



Dartmoor Healthy Trees Survey Report

for

Walkhampton Common, Dartmoor

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Date of surveys	May – July 2023	
Client name	Foundation for Common Land	
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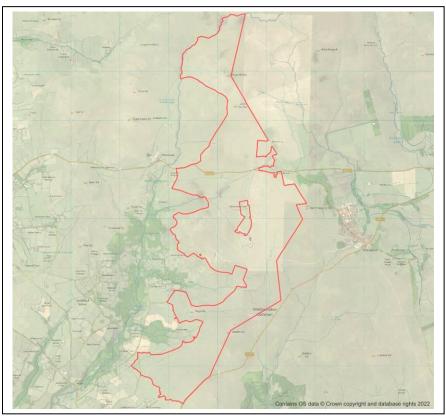
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1.0 INTRODUCTION

1.1 Corylus Ecology and Evolving Forests have worked with the Foundation for Common Land, in consultation with Dartmoor National Park Authority and Dartmoor Commoners' Associations, to develop a method for undertaking surveys of open grown trees on Dartmoor's commons. Surveys were subsequently carried out on a series of commons, including Walkhampton Common in the west of the national park, hereinafter referred to as 'the Site'. The Site is located at Ordnance Survey grid reference SX56507365 (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 core objectives are:
 - To better understand the number, age, distribution, 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 woodland 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.

1.4 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. 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.

1.5 The survey of Walkhampton Common was funded thanks to the Dartmoor Headwaters Project as part of the Our Upland Commons Project. Our Upland Commons is a £3 million project 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 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, including mapping and aerial imagery, 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 and adjoining areas to allow the survey to be tailored to the specific conditions of each area. This rapid assessment was an informal coverage of the area on foot 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 avoid any quarry areas. 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.

2.2 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, suitable for use by volunteers and for covering large areas. The technique had to be suitable to accommodate a variety of landscapes, such as:
 - Exposed moorland tops with individual scattered trees and little or no regeneration;
 - 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 Discussions were held with other organisations, such as Historic England, regarding potential recording techniques. In addition, investigations were carried out into potential apps to use for the survey recording form and mapping, particularly looking at GIS Cloud.
- 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 volunteers for the 2023 survey season, to look at Walkhampton Common. The project was advertised through relevant local Facebook

groups (e.g. Plymouth Tree Partnership, Walkhampton Village Hub, Dartmoor National Park, Ashburton and Ivybridge Facebook pages, Dartington Noticeboard Facebook page), DNPA's volunteer network and extensive networks of Corylus Ecology and Evolving Forests.

2.2.5 In order to trial different approaches to this type of citizen science survey, the 2023 surveys including Walkhampton Common, were undertaken by using a different approach to those carried out previously. A series of volunteer survey days were undertaken during the period May to July 2023, with small groups of volunteers working with individual members of the project team following an initial project briefing and training session. The area was divided into survey patches, as for the 2022 surveys, but rather than pairs of volunteers being assigned a patch to survey in their own time, the approach in 2023 involved a group surveying a patch or several patches on any given survey day through the season.





- 2.2.6 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

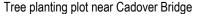
- Presence of lichens or fungi.
- 2.2.7 For trees growing in a group of similar trees of the same species, the number of trees in the stand was also recorded. Additional details were recorded for certain attributes, such as ground conditions where saplings were recorded, details of browsing damage, presence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

3.0 RESULTS

3.1 Phase 1: 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. Following investigations into various apps available for this type of survey, GIS Cloud was considered to be the most suitable for use in this case (see Appendix 1).
- 3.1.2 Following development of an online recording form for the healthy trees survey during 2022, 20 licenses were purchased from GIS Cloud for use of their app in 2023. The form was 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 phase and initial site assessments included meeting the landowner on Walkhampton Common, 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.







