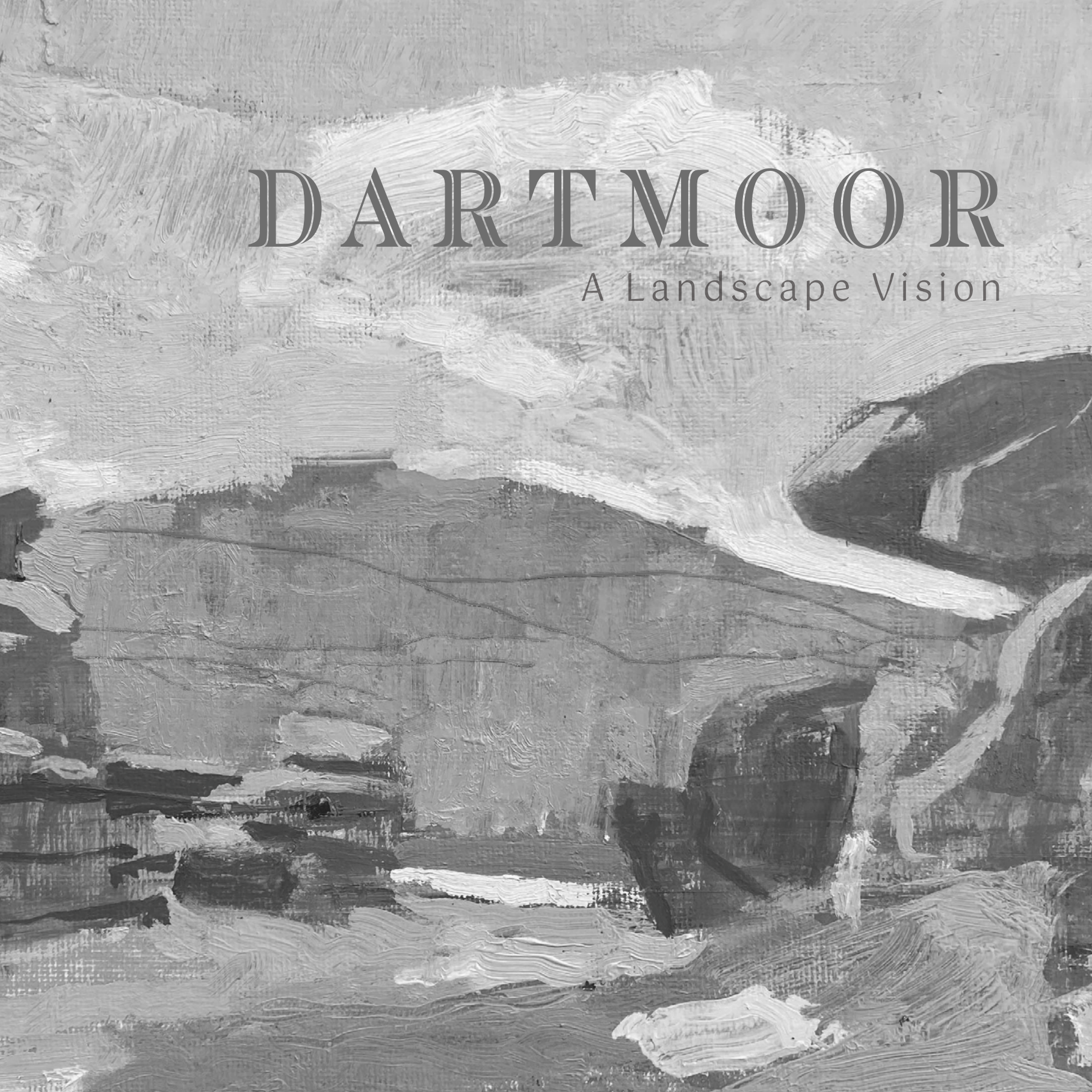

DARTMOOR

A Landscape Vision

Front Cover: Quentin Martin
Dartmoor - Oil on Canvas

MADE FOR & IN ASSOCIATION WITH
THE DUCHY OF CORNWALL & THE CENTRAL DARTMOOR FARM CLUSTER

ACKNOWLEDGEMENTS & THANKS

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Central Dartmoor Landscape Recovery Team:
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Consultees:
Dartmoor Commoners' Council, Forest of Dartmoor Association, Dartmoor Commons Owners Association, MoD, Common Cause Project, Dartmoor Pony Heritage Trust, Dartmoor Hill Pony Association, Dartmoor National Park Authority, Dartmoor Nature Alliance, Historic England, Dartmoor Preservation Association, Devon & Somerset Fire Service, Environment Agency, Forestry Commission, Natural England, Devon Wildlife Trust, Butterfly Conservation, Dartmoor Hill Farm Project, Devon County Council, Wildfowl & Wetlands Trust, Rewilding Britain, RSPB, South West Water, The Dartmoor Society, Westcountry Rivers Trust, Moor Trees, SW Peatland Partnership, Dart Fisheries and Conservation Association, Dartmoor Pony Moorland Scheme & numerous Dartmoor commoners and farmers.

Dr Abigail Entwistle and Rebecca Plant of Fauna and Flora International for helping guide the consultation process.

Thanks to Rob Hindle of Rural Solutions for his guidance and contribution to editing this vision.

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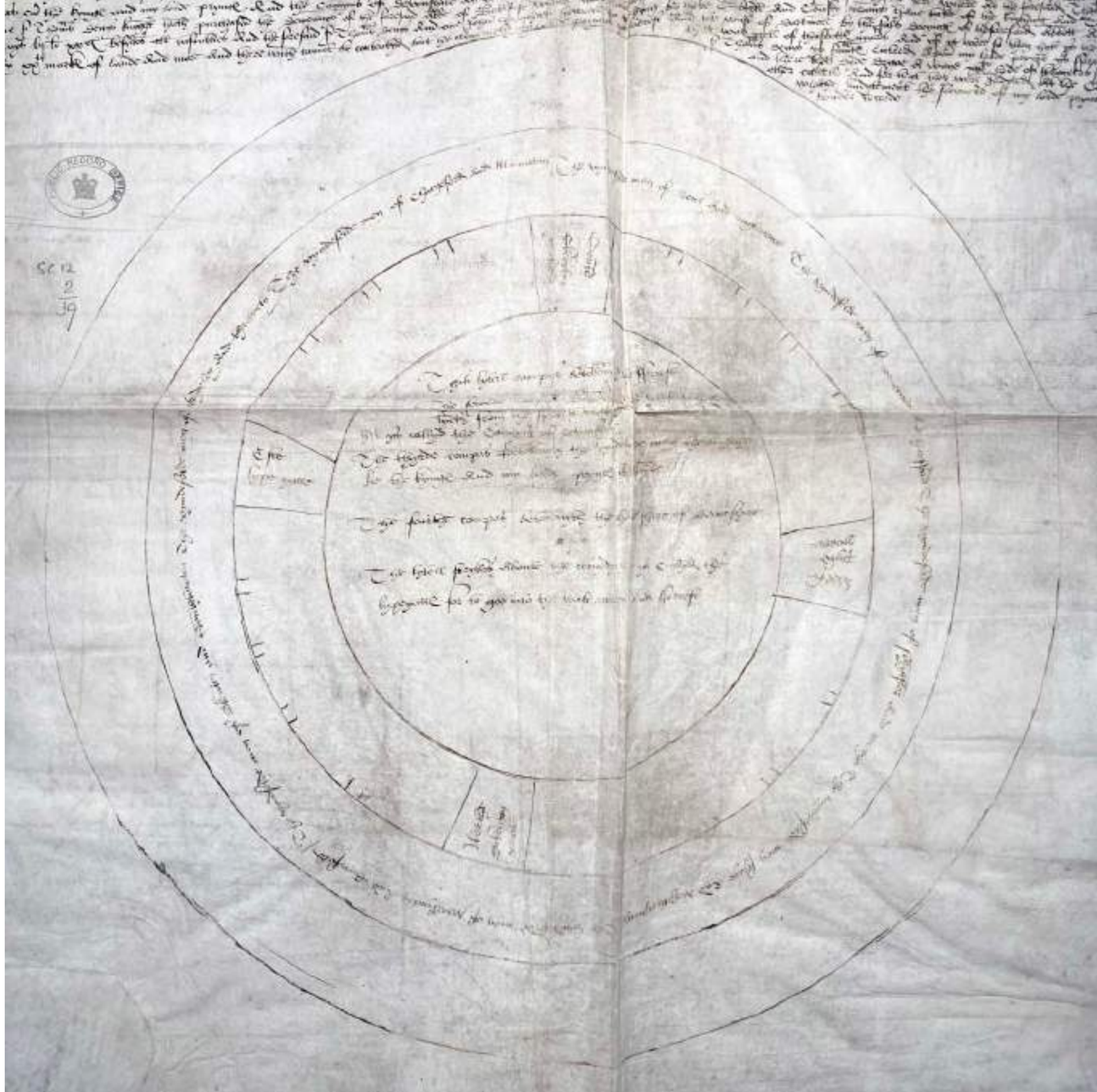
DUCHY of CORNWALL

CENTRAL DARTMOOR LANDSCAPE RECOVERY

Completed: April 2025
Document number: DAR-DIG-00-RP-0003 P10

Opposite:
16th century diagram of Dartmoor Forest
Public Record Office



Dartmoor is a magnificent and complex ecosystem - the balance between nature and people has evolved for thousands of years to shape the landscape we recognise today.

To keep Dartmoor special, we must respond to the twin challenges of global warming and the requirement to restore nature, while ensuring the communities on Dartmoor can thrive.

Like the thousands of young people who set out on the Ten Tors Challenge each year, knowing your destination is essential before setting off on any journey.

The Dartmoor landscape vision provides that destination. It shows us what might be possible and how that might be achieved. It is bold and ambitious and something that I hope, by working together can be delivered for not just the current generation but for generations to come.

HRH Prince William, Duke of Cornwall

Clapper Bridge
Credit: Ben Wrigley (Unsplash)

Foreword

This Study was inspired to achieve a consensus relating to the future management of Central Dartmoor's land and natural capital. It uniquely combines a review of literature, data, climate modelling, lived experience and opinion from a diverse range of stakeholders, culminating in the production of three visual impressions of what the majority of these stakeholders would like to see over time. These are reflective of the three recognised landscape forms of valleys and foothills, enclosed uplands and the high moor.

Alongside these are a series of suggested Key Principles and Management Actions, which are offered to inform and help shape management plans linked to the work of the Landscape Recovery Project and Duchy of Cornwall.

The work has been led by the Duchy of Cornwall and Central Dartmoor Farm Cluster. However, it has been designed with inspiration and learning from the whole of Dartmoor and has benefited from the input of a wide range of knowledgeable and interested parties.

Looking back to people's first footsteps on this great place, the underlying principles of management that stem from a system of pastoralism - underpinned by community - have always worked alongside nature's natural processes. Today, Dartmoor faces the most pressure it has experienced for generations. This Study and the discussions that have taken place along its journey usefully remind us of the importance of working at one with nature, attaching a truly integrated approach to future management, and ensuring everyone can find their place in this special landscape.

We thank you for your time and commitment to the process and hope that this work will help you by providing a useful platform through which to progressively move Central Dartmoor's management forwards in a way that is both environmentally and economically sustainable.

In particular we would like to acknowledge the dedication and commitment to Dartmoor and this project from Tom Stratton during his time as Land Steward for the Duchy of Cornwall.

Matthew Morris, Rural Director, Duchy of Cornwall
Claire Hyne, Project Manager, Central Dartmoor Landscape Recovery Project

Defining landscape

When we look out over landscapes, we see them created by three interwoven layers, ever shifting with geological time.

They are:

1) The inert materials which are under all our feet. Geology, and the form which it has taken over millenia.

2) The biological world which lives on this geology and has inhabited it and shaped it for millions of years. Soils, water, wildlife.

3) The people and cultures interacting with that living world and geology through actions of their daily lives and all their ancestors before them.

