO

NATIONAL DECLINE BUT DARTMOOR STILL A KEY STRONGHOLD
MIGRANT of moors & heaths with scattered trees; found at the moorland fringe. Lays its eggs in the nests of other birds, especially the ground nesting meadow pipit. Uses trees as perches to scan for host nests; large, hairy caterpillars are a key food source.

Nesting season

J	F	M	A	M	J	J	A	S	O	N	D
---	---	---	---	---	---	---	---	---	---	---	---

Data sources: Devon Bird Atlas 2007-2013 Editors Stella Beavan and Mike Lock , BTO/JNCC/RSPB Breeding Bird Surveys UK and England, BTO Birdtrends (bto.org/about-birds/birdtrends/), Dartmoor ring ouzel surveys 2010-2018, Dartmoor Shrike surveys 2008/09.
Note: declines are based on recent data but not all exactly the same time period.

Appendix 4 – Areas of interest seen on Dartmoor to date with increased natural or planted trees that may provide evidence or examples for future planting plans

1. Chinaclay works, Cadover Bridge

Multiple areas of extensive new planting in fenced enclosures of roughly 1-3 ha each. Mixed broadleaves. Too extensive an area for this project but the size and density of planting may give some environmental protection and enhance early-stage growth.



2. Powdermills, area above old works

Naturally regenerated (or possibly planted for the works) dense woodland in hollow progressing through lighter scrub to open moor. A possible small-scale model of a natural woodland thinning with altitude.



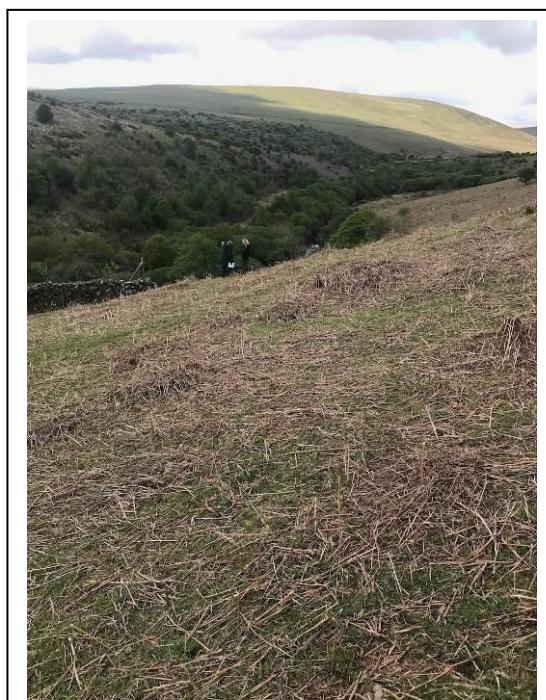
3. Bench Tor

In the survey area of Holne Moor. Dense woodland in steep stream bed giving way to montane scrub and open moor.



4. Burford Down, Erme Valley

Natural regeneration in large excluded area showing the likely natural progression of scrub and woodland, all be it on an east facing valley side.



5. Sherberton Common

New planting in tubes, no fencing, some dead hedging with gorse. Planted without fencing, would be a good area for monitoring success as a model of cost-effective planting within a grazed area.



6. Piles Copse

Very successful new planting as individual trees in "cactus" guards and excluded fenced areas. Some trees grown from seed originating in Piles Copse, others bought in from Moor Trees.



7. Small fenced enclosures, Harford

Experimental enclosures now c. 5-10 years old. Very little growth. The lack of growth in these areas could be exposure, soils or planting stock.