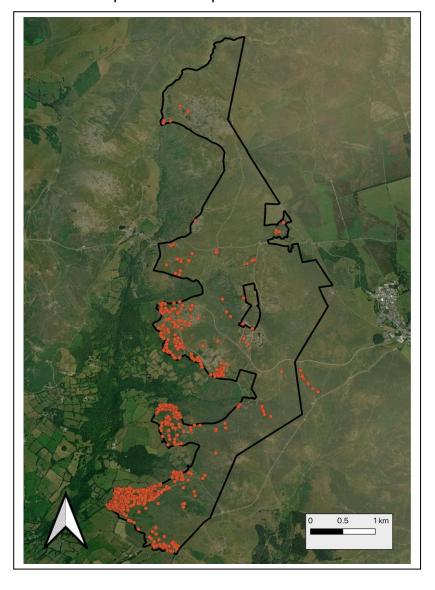
Regeneration plot on Harford Moor

3.2 Phase 2: Healthy Trees for Tomorrow Survey

- 3.2.1 During 2023, a total of 1,376 trees and groups of trees were surveyed across Walkhampton Common. This was achieved by 17 volunteers and six members of the project team during 204 hours of survey time.
- 3.2.2 A total of 1,079 data points (either individual trees or groups of similar trees) were recorded across Walkhampton Common during four survey events in May and June 2023 (shown as red dots on Map 2). In total this amounts to in excess of 1,376 individual trees recorded across Walkhampton Common¹. The majority of the trees recorded were found in the west of the area, in the sheltered moorland fringes close

¹ It should be noted that the survey looked only at trees whose canopy was not contiguous with trees in a woodland block.

to existing wooded areas and/or watercourses. By comparison, relatively few trees were recorded across the open moorland tops.



Map 2: All Trees/Groups of Trees Recorded

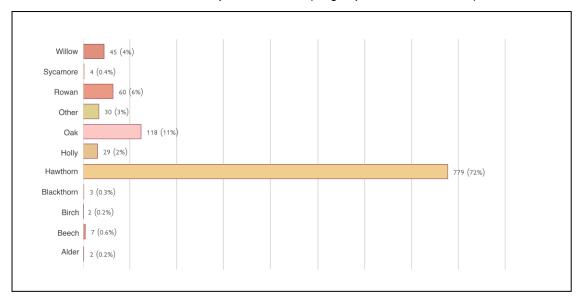
- 3.2.3 Of the 1,376 individual trees recorded across Walkhampton Common, the greatest number were hawthorn (886 trees or 65%), followed by willow (155 trees or 11%), oak (125 trees or 9%), rowan (71 trees or 5%) and beech (68 trees or 5%). The remaining species holly (29 trees), sycamore (4 trees), blackthorn (3 trees), birch (3 trees) and alder (2 trees) each formed less than 5% of the total (see Chart 1a).
- 3.2.4 Of the trees recorded, around one quarter (353 trees or 26%) were found in groups of trees of the same species and with all other attributes being similar within the group. The species most frequently found in groups were hawthorn and willow, followed by beech: 15% of hawthorns, 79% of willows and 96% of

beech trees were recorded within 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). For example, willow formed a lower proportion of the total data points recorded compared to oak. Although oak amounted to 9% of the total trees recorded, those found in groups only equated to 1% of the total trees or 11% of the oaks. Hawthorn and willow both had a similar proportion of trees found in groups (39% and 35% respectively).

Willow 155 (11%) 4 (0.4%) Rowan Other 30 (2%) 125 (9%) Holly 886 (65%) Hawthorn Blackthorn 3 (0.2%) Birch Beech Alder 2 (0.2%)

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





3.2.5 In relation to growth stages, for individual trees (Chart 2a), around half of all trees recorded were mature (696 trees or 51%), around one quarter were semi-mature (297 trees or 22%), one tenth were saplings (136 trees or 10%), one tenth were dead (143 trees or 10%) and less than one tenth were dying (98

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trees or 7%). The percentage breakdown of results for tree growth stages is broadly similar when considering individual trees or groups of trees (see Charts 2a and 2b for comparison).