CONTENTS

A two stage process

This combined research and visioning document reflects two interwoven lines of work, which Digg & Co, the Duchy of Cornwall and the Central Dartmoor Landscape Recovery project team completed over the latter 6 months of 2024 and into 2025. They are:

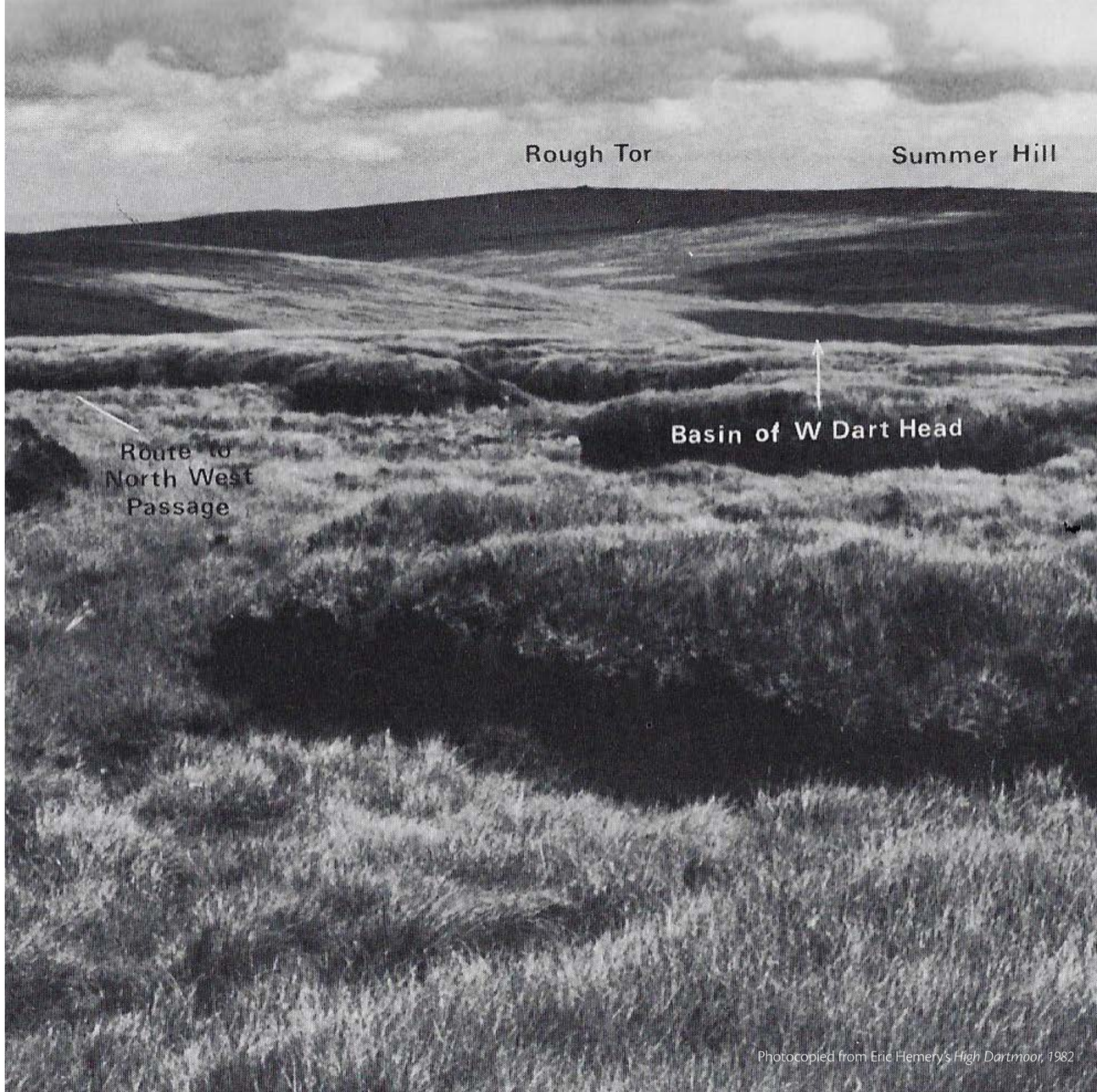
1. **A detailed landscape and literature review of Dartmoor.**

2. **A comprehensive stakeholder engagement process.**

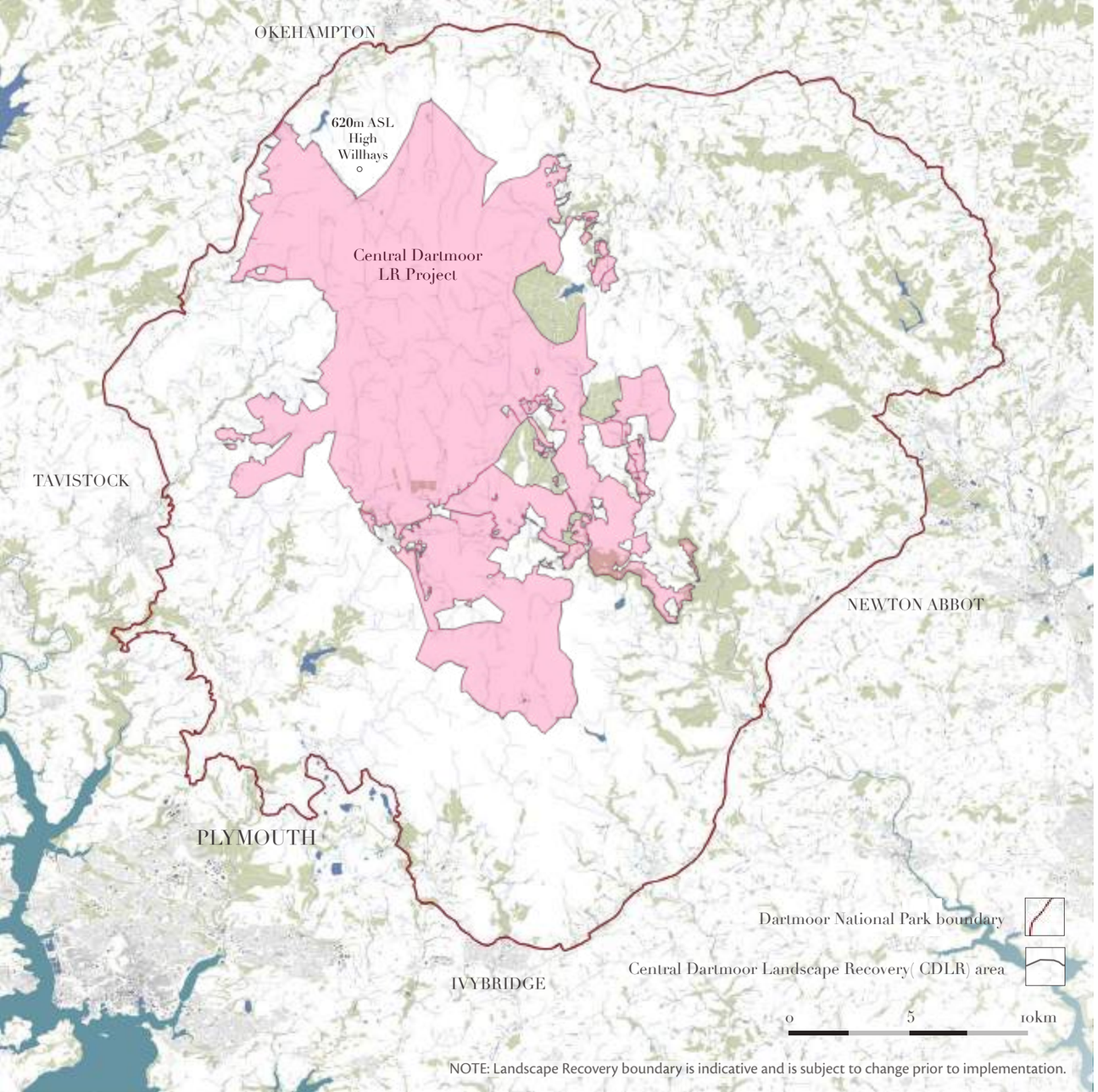
The ideas and future opportunities for landscape scale management presented throughout are the culmination of this work. Both these processes were designed to maximise the flow of information into one cohesive landscape vision, from which myriad actions are expected to emerge. They will shape the landscape in the years to come and will provide a sourcebook for ideas as we continue to rotate around the sun.

Thank you,
Toby

Studio Director - Digg & Co.



Photocopied from Eric Hemery's *High Dartmoor*, 1982



Map to show Central Dartmoor Landscape Recovery project within the National Park

1 Why this work, why now?

The work within was conceived and commissioned by two collaborating partners, the area of which is illustrated opposite. These are:

1) **The Duchy of Cornwall - who are devising and producing a new management strategy for their Dartmoor Estate.**

2) **The Central Dartmoor Landscape Recovery Project - which requires a project vision and direction to progress to tangible management actions.**

It builds on and is informed by the existing literature, and previous visioning work led by the Dartmoor National Park Authority (including the 2005 Moorland Vision) and the Partnership Plan A Vision for Dartmoor in 2045, together with the wealth of practical and learned experience from land managers, farmers and commoners.

The work has been produced to inform these plans and strategies. The key principles and management actions are aimed at both the Duchy Estate and Central Dartmoor Landscape Recovery Project area, however Dartmoor's ecosystem is not limited to this boundary, so it has been necessary to consider Dartmoor as a whole in our study and analysis.

Dartmoor is always changing and will forever continue to do so. However, it will be changing now faster than ever, in part due to climate change, but also through cultural and societal shifts in land-use. It is logical to adapt land-use and management in line with this speed of change, to be humble and practical in the face of seemingly conflicting data and to work mutually with the natural Dartmoor system, not against it.

In this Study we have deliberately prioritised storytelling over technical language so it can be shared with and used by as many people as possible. In so doing we hope that new ideas are formed, new relationships brokered, that misunderstanding is reduced, and divisions mended. Similarly, we have deliberately not reviewed policy. As ever, all land managers must work within the relevant policy context, but the detail of policy is not constant and will change within the timeline of this Study. The impact of policy will be relevant to individual strategies and land management plans and we anticipate this will be addressed accordingly

Finally, it has come to our attention after multiple months collating this work and speaking with so many people whose life is Dartmoor, that the future vision of this place, which we have sought to share through data and visualisation, is commonly held. Far from being divided and broken, the underlying unity we have experienced about a positive future for Dartmoor, is quite astounding.

DEVELOPING A SHARED LANDSCAPE VISION

So how does one, out of all this data, begin to craft this shared vision. Well, to be honest, it is both an art and a science. Throughout the process, one encounters more and more evidence which supports clear next steps. As more knowledge surfaces, much weight is given to certain things to preserve, enhance or change.

Sometimes ideas start as tiny conversations, which provide another thread to the rich tapestry of place, something we can then explore and discover. To function, this tapestry needs to be fully formed. As the data provides weight to logical key principles, we interweave these with ecological, social, cultural, economic and historic reference points to aim for a unified whole: the individual principles of which combine to create a shared holistic landscape vision.

Throughout this book you will see these key principles emerging. Please feel free to make your own too, for it will be the evolution of this work and its long-term management iterations that will see the landscape succeed. We will always have much more to learn!

Overleaf, you will see the suggested key principles, which we present now to inform the co-design of future farm/common management plans, landscape and estate scale strategies. They are listed here to give a summary of findings, but to understand why we think they should underpin the future landscape vision, you need to read further.

As ever, this will not happen overnight. We see this vision emerging over a period of 20 to 50 years plus.

Oil on Canvas. Dartmoor.
Credit: Quentin Martin

KEY PRINCIPLES (non hierarchical)

1. Maintain and increase upland **peatland restoration** and protection.

2. Where appropriate, advance the succession to **woodland within river valleys**. Protecting rivers from increasing rainfall. Work in an integrated way with multiple natural flood management techniques to develop catchment scale improvements.

3. Move towards landscape-scale, ecologically led, **grazing principles.** Rekindle herding and shepherding in line with scientific monitoring and system feedback.

4. **Reconnect** the natural habitats between upland areas and enclosed farmland. Promote species recovery within these.

5. Be open to **trial and change** (experimental mindset). Set up multiple ecological trials with the Landscape Recovery Project and Dartmoor Land Use Management Group's help.

6. Work at catchment scale to **enhance and protect the river systems** to work better in the face of climate change (slow upland flow to mitigate downstream impact).

7. Maintain ancient enclosed field patterns and improve or replace where lost, heritage field shapes. Invest in **repair of historic infrastructure** such as walls etc.

8. Prioritise **native species-rich habitats** and their adapted flora and fauna across all landscapes (in bye, newtake, high moor).

9. Use public money for public goods to support sustainable **farming and commoning** for environment, climate and food/fibre.

10. Support the provision of **quality, affordable homes** for those managing the landscape and retiring farmers and workers.

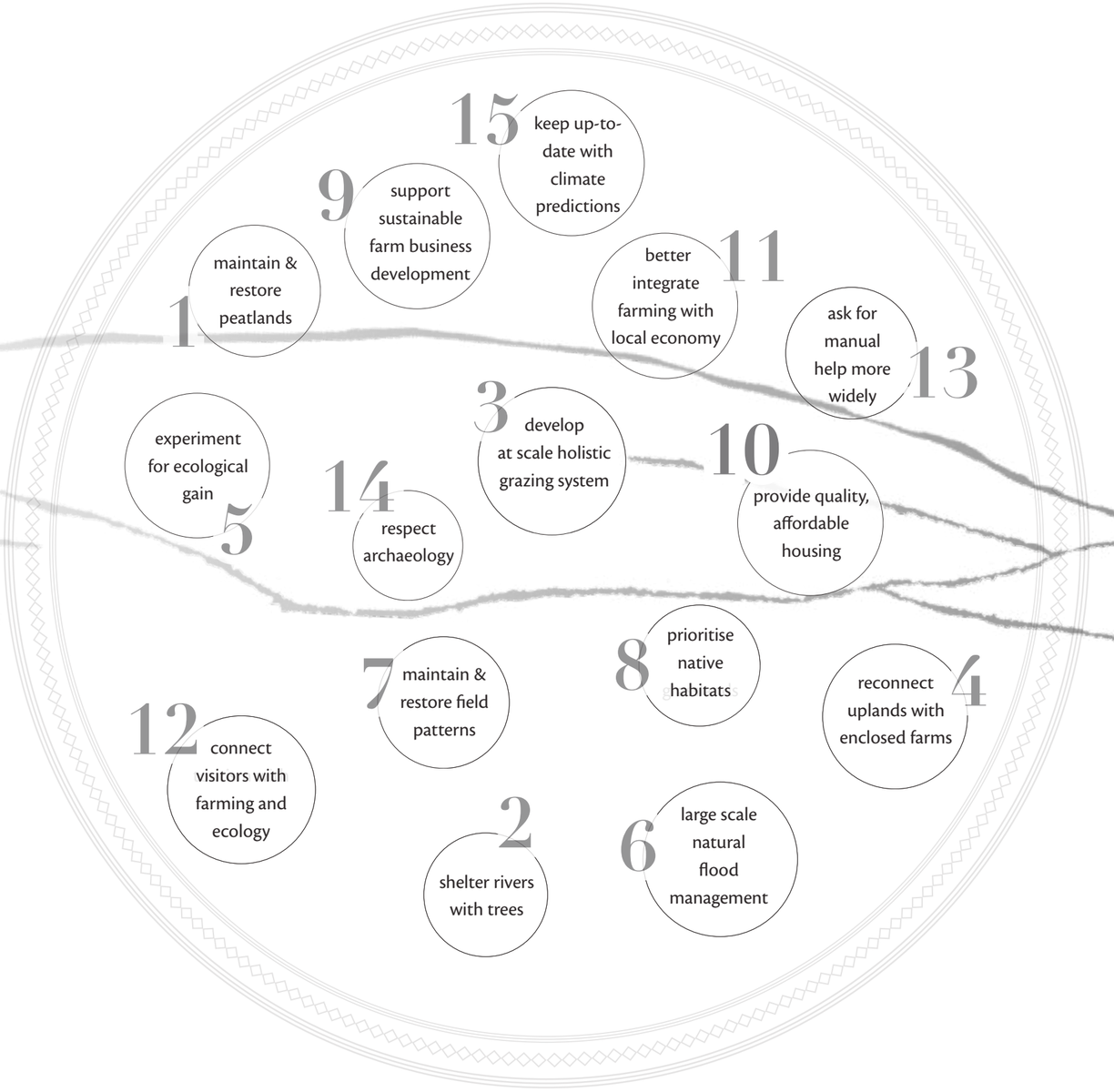
11. Improve integration and narrative of farming practices and products with **local economies** and businesses.

12. Improve and promote **visitor information** regarding to the relationship to farming and the environment.

13. Create a skills pool for **manual help**. (Assistance forum). Educate rural skills beyond the farming community.

14. Respect and maintain ancient **archaeology**, also aiding habitat complexity in the landscape through grazing requirements.

15. Combine local scientists and communities in work to evolve continually the habitats of Dartmoor in line with **up-to-date climate change predictions and scientific advances.**



II Landscape context

Dartmoor's unique geography and topography stems from its granite geology. This map highlights the natural zonation of the HIGH MOOR, ENCLOSED UPLANDS and VALLEYS & FOOTHILLS and how each of these merges into each other through the rising altitude.

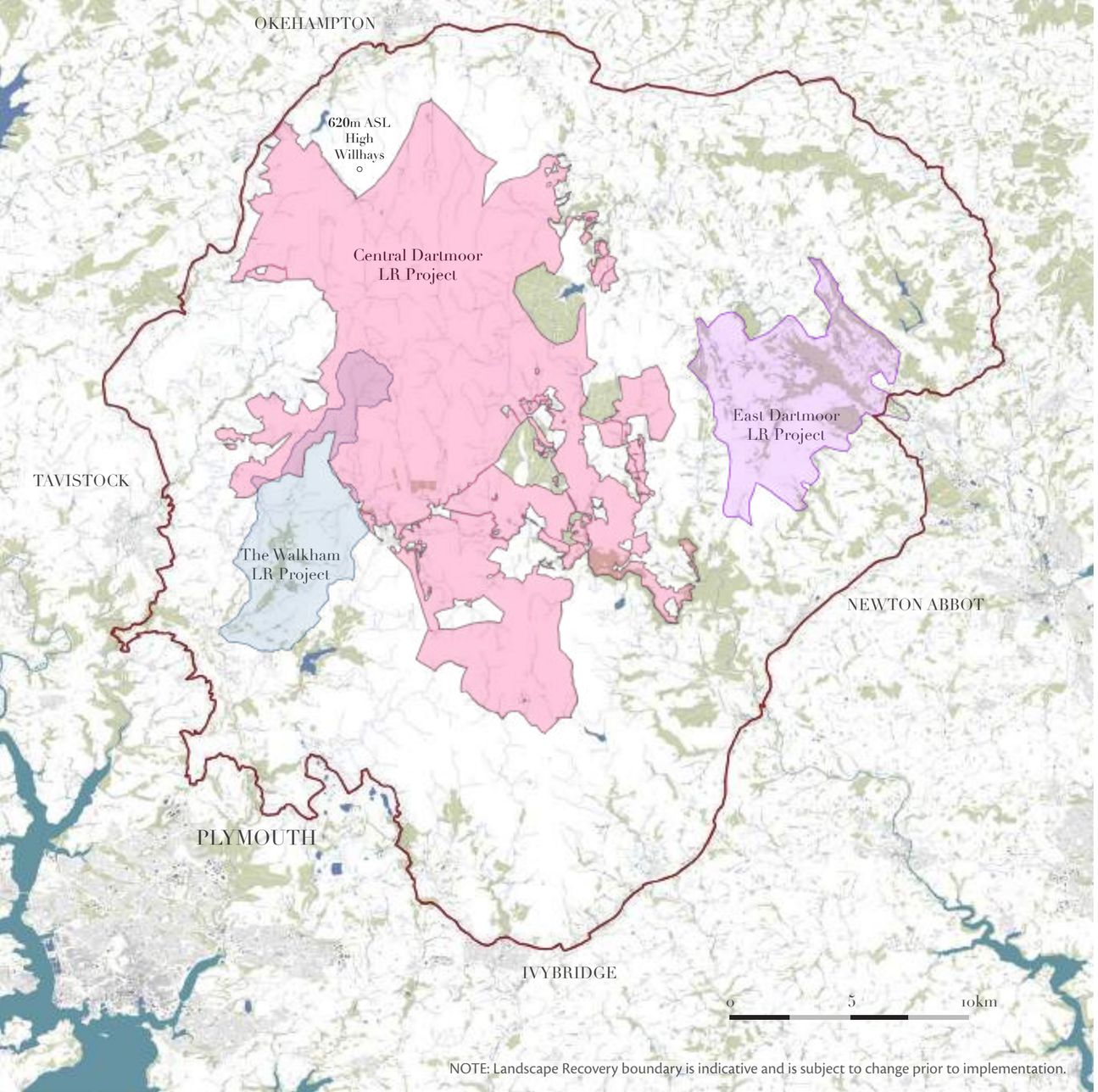
HIGH MOOR (**480-620**m ASL)

ENCLOSED UPLANDS (**350-480**m ASL)

VALLEYS & FOOT HILLS (**220m-350**m ASL)

The map shows how there are several very distinct habitat and landscape areas, all of which need to be given due attention when considering a holistic vision for Dartmoor. The 'Newtakes' represent the space between enclosed Dartmoor and the 'High Moor' and support sizeable livestock operations. They are the connecting glue of upland hydrology and peatlands and the more lush lowland rainforests and enclosed farmland. It is here, in the 'Newtakes', where much of Dartmoor's unique ecology resides.

Topographic map of Dartmoor



NOTE: Landscape Recovery boundary is indicative and is subject to change prior to implementation.

Map to show scale of all Landscape Recovery Projects within the National Park

The map opposite provides landscape project context.

The National Park Boundary (Red) highlights the extent of the Protected Landscape area, whose core goal is to uphold the special qualities and character of Dartmoor. It is within this envelope that the Duchy of Cornwall's holdings and Central Dartmoor Landscape Recovery Project sit (Pink). The other areas of colour highlight two more Landscape Recovery projects, which are simultaneously going through a process of visioning and delivery.

The Central Dartmoor Project covers much of the High Moor. An area of unenclosed upland which summits just below High Willhays (620m). It also takes in Newtakes and enclosed in-bye-farms, especially in the east and west Dart valley to the south east. At present the entire area is being surveyed using the UK Habitats Classification system and condition assessment method. This is consistent with the national method for Biodiversity Net Gain.

A ring of settlements nestle against Dartmoor's lower elevations. These towns and cities consistently exert external forces on the National Park and all its landscapes. This pressure has management requirements attached to it, which are discussed later.

The map highlights the scale, scope and complexity of this ecosystem-scale project and the ramifications for how all actions taken on Dartmoor affect all of Devon through the myriad rivers which start their lives here. What starts as a drop of water in an upland bog manifests itself as life giving water for much for Devon.

- Water Body
- National Park Boundary
- Woodland
- Central Dartmoor Landscape Recovery Boundary
- Urban Development

III Understanding Dartmoor

We needed a way to distill down this huge landscape, its people and its ecology and here is how we did it.

THE CONSTANTS

The **'constants'** covers the unchanging elements of Dartmoor's environment. Explanations are given on how these elements impact Dartmoor's **'ecosystem architects'.** Of course climate is changing, but it will always impose its pressures on this landscape, come heat or cold, hence being a constant.

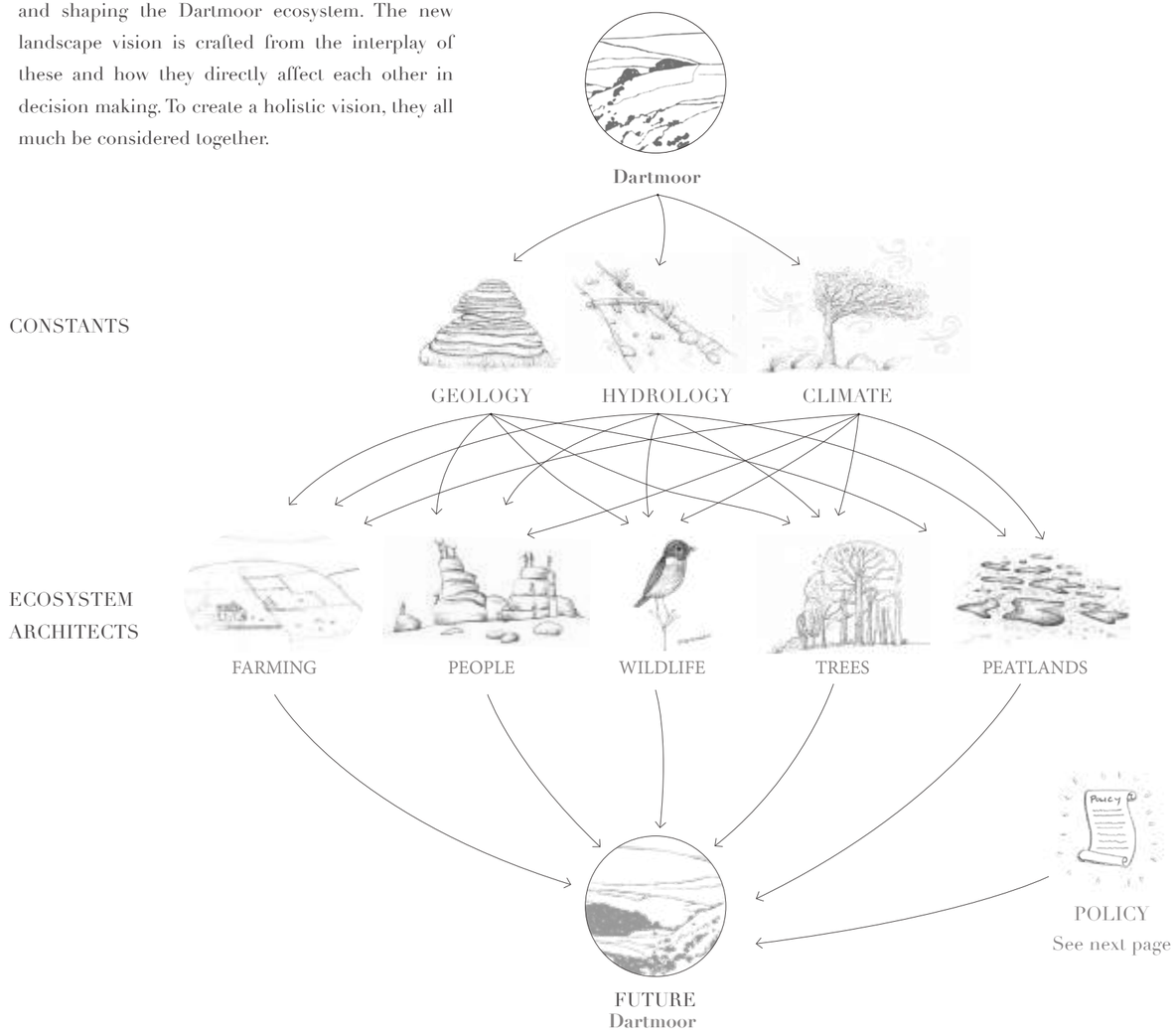
ECOSYSTEM ARCHITECTS

The **'ecosystem architects'** section delves into the factors shaping Dartmoor's ecosystem. These pages explore impacts and highlight pressure points, co-benefits and conflicts with the other **'architects'** to build a simplified web of driving factors within the ecosystem. Essentially, they are what can be changed/managed in human timescales.

The future of Dartmoor will be shaped by the combination of constants and architects interacting in various ways. This future will also be shaped, in part, by policy. For example, more of a lean towards ecologically-driven goals potentially alters farming methods. More tourism and access will perhaps lead towards wildlife depletion through disturbance etc.

The page opposite explains these principle factors. It is within this framework that the new emerging landscape vision has been created.

This page explains the key factors influencing and shaping the Dartmoor ecosystem. The new landscape vision is crafted from the interplay of these and how they directly affect each other in decision making. To create a holistic vision, they all much be considered together.



IV Policy

Policy can exert an important influence on the management of Dartmoor. The Dartmoor National Park Partnership Plan (2021 2026) produced by the National Park Authority and its partners sets out a long-term vision for Dartmoor and guides the five-year strategy for the management of the National Park. The plan includes seven themes including climate change, next generation, nature and natural beauty, cultural heritage, people, farming and forestry, and business and communities. Policies deriving from Acts of Parliament, such as the Environment Act 2021, the future Planning and Infrastructure Act and the government's approach to agri-environment schemes all affect and influence management choices and decisions.

These evolving policies have, since their creation, often brought rapid changes to the face of Dartmoor's landscape and ecology. We have chosen to illustrate Policy outside the key architects as it is both abstract and non-physical, but also short term, both in historic context and in how quickly it can change.

As Dartmoor's future lies in long term, considered, and gently shifting stewardship, we see a need for policy that affects Dartmoor being driven by Dartmoor, no longer the other way round. It would be pertinent to consider how Dartmoor's practitioners and experts can influence nuanced local policies going forward. The Land Use Management Group and the next iteration of the National Park Partnership Plan (due to be reviewed in 2025) will be key to this.

Oil on Canvas. Dartmoor.
Credit: Quentin Martin

V State of play today

Dartmoor has never been more studied than today and it has never had so many interested groups. This level of scrutiny has ballooned in recent years with a high profile court case, a Government review of Protected Sites and many public disagreements. A position often inflamed by overly simplified social media posts when one considers the complexity of the system.

After years of limited success from agri-environment schemes, Defra has launched 'Landscape Recovery.' The three aforementioned projects cover a vast area of Dartmoor. These will design land management agreements that are bespoke to the area, rather than using a blanket approach across the English uplands. The hope is that the Dartmoor Landscape Recovery schemes will capture the nuance of the area by recognising the unique habitats and the difficulties of farming in this environment, while incentivising its sustainable management. This, of course, relies on significant input and commitment from the farmers and commoners.