10%

10%

7%

Unsure - 6

Dead - 143

Dying - 98

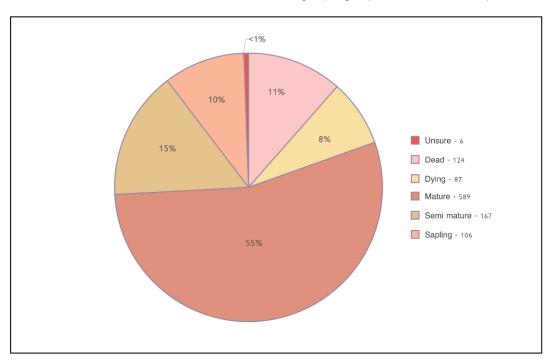
Mature - 696

Semi mature - 297

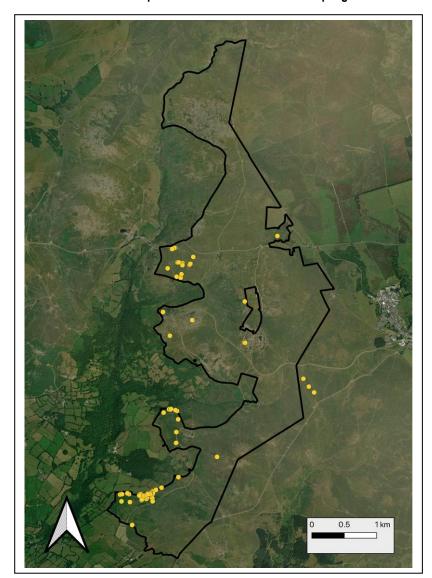
Sapling - 136

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





3.2.6 All of the saplings recorded across the survey area were considered to be natural regeneration. Where saplings were recorded (see Map 3), additional details relating to the conditions where they were found were also noted (see Table 1).

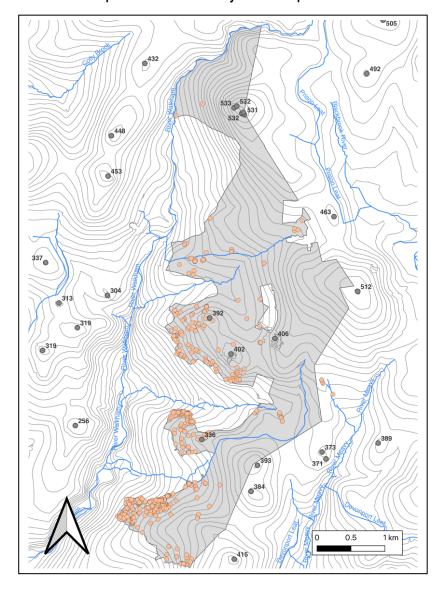


Map 3: Locations of All Recorded Saplings

Table 1: Sapling Detail

	No. of trees	Percentage (%)
Total	136	-
Dry/free draining	53	38
Open areas	27	20
Damp/boggy areas	6	4
Rocky areas	3	2
Protective vegetation	9	7
Within gorse	5	4
Within bracken	4	3
Fenced	0	0

3.2.7 53 of the recorded saplings (38%) were within dry or free draining areas and 27 saplings (20%) were in open areas. All other ground conditions were recorded in lower proportions: six saplings (4%) were recorded in damp or boggy areas and three saplings (2%) were recorded in rocky areas. None of the saplings were recorded as being within areas protected by fencing. Nine saplings (7%) were recorded in areas protected from grazing/browsing by vegetation such as gorse (five trees) and bracken (four trees).



Map 4: Locations of Healthy Trees/Groups of Trees

3.2.8 779 individual trees, or 57% of the total, were considered to be healthy (see Map 4) and 597 (43% of the total) were considered not to be healthy. 550 trees (40%) were recorded as showing signs of dieback, 413 trees (30%) had dead limbs or branches attached, and 333 trees (24%) had broken or fallen limbs nearby. 287 trees (21%) had root exposure, 95 trees (7%) had bare ground under the tree, and 33 trees (2%) had leaf discolouration. These categories tended to have a large degree of overlap, for example the

trees with dieback were also likely to have dead limbs attached or nearby, and trees with bare ground under the tree usually also had root exposure.