As a unique landscape, Dartmoor remains, in the face of many national pressures, a formidable and amazing pastoral upland. It delivers a poignant and priceless counterpoint to the lowland farms, towns and cities it rises above.

It is poised today to journey towards incredible ecological wealth and there have never been more eyes on how it will do that. If it succeeds, Dartmoor will showcase how, in the face of so much change, these resoundingly wild spaces can endure and improve. A further counterpoint to so much loss of wild space globally.

Looking to Wistman's
Credit: Digg & Co

VI The Constants

Haytor Vale
Credit: Nick Fewings (Unsplash)

Climate

Dartmoor and the British Isles are located in the global Temperate Zone, with monthly average temperatures ranging from 3°C to 18°C.

Dartmoor lies in the south-western peninsula, the southernmost part of the British Isles, and is Britain's southernmost western oceanic upland (Fyfe & Woodbury, 2012). In the Dartmoor National Park Authority (DNPA) area, 81% of the land is above 150m in elevation, with 51% classified as upland (over 300m).

Dartmoor falls within the temperate rainforest zone (Ellis, 2016), featuring a hyper-oceanic climate that meets the rainforest criteria: over 1400 mm of annual precipitation, with more than 10% falling during June-August, and a mean annual temperature below 16°C (Alaback, 1991; Ellis, 2016). Dartmoor's uplands also fit the global climate range for blanket peatlands, with a mean annual temperature above -1.0°C and a warmest month mean under 14.5°C (Gallego-Sala et al., 2010). Weather systems are primarily south-westerly.

Climate will continue to exert its constant force on Dartmoor and never more has this element of Dartmoor's ecosystem been under such rapid change in modern human history.

This section of the Study details how data was gathered from weather stations across the Southwest by the Met Office and will be used in decision making by the Duchy of Cornwall and its partners.

You will find data pertaining to frost days, growing season, peatland growth/loss projections and more. This data underpins the direction of the vision and provides a benchmark from which to set management targets. Especially with regards to Net Zero attainment and resilient ecosystem planning. It will also be valuable in external funding conversations, as investment will be needed to adapt to the climatic changes already facing farmers, foresters and commoners.

HEAT STRESS

Rising summer temperatures and heat stress are expected to reduce yields and possibly harm livestock welfare on Dartmoor over the next 40 years. Cattle will face more frequent heat stress, but all livestock will be at higher risk.

WINTER RAINFALL

While average winter rainfall is projected to increase, modelling indicates a similar frequency of particularly wet winters. Rainfall is expected to become more intense, with projected increases in extreme hourly rainfall.

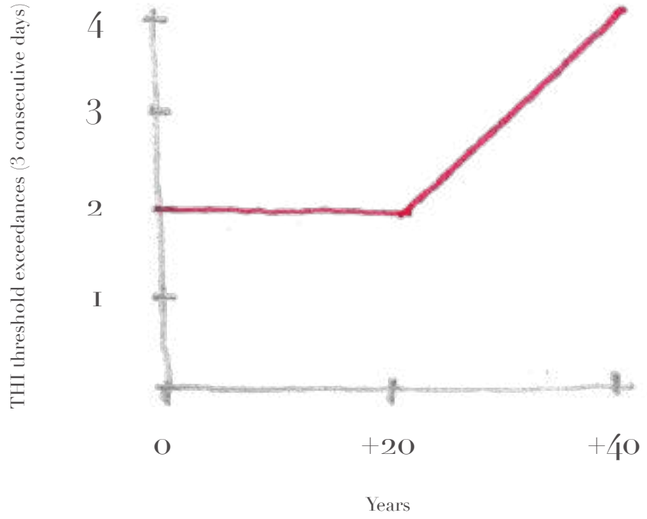
Data from - *Climate projections for the Duchy of Cornwall UK agricultural holdings* by Met Office, Hadley Centre, 2024

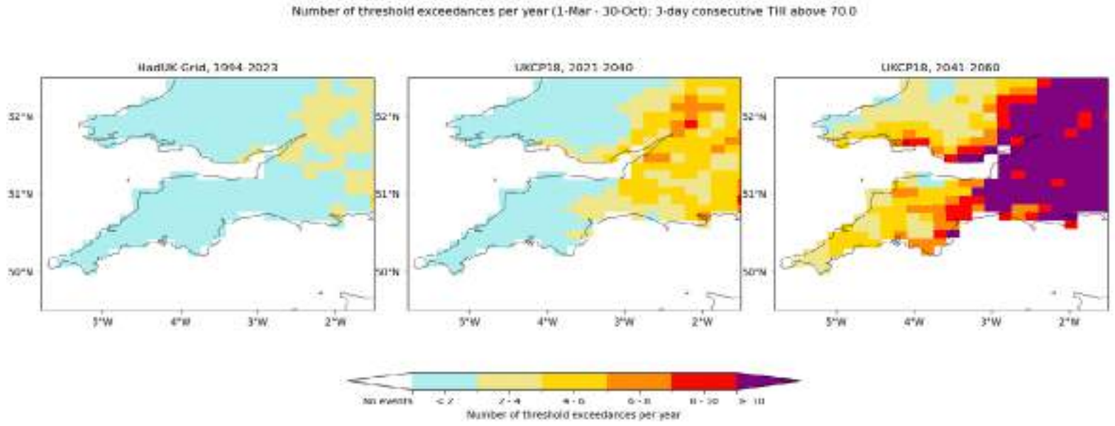
FROST DAYS/GROWING SEASON:

Reduced frequency of frost days. This may increase growing rates but also reduce exposure to the cold conditions some species require to trigger germination. Warmer autumn temperatures will lengthen the growing season. Warmer winters appear to also increase populations of parasites such as ticks/midge.

SUMMER RAINFALL

Lower levels of summer rainfall are predicated with more frequent extended dry periods where little or no rainfall occurs. Plus, a higher chance of drought periods, potentially adversely effecting pasture, livestock welfare and especially peatland.

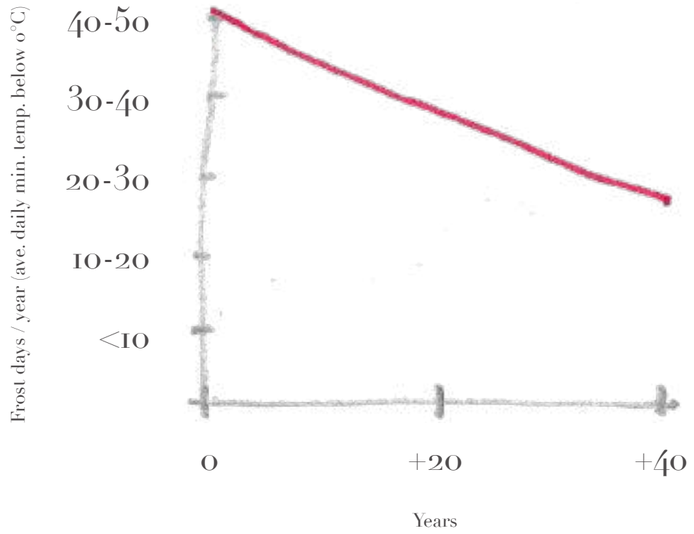


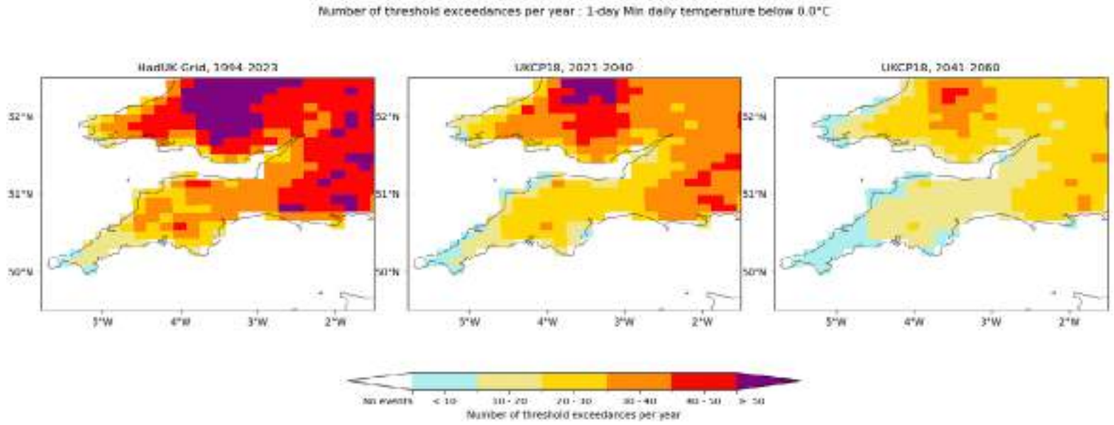


Number of occurrences per year of three consecutive days where the Temperature Humidity Index (THI) exceeds 70 from March 1 to October 30. Each panel shows a different time period:

Left: Historical (1994-2023)
Centre: Near future (2021-2040)
Right: Mid-century (2041-2060)

The THI measures heat stress in livestock. Exceeding this threshold can compromise productivity, such as milk quantity and quality in cattle. The number of heat stress incidents on Dartmoor is expected to increase over the next 40 years, negatively affecting livestock operations. It is worth noting that farms at lower elevations will experience these issues first.

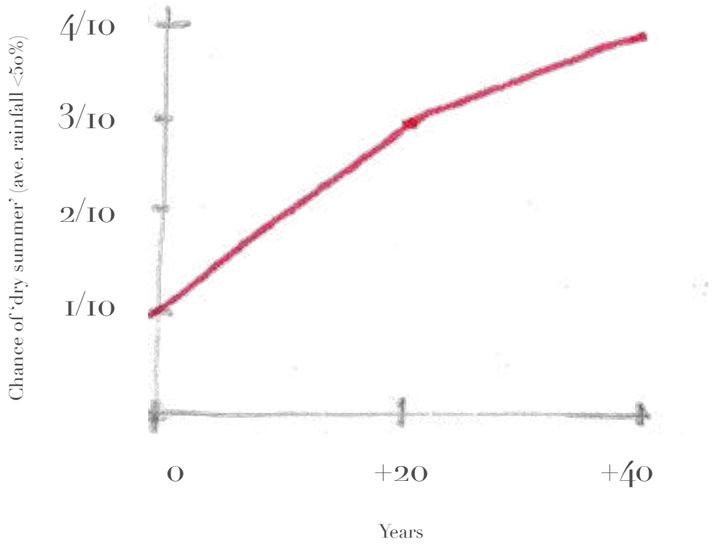


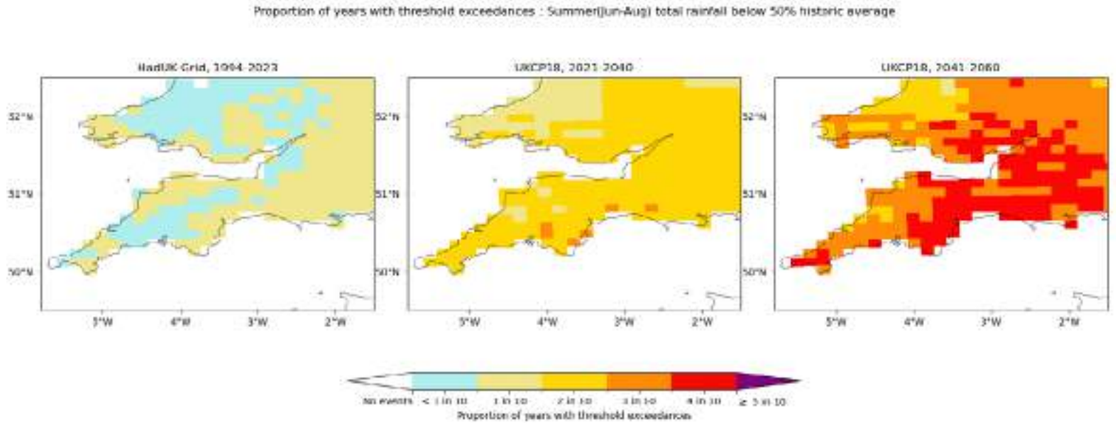


Number of frosts per year: Average occurrences of minimum daily temperatures below 0°C. Each panel represents a different period:

Left: Historical (1994-2023)
Centre: Near future (2021-2040)
Right: Mid-century (2041-2060)

Frosts on Dartmoor are projected to decrease significantly over the next 40 years. This could negatively impact seed germination and flowering for some species that require cold conditions, but may improve crop survival rates, particularly for fruiting trees like apples. Growing days will extend, leading to changes in forage availability for herbivores. Trees will grow faster and dormancy periods will diminish.





Proportion of years with **dry summers** (June-August rainfall below 50% of the 1994-2023 average). Each panel shows a different period:

Left: Historical (1994-2023)
Centre: Near future (2021-2040)
Right: Mid-century (2041-2060)

The frequency of dry summers is projected to increase on Dartmoor, rising from 1 in 10 to 4 in 10 by 2041. This may negatively affect crop growth, pasture quality, and increase heat stress risk for livestock. Subject to wind velocity, higher temperatures will require additional shade for livestock should thermal stress begin to be seen. Breed selection may become important to consider for upland graziers.

TEMPERATURE

Altitude is the main factor affecting temperature on Dartmoor, rather than distance from the coast. Princetown, at 414 meters, has an annual mean temperature of about 8.5°C. From 1961 to 2015, mean temperatures across Dartmoor typically ranged from 13-20°C in summer and 4-8°C in winter. Between 1975 and 2008, spring temperatures increased by about 2°C.

SUNSHINE

Dartmoor averages 3-4 hours of sunshine per day, which helps maintain peatland by reducing evaporation under low sun, humid conditions.

SNOWFALL

Snowfall is closely linked to temperature, with little snow when temperatures exceed 4°C. In the South West, snow usually falls from November to April, with occasional light falls in October and May.