- 3.2.9 1,071 trees (78%) showed no signs of browsing, compared to 305 trees (22%) which 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 'old damage', 'wool on trunk', 'used as shelter' and 'minor browsing', to 'recent, severe', 'significant rubbing of bark, chunks of trunk missing' or 'almost dead from browsing above gorse'. However, it should be noted that identifying evidence of browsing is subjective and was often a feature that volunteers found more difficult to confirm.
- 3.2.10 A number of other attributes were recorded (see Charts 3-5), including altitude, approximate height and stem diameter, crown shape (e.g. fan, oval, spreading, cone, windswept) and the presence of lichens or fungi. Trees were recorded up to a maximum altitude of 460m, with 711 trees (52%) recorded at an altitude lower than 300m, 634 trees (46%) between 301m and 400m, and 33 trees (2%) above 400m (see Chart 3).

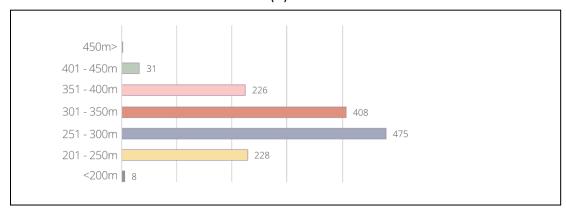


Chart 3: Recorded Altitude (m) of Individual Trees

- 3.2.11 Estimates of tree height ranged from 0.05m to greater than 16m, with almost half of the trees (672 trees or 49%) being less than 3m tall, almost one quarter (326 trees or 24%) between 3m and 4m tall, around one tenth (130 trees or 9%) between 4m and 5m tall as well as between 5m and 6m (154 trees or 11%), and 96 trees (7%) over 6m tall (see Chart 4). Stem diameter ranged from less than 5cm to greater than 100cm: 185 trees (13%) were in the smallest category of <5cm, 764 trees (56%) were between 5cm and 25cm, 340 trees (25%) were between 25cm and 50cm, and 87 trees (6%) were greater than 50cm (see Chart 5).
- 3.2.12 Regarding crown shape, of the 1,376 individual trees recorded, 329 trees (24%) were recorded as spreading, 298 trees (22%) were recorded as fan shaped, 235 trees (17%) unclear or not applicable, 82 trees (6%) cone, 73 trees (5%) oval, and 62 trees (5%) windswept (see Appendix 2).

Chart 4: Recorded Height (m) of Individual Trees

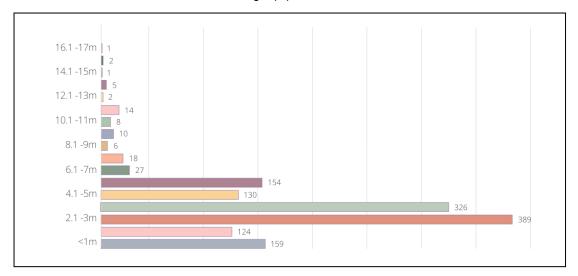
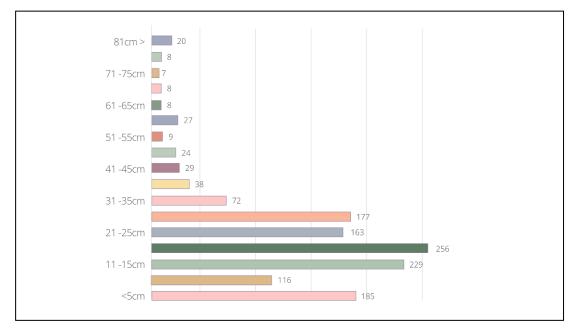


Chart 5: Recorded Stem Diameters (cm) of Individual Trees



3.2.13 Lichens can be broadly grouped into three main types: crustose (encrusting), foliose (leaf-like) and fruticose (branching). 540 trees (39%) had all three types (see Appendix 2). 154 had crustose and foliose lichens, 99 had foliose and fruticose, and 12 had crustose and fruticose. 62 trees had only crustose lichens, 38 only fruticose and 32 only foliose. 142 trees (10%) had no lichens recorded. Of those trees with no lichens, 98 were saplings, 23 were dead, 12 were semi-mature, 7 were mature and 1 dying. In addition, the presence of fungi was also recorded: 69 trees (5%) were recorded as having fungus present.