Lowland areas: fewer than 5 days of snow per year
Highland areas: 15-20 days on average
Summits: around 30 days on average

WIND

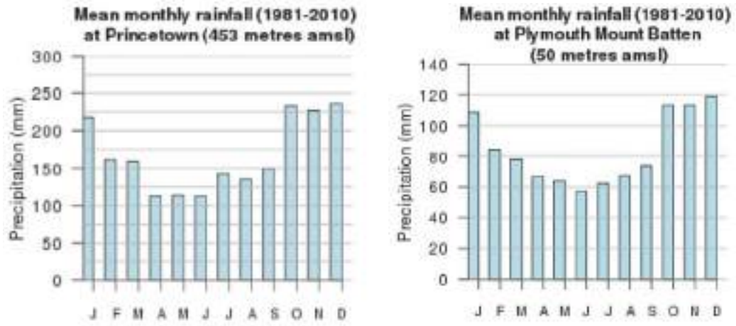
Southwest England is one of the most exposed regions in the UK, with higher wind speeds than most areas except Western Scotland. Wind climate is measured by monthly mean speeds, highest gusts, and the number of days with gale-force winds (34 knots for 10 consecutive minutes).

RAINFALL

Air humidity, controlled by sea temperature, significantly affects rainfall. Off the South West's coast, sea temperatures peak in late summer and autumn, leading to the most rainfall in these seasons and the least in spring. Rainfall is also influenced by altitude; moist air rising over hills cools and produces rain.

Coastal areas of Cornwall and Devon receive 900-1000 mm of rain annually, while upland areas like Dartmoor can receive up to double that amount. In contrast, the driest parts of Eastern England average around 500 mm, while Western Scottish mountains can get over 4000 mm.

At Princetown, there are more than 18 wet days per month in winter and 12-13 in summer, with an average annual rainfall of 2,150 mm, compared to 1,582 mm at Widecombe-in-the-Moor.



PAST PRECIPITATION TRENDS

The opposite top graphs illustrate total annual precipitation for (a) Plymouth and (b) Cowsic Valley, with black dots for recorded amounts, a blue line for the trend, and a red dashed line for a smoothed curve. From 1879 to 2012, total precipitation increased by over 10% at Cowsic River and 8% in Plymouth.

The bottom graphs show total annual precipitation recorded at upland Dartmoor stations (Double Waters, Hurston Ridge, Princetown, and White Ridge) from 1961 to 2015. Black dots represent the recorded precipitation, the blue line indicates the linear trend, and the red dashed line is a smoothed curve.

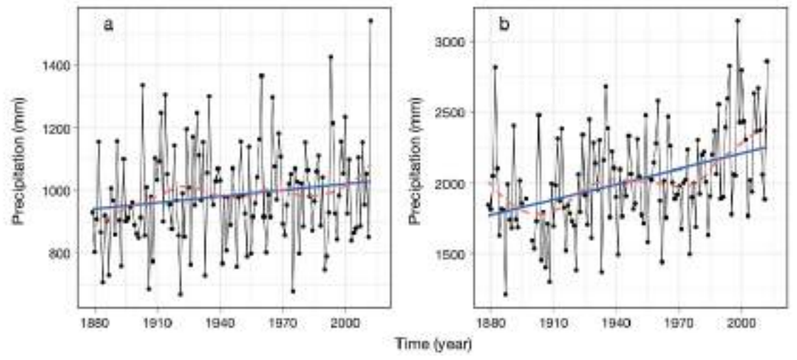
GEOLOGICAL PAST

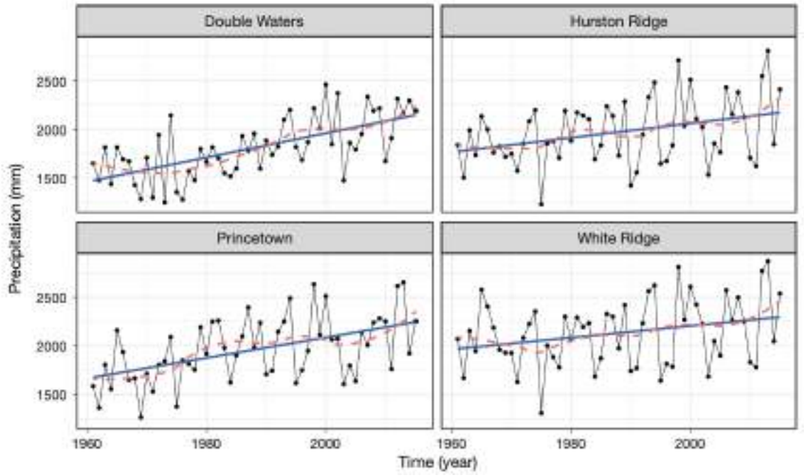
The geological past spans the last 10,000 years, beginning with the retreat of the last permafrost. Between 2000 BC and 1455 BC, there was a long period of mild climate, followed by a significant climatic shift from 1455 BC to 1395 BC, which favoured human survival and led to the creation of field systems called "reaves."

Paleoecological studies from Tor Royal Bog reveal a climate deterioration between 1395 and 1155 BC, causing cooling and wetting that resulted in the abandonment of reaves and settlements, likely due to over-exploitation of soils and climatic changes. This led to the formation of podzolic soils and the development of peatland on Dartmoor.

Plymouth

Cowsic Valley





Historical annual precipitation trends

(Data from '*Deviation between projected and observed precipitation trends greater with altitude*' By Murphy et al, 2019, University of Plymouth

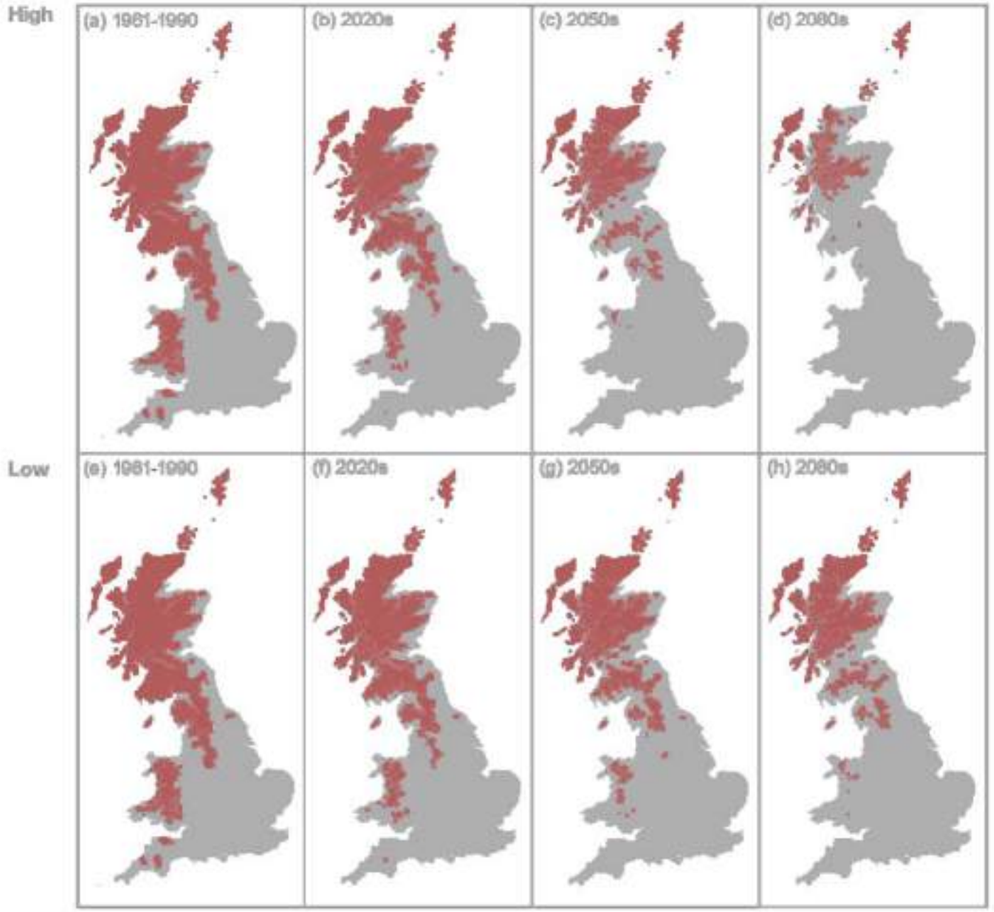
FUTURE TRENDS AFFECTING PEATLAND FORMATION

Future changes in precipitation are expected to be greatest at higher elevations. Projections suggest winter precipitation may increase by 10-20% by 2040-2059. Climate scenarios predicting 2°C warming suggest Dartmoor may no longer be suitable for blanket peatland. Increased sunshine and wind will likely accelerate evaporation, while warming and drought could lower the water table, leading to peat erosion and carbon release, further contributing to global warming.

Dartmoor's uplands are a mixture of thin mineral-rich growan soils and deep peat which vary in thickness according to gradient, hydrology and altitude. In the face of more extreme climate projections and increased rainfall, these sensitive soils and peat bogs will become more susceptible to degradation.

The opposite maps have been generated using a model of blanket peatland suitability based on annual moisture index and temperature, and have been applied to predict changes to peatland range in the UK under various climate change scenarios. Predictions for UK peatland retreat are anywhere from a 50% loss under the lowest emissions scenarios, to up to an 84% loss of current areas suitable for peatland by the 2080s. Under this model, peatland is predicted to retreat from Dartmoor (and the South West entirely) by the 2050s.

These projections are also based on the conditions suitable for peatland formation, so although under this model it is predicted that no new peatland may form on Dartmoor, this does not mean that efforts to maintain the extent and quality of existing peatlands are wasted. Furthermore, the model predicted that by present day there would be no areas suitable to support blanket peatland in the South West, other than on Dartmoor. Today there remains peatland on Bodmin Moor and on Exmoor; indicating that peatland resilience under climate shifts may be more complex to predict than previously understood (as of 2010 when these findings were published).



Future areas capable of forming new peat under high and low climate warming scenarios
(Gallego-sala et al. 2010)

Geology

Dartmoor is a large granite formation, known as a "boss," the largest in southwest England. Formed millions of years ago, Dartmoor is part of a larger underground granite formation called the 'Cornubian Batholith'. When Dartmoor formed as molten rock, it heated the surrounding rocks, creating a tougher outer ring called the "metamorphic aureole," which produced better soils for lowland farming than Dartmoor's own rocky uplands.

The granite in Dartmoor creates acidic, shallow soils with layers of peat and gravel particles known as 'growan'. This soil, combined with factors like climate and altitude, makes Dartmoor unsuitable for growing crops in the present day, favouring grazing land instead. Farming and grazing on Dartmoor date back to the Neolithic era.

Over at least the last ten million years, weathering and erosion processes have worn away the softer materials surrounding the granite, leading to the formation of distinctive tors, which are striking stone outcrops that rise prominently above the landscape.

Ponies grazing around
Combestone Tor
Credit: Digg & Co

The debris from this weathering has created clitter slopes, scattered with angular stones and boulders. The soil on Dartmoor is generally thin and has little humus, which supports unique moorland plants and scrubland habitats. Surrounding the highland granite mass, is softer rock that leads into the lower hills and valleys.

The soft, eroded subsoil supports burrowing animals like rabbits, while the impermeable granite shapes Dartmoor's water systems, creating habitats such as grasslands, bogs, and heathlands which provide homes to unique wildlife such as the hazel dormouse, bog hoverfly and curlew.

The geology and hydrology of Dartmoor are closely linked, with granite serving as a major aquifer for at least 14 rivers, only two of which flow to the north coast. Although river valleys have eroded over time, the granite's hardness makes it resistant to significant erosion. The softer growan, however, is more susceptible to erosion, leading to ongoing sediment deposition in the rivers.

Igneous Granite

Mafic Tuff

Mudstone, Siltstone & Sandstone

Mudstone, Siltstone & Sandstone

Limestone, Mudstone & CalcareousMudstone

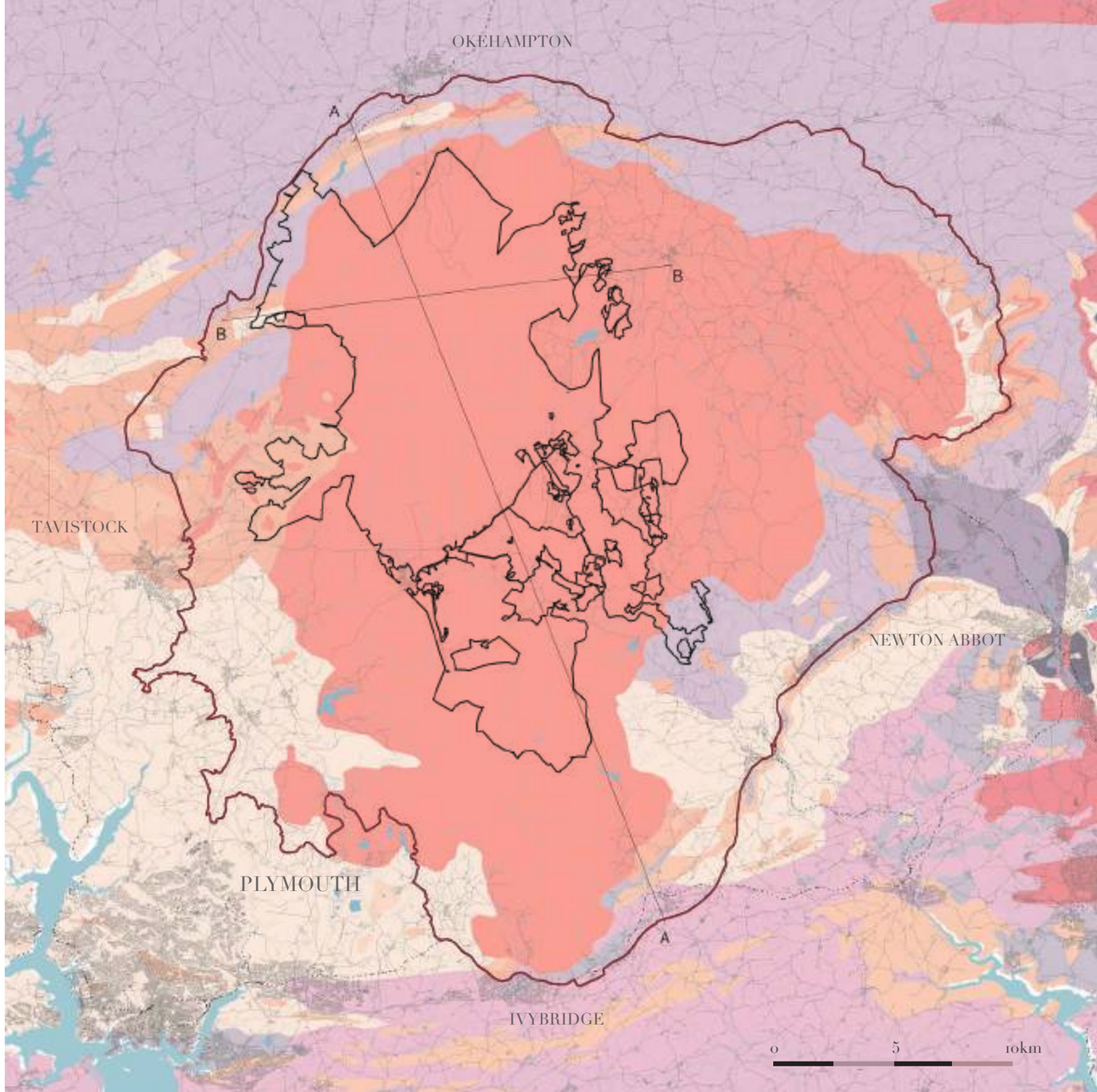
Mudstone, Siltstone & Sandstone (Lower Culm)

Mudstone, Siltstone & Sandstone (Upper Culm)

Central Dartmoor Landscape Recovery area

Dartmoor National Park Boundary

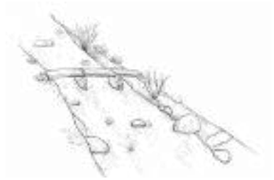
Map opposite shows Dartmoor's geology
Adapted from British Geological Survey



Hydrology

Due to its high elevation, Dartmoor experiences heavy rainfall. Water falls as rain or snow and flows downwards via rivers, streams, and brooks. Impermeable granite beneath the moor prevents water infiltration, meaning more surface water flow over the land into rivers and streams. Because of the impermeable rock, the specific types of water-storing vegetation and soil conditions play a more vital role in storing water.

Human extractions including tin, peat and drinking water have resulted in disrupted water pathways, less water storage within the ground, and a very different water cycle to the natural cycle that over time had shaped the topography and ecosystem of Dartmoor.



West Dart River
Credit: Digg & Co

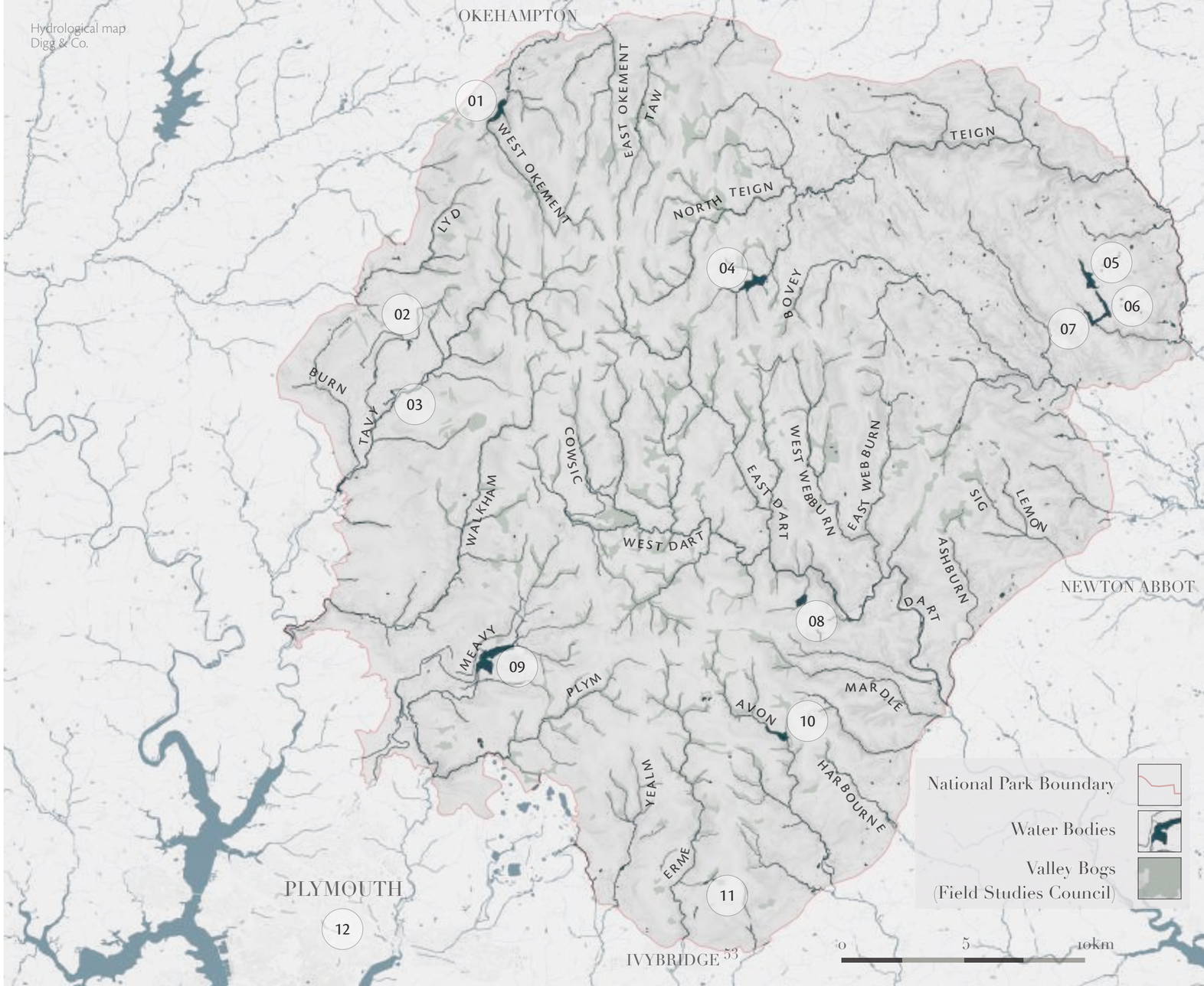
RIVERS AND RESERVOIRS

Dartmoor's rivers are vital lifelines, supporting habitats, industry, and wildlife for millennia. They have sustained agriculture, energy production, and recreation. Compared to the surrounding Devon lowlands, Dartmoor has fewer rivers and streams, reflecting its role as both a major water source and a natural sponge, where water moves slowly through peat and growan (rotting granite). The smoother landscape and minimal drainage, unlike the heavily farmed lowlands, result in fewer mapped waterways.

However, the construction of reservoirs has had the greatest human impact. While providing essential water and hydroelectric power, these reservoirs have transformed ecosystems, disrupting habitats and blocking migratory species like wild salmon from reaching upstream spawning grounds. Of the reservoirs listed below, Burrator Reservoir is the one known to have a fish pass system.

01 Meldon Reservoir
02 Wheal Jewell Reservoir
03 River Tavy Reservoir
04 Fernworthy Reservoir
05 Kennick Reservoir
06 Tottiford Reservoir
07 Trenchford Reservoir
08 Venford Reservoir
09 Burrator Reservoir (fish pass)
10 Avon Dam Reservoir
11 Butter Brook Reservoir
12 Hartley Reservoir

Hydrological map
Digg & Co.



The watersheds, rivers and reservoirs of Dartmoor

VII Ecosystem architects

Riding holidays on horseback
Credit: Malcolm Snelgrove

VII Ecosystem architects

Across the breadth of Dartmoor's landscape we have distilled down the key influencing factors of change. These are called the ecosystem architects. A mixture of human actions, natural forces, wildlife and unique habitats.

This chapter reviews these influencers and draws out how they each interact with each other and therefore, how they change Dartmoor. In creating a vision for the future, each of these architects is intrinsically linked to each other. Where one gains another may lose. Where approaches are linear in thinking, aspects of the ecosystem may incidentally benefit or not.

Our aspiration is that all strategies and land management plans relating to Dartmoor are based on this fundamental understanding and decision-making process. That in creating a logical future plan, each architect is considered and only when this is done can a decision be defined. This method is designed to give appropriate weight to all that is Dartmoor and to see the architects as essential tools in stewardship and management. Each section features a Drivers of Change chapter, which links ecosystem architects with their respective peers. This shows how each affect each other.

1
FARMING

2
PEOPLE

3
WILDLIFE

4
TREES

5
PEATLANDS

Herding on horseback
Credit: Malcolm Snelgrove

1. FARMING
A HISTORY OF GRAZING MANAGEMENT

Dartmoor has, for thousands of years, held farming and pastoralism at its heart. As far back as the start of Duchy ownership in 1337 the uplands have been used as a large hunting and grazing landscape. Much of the openness enjoyed today is a result of this.

This chapter describes how once vast herds of cattle and sheep were driven from lowland farms to spend the summer high on the open plateaus of Dartmoor, how this transhumance changed over time and how agricultural revolutions and the abandonment of pastoral ways of life altered the grazing system we see today.

It offers views and actions, both ecologically and from a farming context, as to how Dartmoor's future grazing management can be a driver for ecological gain and repair.

Gorse scrubland with South Devon cattle
Credit: Digg & Co.

LIVESTOCK & GRAZING

Step back 4,000-5,000 years. The wild herds are gone. They left slowly, their meat, bones, skins and hooves steadily consumed as people honed knowledge of the land. We studied the stars, the moon, the winds, the medicines in the plants. We created tools and bartered. We analysed and designed and we became so good at harvesting wild protein that, ever so slowly, we no longer walked amongst our fellow wild mammals. It must have been a complicated and worrying time.

But it was never really as clear cut as that. We will have captured calves from wild Aurochs and equines, whose mothers would have fallen to the spear and bow. Our kindness to each other suddenly firing across to another species. It is probable that the children of hunters had these little wild pets, and the kindness of the cow and the playfulness of the horse played back at us. Their social system relying on symbiosis and community. Taming the wild flowed both ways. Protection from wolves, regular feeding, the plant medicines. Slowly, but unequivocally we entered into a contract with livestock. It was from here that the cultural landscape of the Dartmoor we know today began.

Dartmoor's pre-historic landscape was probably once a mixture of woodlands and bogs. It was also a tundra. Once there was ice, perhaps glacial pools. Then it melted. Sometimes it will have been very grassy. Perhaps once it was totally uncovered - moss maybe all that clung to its hard granite shell. Looking into the past to find an ecological nirvana is really hard. For some it will be endless forest. For some wide prairie. Dartmoor has had both and crucially it could have both again ... only this time, rightly or wrongly, we will be deciding.

Why this matters is because livestock and farming shape this future and not necessarily in the binary way we are so often presented with. In natural systems, grazing animals do not create over-grazed or under-grazed landscapes, they simply migrate to new grounds. In grazing practice it is more important to focus on energy flows and livestock movement in order to see the real picture. A keen focus on the management of those animals' behaviours and their complex dance of decadal, annual and seasonal grazing patterns is what is now needed to crack the ecological grazing code. It is perhaps this point which has been missed from recent history of both livestock booms to livestock bust.

Taking inspiration from Harold Fox's seminal text, *Dartmoor's Alluring Uplands*, on the lives and times of Dartmoor's transhumance period, it is clear that vast quantities of stock used to frequent the Commons through a summer grazing period which regularly started in mid-May or June and ended between Halloween and mid-November, weather and grass growth dependent. A number far larger than today.

The current grazing rights held for Dartmoor are: 145,000 sheep, 33,000 cattle, 5,450 ponies and 12,330 other potential grazing units. In practice the numbers actually grazed are much smaller (DNPA - Factsheet). This is a high number, but it is incredible how historic records attest to large mixed herds entering the moor each summer.

Records from the start of the Duchy's ownership, starting in 1337, show that annually upward of 10,000 head of cattle were droved to the moor from nearby Devon parishes, each parish having a right of common due to the law (except Barnstaple and Totnes). This number does not include the stock of Venville men - those who owned farms in adjacent 'venville parishes' nor does it include any sheep, which were much less strictly controlled than the cattle. In almost all cases, agricultural historians reference the Red (cattle) and White (sheep) tides, which migrated to Dartmoor annually for the mineral-rich grasses and herbs growing in the lean granite soils.

Curlew

Many farmers, as now, would have supplemented their farming businesses at home with the Common: They could carry higher numbers of animals at home due to hay making and fodder creation when animals were de-pastured on Dartmoor through summer. Subsequently, as Harold Fox notes below:

'We cannot escape moving towards the conclusion that Dartmoor as a whole might have supported well over 20,000 fee paying cattle through the summer grazing season.'

Harold Fox

Ponies and goats were grazed too. Pigs were pannaged and many people grew oats and barley on enclosed land to varying degrees of success.

Therefore, it is hard to imagine that grazing of farmed livestock, has been solely responsible for the recorded declines in wildlife abundance or habitat loss - as is so often purported, when our research suggests grazing has ebbed and flowed around grazing allocations which are orders of magnitude higher than today. Yet the current narrative is one of significant ecological decay.

Could it be that the decline is linked with the loss of nutrient cycling delivered by seasonally large herds feeding on mineral-rich grass for a summer grazing cycle? Followed closely by a large depletion of stock as the natural tendency of animals would be to leave the high moor to the shelter and forage of the lowlands, river valleys and rested grasslands of the home farm?