4.0 EVALUATION

4.1 Summary

- 4.1.1 By working with a group of volunteers during the summers of 2022 and 2023, Corylus Ecology and Evolving Forests have delivered surveys of open grown trees on several commons on Dartmoor. This has provided baseline information on the number, age, distribution and health of individual trees on these commons. The survey results for Walkhampton Common were gathered during May and June 2023, by 17 volunteers, during an estimated 204 hours of survey time.
- 4.1.2 Given the limitations of this type of survey, it is not intended that the results should be scientifically robust. 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.
- 4.1.3 This work was funded by the Dartmoor Headwaters Project, and has been carried out in relation to a tree regeneration project for several commons on Dartmoor, which forms part of the Our Common Cause Partnership funded by the National Lottery Heritage Fund and other partners. 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.

4.2 Phase 2: Healthy Trees for Tomorrow Survey

- 4.2.1 Around 1,400 trees have been recorded across Walkhampton Common. As had been expected, the majority of these trees were found along the western fringe of the site, at lower altitudes and close to existing wooded areas and/or watercourses, rather than on the high moorland areas. Relatively few trees were recorded across the open moorland tops. However, although the number of trees recorded in the more exposed and higher altitude areas was low, the presence of several saplings in some of the highest areas of the site, at an altitude of over 400m, is of particular interest.
- 4.2.2 At least 10 tree species were recorded across the survey area. Around two thirds of the trees recorded were hawthorn (65%) and around one tenth were willow (11%) and also oak (9%). The other species recorded including rowan, beech, holly, sycamore, blackthorn, birch and alder were found in small numbers. Around one quarter of the trees were recorded growing in groups of similar trees, particularly hawthorn, willow and beech. Whilst trees in groups accounted for a relatively low proportion of the hawthorns recorded (15%), the proportions for willow and beech were much greater (79% of willows and 96% of beech trees). For beech trees, this is potentially due to the fact these were often recorded on boundary features where they would have originally been planted, whereas for willow this is more likely a reflection of the growth habit and habitat preferences of willows.

4.2.3 Around half of all trees recorded were mature (51%), almost one quarter semi-mature (22%), and around one tenth each for saplings (10%), dead (10%) or dying (7%). Almost four fifths of trees recorded (78%) showed no signs of browsing, however, this figure needs to considered alongside the possible difficulty in identifying the presence of browsing. Whilst the figure for browsing is encouraging, it is important to note that almost three quarters of the recorded trees are mature, dying or dead, with saplings making up only one tenth of the trees recorded. These survey results imply that the tree population across Walkhampton Common is generally advanced and would benefit from rejuvenation.

- 4.2.4 All of the saplings recorded were considered to be naturally occurring. More than one third of all recorded saplings (38%) were in areas noted as being dry or free draining, with one fifth (20%) recorded as being in open areas. Fewer than one tenth of the saplings (7%) were noted as being within areas of protective vegetation, and none were noted as being protected by fencing. It would be interesting to revisit the recorded saplings in the next few growing seasons to see what proportion of the trees survive compared to those that suffer browsing or other damage.
- 4.2.5 Over half of the trees (57%) were considered to be healthy. 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. It is important to note that this survey was not an arboricultural assessment; however, based on the findings of this survey, further investigation is recommended to assess the implication that almost half of the trees recorded (43%) may be unhealthy. These results for tree health possibly arise from issues relating to the recording process and methodology, but it is important that this issue is considered in more detail.
- 4.2.6 Various other attributes were recorded, including altitude, approximate height and stem diameter, crown shape and the presence of lichens or fungi. It would be interesting to carry out further research into the tree population found on Walkhampton Common, for instance to provide a greater understanding of the health, age structure and likely future establishment of natural regeneration into the future.
- 4.2.7 In combination, the data recorded help to build up a picture of the open grown trees present across the commons involved in this project, including Walkhampton Common. These data will form a baseline for assessing change over time and will be useful for informing 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.
- 4.2.8 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.

5.0 CONCLUSIONS

A survey of open grown trees on Dartmoor commons, including Walkhampton Common, 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 Dartmoor Commoners.

- 5.2 This work has been carried out in relation to a tree regeneration project for several commons on Dartmoor. The work on Walkhampton Common was funded by the Dartmoor Headwaters Project and forms 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. An additional outcome of the 2023 surveys is to trial different approaches to this type of citizen science survey, which tested two different methods for recording trees with volunteers on Dartmoor.
- The survey recorded approximately 1,400 trees across Walkhampton Common by 17 volunteers during 204 hours of survey time. At least 10 tree species were recorded across the survey area, with the majority of trees recorded being hawthorn, followed by willow and oak. The other species recorded include rowan, beech, holly, sycamore, blackthorn, birch and alder. Around one quarter of the trees were recorded growing in groups of similar trees, particularly hawthorn, willow and beech.
- Around half of all trees recorded were mature, one quarter semi-mature, and around one tenth each for saplings, dying or dead. Over half of the trees were considered to be healthy and almost four fifths of trees recorded 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.
- The survey results imply that the tree population across Walkhampton Common is generally advanced and would benefit from rejuvenation. Further investigation is recommended, for instance to assess the implication that almost half of the trees recorded (43%) may be unhealthy, and to revisit the recorded saplings in the next few growing seasons to see what proportion of the trees survive.
- 5.7 The survey work undertaken on Walkhampton Common during 2023 has provided a unique insight into the western side of the Moor. This area has a different landscape to the other sites assessed through the Dartmoor Healthy Trees for Tomorrow project, being extensively quarried and also facing directly onto the prevailing weather. It is recommended that, if possible, areas on the east and north of the moor be considered for future surveying as both 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. In addition, 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.

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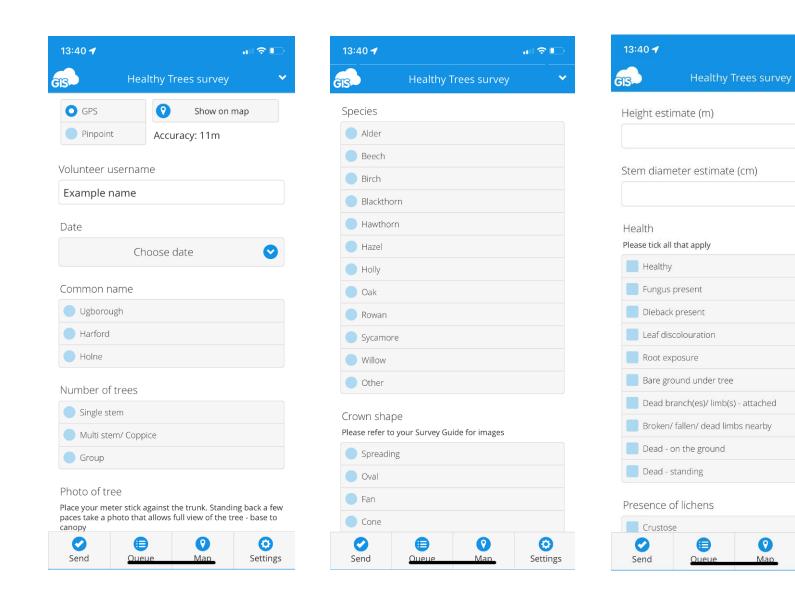
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APPENDICES

Appendix 1 - Survey Form



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Map

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Settings

Appendix 2 – Additional Results Tables

Table of Crown Shape

	Number	Percentage
Cone	82	6
Fan	298	22
Oval	73	5
Spreading	329	24
Unclear / N/A	235	17
Windswept	62	5

Table of Lichens/Fungi

	Туре	No. of types of lichen	No. of trees	Percentage	Notes
Lichens	Crustose, foliose & fruticose	3	540	39	
	Crustose & foliose	2	154	11	
	Foliose & fruticose	2	99	7	
	Fruticose & Crustose	2	12	1	
	Crustose	1	62	5	
	Foliose	1	32	2	
	Fruticose	1	38	3	
	No lichens	0	142	10	98 saplings, 12 semi-mature, 7 mature, 23 dead and 1 dying
Fungi	-	-	69	5	