Ecologically this is a significant point, which really cannot be understated. Below is an attempt to explain why through the eyes of a Curlew this annual disturbance, rest and recovery cycle played into ecology, rather than degraded it. One could substitute many species into this analogy and it would still hold true. It is perhaps a key point to carry forward in light of all that Dartmoor is ecologically renowned for:

The Eurasian Curlew breeds on open landscapes where overwatch from predators is limited by the degree of openness. Upland grassland or 'moorland' is a good place to nest, as long as the sward in the early spring is fairly tight and not too dense. This is crucial because Curlew have to see the approach of predators, such as foxes and crows. Nearby vertical structure is disliked due to predators being able to look into the nests, but this factor varies nationally.

Timing for the Curlew, like all ground nesters, is critical. A fast hatch to fledge period being evolution's way of getting up and out, as the probability of predation goes up everyday they are relatively helpless on the ground.

Curlew start breeding in April. If we take the transhumance grazing system, our cows and sheep would have left the moor as a relatively tightly grazed sward at the end of autumn. Slow growth, frost and high winter winds means that as the land comes to life in spring, their nesting habitat is perfectly ready to receive the returning birds. It is still the tight sward from the previous autumn.

Marsh Fritillary

They then have about a month to nest before the huge quantities of stock, which once flowed to Dartmoor, arrive, giving them the time needed to fledge chicks. As the herds start to migrate up hill, their dung and trampling stirs the land and there is an explosion of insects, which allows the now running Curlew chicks to both evade trampling and take advantage of this early summer bounty.

Transhumance, or at least the process of significant annual grazing movement, positively associates itself with the rhythm of nature and below we have reviewed how this grazing system has changed over the last 1500 years of Dartmoor's history.

PERSONAL TRANSHUMANCE SAXON PERIOD

Personal transhumance refers to the practice of living with stock during the summer months. On Dartmoor, for many years, even into relatively recent times, people for whom livestock were their livelihood, migrated to the moor for the summer months and lived in both semi-permanent and temporary shelters as they moved from one good grazing pasture to the next. It is likely that the remains of several small dwellings and/or clusters of dwellings are directly related to this and several places on Dartmoor have been named as such.

'The Tiny One Roomed Shelters found at Hound Tor, some with hearths, others without and probably used for storage of dairy products, are likely to have been typical.'

Harold Fox P157

'Smeardon Down, [which] derives from smeoru 'implies high quality grazing' and dun (down) - a hill. When combined, it means a hill which gave rich, butter making pasturage'.

Harold Fox P149

Both cowherds and shepherds would have carried all essentials with them and used horses for rugs, churns, pales and canvas. As the year wore on they would have naturally migrated from moor edges to the uplands as the grass grew in line with advancing daylight and warmth. It is likely that the high moor was not grazed until as late as July or August. This allowed for complex vegetation communities to develop as their growth/flowering period was accommodated, and then short, but intense disturbance, led to many plants being able to carry out their life-cycles under the timing and seasonality of this practice. By October the weather was worsening, the grasses and herbs diminishing in value and the herds naturally crept lower until technically no longer on 'the moor.'

It is well known across the world that pastoralists have a very intimate knowledge of their landscape. Perhaps the most intimate of all the agrarian practices. It would have been no different on Dartmoor and remains the same into the present day, where commoners' knowledge of bogs, shelter and good grazing is still passed down through the generations.

From recent conversations with commoners who still manage livestock on Dartmoor, this remains the case. Changes in farming today may lead to the first break in generational wisdom ever seen. This would be a huge loss considering the time it takes to re-learn extinct ways. Preventing this loss should be a vital part of future decision making when also paired with ecological education and practical ecosystem enhancing farming techniques.

Back to the Saxons; in many ways, this period would probably have laid the foundations of farming's truly close relationship with Dartmoor's natural environment and it is likely this seasonal activity would have held great weight amongst the rural people of Devon. As in many Alpine regions of Europe, evidence suggests that the spring and autumn migrations were surrounded by celebrations and the chance to chat with nearby neighbours, whose daily lives typically kept them isolated in the Devon valleys. A deep sense of community would have prevailed and mutual collaboration would have been regular and normal.

This type of personal transhumance would have had impacts on wildlife too. Bear, Wolf, Fox, Golden and White Tailed Eagle - all past residents of Dartmoor - and other predatory/scavenging animals - would have been hunted to avert conflict with pastoralists, however it is interesting to note that the last Wolf was supposedly shot on Dartmoor in 1780, far, far later than the practice of transhumance. In fact, despite an obvious dislike of predation from herders, in many cultures, these animals are revered and belief systems of the time would have led to people adapting techniques to maintain a truce with the wild. The use of dogs and constant human vigilance both being highly effective at preventing most attacks. Religion would have seen these wild creatures as partly protected and, as today in Alpine areas of Europe, a fragile truce will have prevailed. If one considers not the annoyance, but the usefulness of these creatures, Eagle, Buzzard and Wolf scavenging sick stock would have aided in natural selection and cleaned up possible disease issues. Constant vigilance by herders and their dogs would have generally averted overly high levels of predation.

IMPERSONAL TRANSHUMANCE - DOMESDAY ONWARD

'In the region, latterly, livestock were moved to the uplands in Summer to be looked after by supervisors and their owners did not reside there. They were guardian herdsmen'

Peter Herring

Perhaps one of the most well-known types of seasonal transhumance, which existed for many years, was the migration of impersonal transhumance. This method was primarily used between the 13th century and 18th century and inspired the stories of the Red and White tides of cattle and sheep, which were gathered near the moor edge and taken under the wing of 'middlemen' also known as Moormen.

One can only imagine the scenes from small lanes and droves around Dartmoor as the spring herds gathered from low country farms across Devon with cows, horses and sheep filling village greens and moor edge meadows in preparation for the summer grazing season.

‘Middlemen took charge of many farmers’ stock and over the summer they moved within their allotted quarter of the moor finding the best grazing and refuge from the relentlessly changeable Dartmoor weather. No doubt also commandeering the Saxon huts and houses for shelter.

It was this practice, which was catalogued by the Duchy of Cornwall due to their tithe, which they claimed for every head of cattle on the moor each summer. For much of this time the payment was 1.5 pence per cow. During the summer months, the vast herds of livestock moved amongst the moorland landscape with periodic gatherings for taxation, veterinary requirements and for ‘down country’ farms to take back any animals which they wanted back. Some naughty folk regularly tried to leave their cattle on the moor for longer than the season allowed to avoid lowland headage taxation, which was a common Royal tax collected from farmers.

It is incredible to imagine the sound of the moor, alive with spring Skylark, Curlew, Lapwing, Plover, Dunlin and Black Grouse etc. being complimented by the advancing sound of bells, bleating sheep, dogs, cows and people as they entered the moorland domain each summer for the grazing season.

Both personal and impersonal transhumance will have overlapped. Many smaller, lesser transhumance pastoralists would have used home Common land to offer good grazing to milking cows, which they would have milked daily and sold excess butter, cheese and milk into a system of local farm gate collections; gathering excess and selling dairy produce to the stannary towns (Ashburton etc.) and further afield. By all accounts this was fairly lucrative and would have provided a gentle life living close to nature on Dartmoor’s fringes.

Dunlin

SET STOCKING & THE BEGINNING OF LEARS

As time wore on, both livestock breeding and an improving winter climate, as well as knowledge of other hardier upland livestock, filtered in. Theft of livestock diminished and farming in the down country was industrialised through the Agricultural and Industrial revolutions. Quite suddenly, the family or even multi-family farming unit and their labourers either broke up as machines took over, or were needed to manage expanding croplands and larger herds. This left fewer people for upland pastoralism and in a slow but inexorable march away from daily herding, the landscapes of Dartmoor shifted to one of leared stock.

Learing is essentially a Dartmoor term for hefting. The process of binding a unit of animals to a particular hillside or range of hills.

Learing works because of the ‘wall of teeth’ - a concept of maintaining adequately held stocking densities of cows, ponies and sheep in adjacent Lears, meaning that pickings are slim if wandering herds stray into nearby ground. As numbers built over the spring let-out, the Lears filled and generally, with some training and use of matriarchal cows, mares and ewes, whose knowledge of the moor was also passed on generationally, the herds would stay within close proximity of their allocated area.

Today, in some places, Lears have broken down as the numbers of animals on Dartmoor have diminished. Areas which once would have had stock occupying them have become deserted and in many cases, livestock, which is still de-pastured to Dartmoor, has the ability to stray.

In reality, it seems this happens less than one might expect, as with the reduction in stock and reductions in active herding, the livestock of today inhabit local pastures which tend to become hard grazed as unpalatable and rank species have filled the areas where livestock once stood. Predominantly on the open moor this palatability issue comes in the form of Molinia - a deciduous grass, whose niche appears to be grazing changes - less summer grazing, less cattle impact, short palatability period - post fire dominant vegetation succession, impacted hydrology through mining and drainage and a move to warmer, wetter winters with less deep frost.

Learing still carries strong weight, and is a cultural tradition, but in the fullness of Dartmoor's history, appears to be a relatively modern concept and may no longer be as viable a management tool as previously. Due to lighter stocking rates, it may be that combinations of more dynamic hefts, focused, seasonal grazing movements and ecologically considered densities may offer the key to unlocking healthy animals and bio-abundant, species rich habitats.

MODERN COMMONING

Post the second world war and increasingly since the 1960s, many commoners have looked to maintain some stock on the moor through all seasons to supplment the home farm activity. This was initally supported by the Hill Farm Subsidy circa 1940s - late 50s, which created stocking imbalances due to the requirement for high pregnancy rates and began the trend of policy leading upland management. By the 1970s, government subsidies were commonplace and initially started as headage payments, which were brought in after Britain joined the European Economic Community. As the Fursdon Review states -

'After the UK's accession to the then European Economic Community, the operation of the Common Agricultural Policy became a further significant de-stabilising factor on Dartmoor. In particular, the introduction of headage payments for sheep (first the Ewe Premium and then the Sheep Annual Premium) and then for cattle (through the Suckler Cow Premium and more latterly the Beef Special Premium) encouraged increased stocking on Dartmoor's Common. This is now recognised by both farmers and environmentalists to have resulted in significant environmental and ecological damage. In a version of the 'tragedy of the Common', graziers responded rationally to the incentives they were being offered as individuals, but the overall impact on the Common was negative, with increased swaling (burning of vegetation to stimulate the growth of palatable grass) and high year-round stocking rates being maintained through environmentally damaging practices.'

Subsequent payments have conversely focused on reductions of stock to maintain or enhance upland heath and acid grasslands due to these early incentives driving degrading practices. However, as you will read later in this chapter, both the intensity of grazing, coupled with increased burning, probably led to the widespread imbalances in the upland grassland/heatland/bog ecosystem. These are the challenges which are faced by managers today.

It appears from talking through this issue with commoners and managers that the current commoning system, is neither as good for farmers, nor as good for wildlife as it could be. A more active approach is necessary and certainly an experimental and open minded approach to trialling new techniques may unlock recovery in quite short time periods.

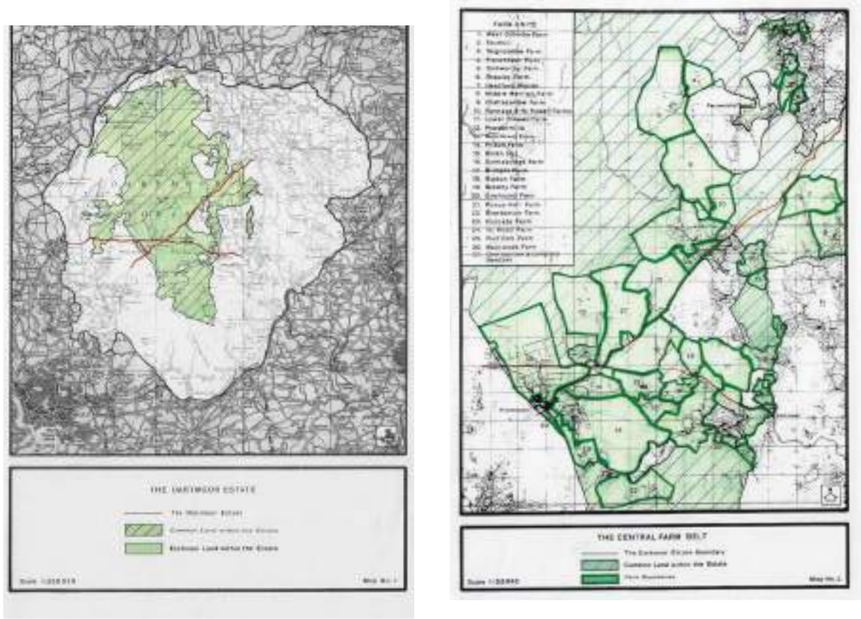
CONCLUSION

Dartmoor's pastoral history is wonderfully well documented, with several historians focusing on this part of its heritage. Pastoral history represents a fundamental and iconic part of Dartmoor, and its ecosystem, over the passage of time.

The restless ebb and flow of livestock numbers and styles of management will have seen periods of often rapid vegetation change as the fortunes of pastoralists waxed and waned through history. Evidence of these vegetation changes dating back as far as the 1700s, and probably further with more research, attest to the constant oscillation of grasslands, heaths, gorse and bracken, as well as the fluid state of the Dartmoor treescape. It appears that with modern stocking numbers, combined with various other major changes (climate, agri-environment changes etc), using

holistic grazing principles to maximise the efficacy of current stocking rates would be a place to concentrate trial efforts. A mixture of techniques may be used to evolve management continually in the face of changing weather patterns and vegetation growth rates.

It would also be beneficial to look into multi-year stocking density cycles which allow for an ebb and flow of grazing pressure, constantly providing dynamic input into the Dartmoor grazing system, however this will take time to develop and is not wholly suited to current farming cycles. However in zonal areas, this could work exceptionally well.



Duchy maps of Newtakes and Forest photocopied from Dartmoor Review 1992

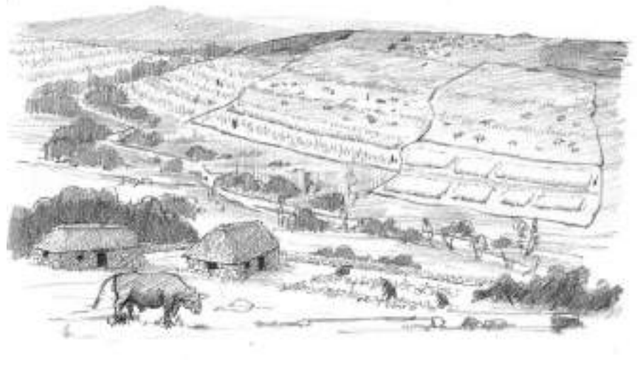
OTHER AGRICULTURAL ELEMENTS OF NOTE:

ENCLOSURE & THE NEWTAKES

The Duchy's Dartmoor Estate covers approximately 68,000 acres (28% of the National Park). Much of this is referred to as 'high moor' or open moor and is a vast unenclosed upland landscape replete with most major upland habitat types.

A particular feature of the Estate is the presence of so called Newtakes, areas of enclosed or semi-enclosed land which were formed in approximately the 1780s through a law of the ancient tenements which granted enclosure of 'waste' to the tune of 8 acres per generation. However this allowance was massively exceeded and today, as the map shows, the Newtakes make up a significant proportion of the West Dart valleys, from Princetown in the West to Postbridge in the East.

The significance of these areas, when looking at Dartmoor in a holistic context, is that they are located principally at lower altitudes than much of the Forest. Reflecting the typical enclosure creep of all upland landscapes. However marginal, the temperature, shelter and ever so slight



improvements in weather conditions would make farming the land a little easier. Importantly, these landscapes would have fallen under the remit of contemporary farming techniques and would have been cultivated and 'improved' to leave us with the appearance we have today of rich greens amongst the moorland's russets and ochres. Many arable attempts have now phase shifted back to grassland, scrubland and peatland habitats.

TREE PLANTING IN NEWTAKES...

For tree planting, the Newtakes offer a clear opportunity, that being one of secured boundaries. This could be a good way of supporting the expansion of natural woodland and wood pasture networks in a novel and simple way, whilst also being better located outside of the major peatland areas and in slightly lower, more tree-friendly, places. Evidence of this happening naturally is rife all along the West Dart valley, where a large proportion of the Newtakes occur. This would achieve a connectivity between the valleys and foothills, the enclosed uplands and the high moor in a way that is impactful to landscape and nature, whilst retaining large areas of extensive and very diverse, grazed habitats. It should be noted that the Newtakes currently harbour special habitats and species, such as Whinchat, so any concerted tree planting efforts should be considered in conjunction with all other ecosystem architects and the effects this may have on them.

RUSH PASTURE AND MANAGED CONSERVATION

Where the high moor and enclosed in bye represent two polar opposites of landscape type and view, the Newtakes blur the lines between them. It is here that, due to their lower elevations, varying mosaic habitats are found including valley mire systems. The newtakes are consequently a great location for more managed conservation and trialling of grazing and vegetation management techniques to restore or enhance habitat.

Habitats such as rush pasture, willow scrub, hawthorn glades, as well as more open grazing habitats can all be managed in the parcels which they are enclosed within and this can add to the overall diversity of the landscape. It should be noted that rush Pasture restoration is also applicable in in-bye land at lover elevations.

LANDSCAPE VALUE

Aesthetically, the road running from Dartmeet to Two Bridges represents an excellent developing mosaic, where naturally recolonising valley slopes are met, in some places, with upland hay meadows and then open moor, all within a mile of each other. Despite the geometric nature of the enclosure pattern, this will be a biologically rich landscape, where minor grazing changes could afford an optimised farming and biological system and where grassland, woodland and scrub makes up the overall nature of the local environment.

IN BYE LAND

Dartmoor is blessed with some of the most ancient field patterns in the UK. Principally cleaved from scrub and woodland, with granite faced stone banks - the stone would have come from clearing the fields of stone to cultivate crops and reap hay.

These rich landscapes of managed hedges, stone walls, banks and ancient hay meadows offer great wildlife opportunity and farming utility, however in recent times, their overall ecosystem value has degraded with the use of artificial fertilisers and increasing silage use. This has somewhat dislocated these pastures from the upland landscapes and lowered their overall value to the place as a whole. A key objective would be to focus attention on the recovery of this unique cultural landscape with species rich meadows celebrated and restored widely.

HAY MEADOWS

Upland hay meadows are often the last bastions of diverse, semi-natural grasslands. They are extremely rare nationally now and yet harbour astounding soil and plant genetics. They are typically managed in the time honoured way of high-late summer cutting, before autumn aftermath grazing with livestock. They importantly create niches for many species. One example being that this 'shut up' land - April through July - provides large areas of open sward for ground nesting birds. This presents opportunities for the creation, or conservation, of upland hay meadows,

which offer a different suit of species-rich plant communities, which may not have been able to flourish without farming. Perhaps in a new system one could see areas dedicated to community hay. Some light liming being continued would essentially broaden the species composition of the landscape and perhaps help with increasing acidity of upland streams.

SWALING - CONTROLLING MOLINIA AND REDUCING WILDFIRE RISK

With the projected drier, hotter summers on Dartmoor comes the increased risk of wildfire. This presents an opportunity to focus on proactive fire management to reduce risk and lessen the impact of severe wildfires. The most fitting fire management approach may involve combining efforts to reduce fire fuel loads with re-wetting peatland habitats. Waterlogged peatlands with high water tables are more resistant to wildfires than drier areas, such as heather-covered moorland (Davies et al., 2023).

Swaling, the local method of burning grasslands and scrub, has historically been used to manage Dartmoor's landscapes. Conducted over winter and spring, it refreshes grasslands, makes them more palatable for livestock and controls dominant plants. Evidence suggests that controlled burning on Dartmoor began after the last Ice Age. Initially used to create better grazing for wild game, this technique was later adapted to manage livestock-dominated ecosystems. For thousands of years, swaling has helped maintain Devon's uplands and Culm grasslands, supporting habitats and wildlife such as the Marsh Fritillary butterfly, which has partially adapted to this practice (Crouch - Unpublished data).

The effectiveness of swaling, like grazing, depends on using it at the right place, time, and frequency. Some plants on Dartmoor are fire-adapted. For example, heather shows a 30 50% increase in seed germination after burning. Molinia, a core component of the fire fuel load issue on Dartmoor, is a fire-adapted species thought to thrive under dry conditions and spreads widely post-burning (Colston, 2021). However, small controlled burns, off deep peat, have been found to control Molinia dominance and therefore reduce the fire fuel load and must be combined with post-burn spring and summer grazing by cattle on the new shoots (Colston, 2021). Wildfire

impacts on peatlands depend heavily on burn severity (Davies et al., 2023), which is why the hydrological intactness of peatlands are so important to wildlife management.

In blanket bogs, the depth of the water table controls how severe a fire can be (Wilkinson et al., 2020; Kelly et al., 2023). This shows the need to maintain high water tables and restore healthy water systems to protect Dartmoor from wildfires. Testing new approaches, such as different types of firebreaks, could also improve outcomes.

Although swaling has a long history, it has faced criticism for its visual impacts, carbon emissions, and effects on peatlands and plant diversity. Recent laws now restrict swaling to small, rotational burns. Combined with reduced grazing pressure and climate change, this has increased fuel loads.

As Dartmoor faces changing weather patterns milder winters, more droughts, and heavier rain land managers must use a combination of tools. Grazing, cutting, swaling, and hydrological restoration must all work together, as no single method can create the diverse upland habitats that conservationists and managers aim to achieve. Grazing timing and pressure by targeted actions of herbivores offers a flexible management tool, which is both diverse and can be manipulated almost daily to achieve possible outcomes and could work well in light of reducing burning.

Opposite shows a typical burn - firstly, firebreaks are established, these burns creep into the wind with beaters managing spread closely. Once the break is safe, the burn area is lit and moves with the wind to a natural or burnt downwind break at the end of the targeted area.

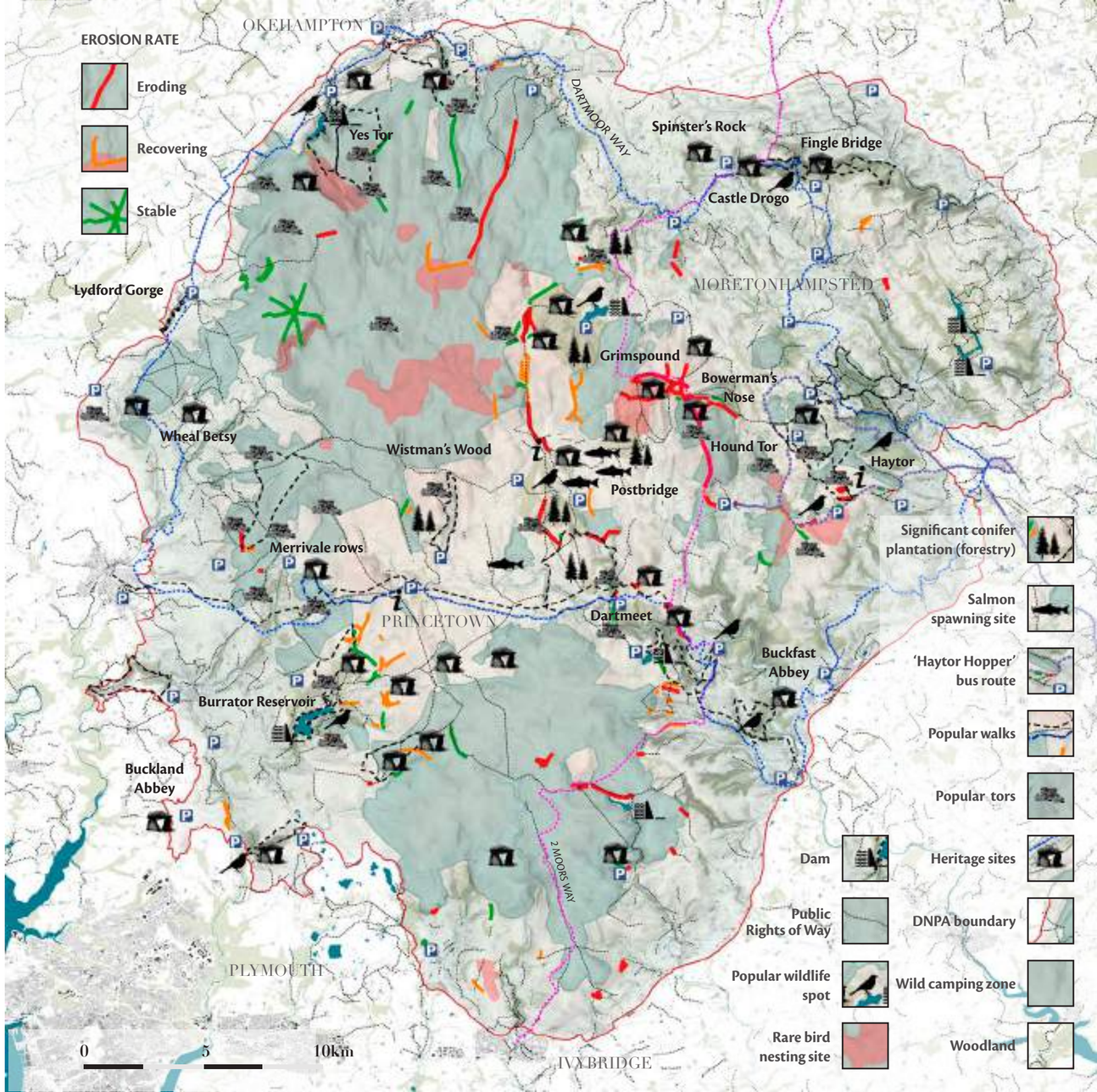
2. PEOPLE

Dartmoor's ancient landscapes have long served as a witness to human endeavour, shaped by centuries of settlement, industry, and culture. Since the last Ice Age, this landscape has seen continuous human presence, enduring fluctuations in climate, society, and land use.

From early hunter-gatherers and Neolithic farmers to Medieval stannary towns and industrial quarrying, Dartmoor's history reflects a deep connection between people and place. Settlements once spread across its uplands, and though many have disappeared, their remnants stone circles, cairns, farmsteads, and churches still punctuate the moor, testifying to the enduring human spirit amid its austere yet captivating terrain.

Today, people working on Dartmoor include farmers, rangers, historians, guides, soldiers, tourism staff, artists, and scientists, all contributing to its ongoing legacy. Dartmoor is not only a working landscape but also a source of inspiration. Artists, poets, and naturalists have been drawn to its wild character, crafting vivid portrayals that romanticise and preserve Dartmoor's mystique. Recreational visitors and conservationists now join locals in exploring this dynamic terrain, trekking across open moorlands, climbing tors, fishing rivers, and studying its diverse flora and fauna.

This layered history has created a complex landscape where ancient and modern, natural and constructed, coalesce into a remarkable heritage. Dartmoor's story is one of resilience and adaptation. We are now witnessing an era of stewardship where, if we wish to protect Dartmoor, we must balance people's actions and requirements with the appropriate respect and reciprocity required to see an improving the natural ecosystem.



Map opposite shows popular visitor destinations, visitor flashpoints (such as eroded paths), key wildlife breeding areas and bus routes
Sources - listed in appendix

Farming

People on Dartmoor are affected by farming in primarily two separate ways, mainly because the people out on the Moor are largely, but not exclusively, farmers and recreational users. Therefore, avoiding the obvious relationship between farmers and farming, residents and visitors are typically affected by farming in mostly positive ways. The pastoral landscape is generally a beautiful thing to behold for the dog walker or moorland cyclist, and the sight of livestock grazing the moorland, perhaps hemmed in by quaint dry-stone walls is savoured by many who visit and live on Dartmoor. In some cases people and farming rub shoulders and cause disturbances, largely between dog walkers, motorists and livestock.

Wildlife

Wildlife is often the main source of attraction for most Dartmoor visitors, with the National Park advertising many nature trails and bird watching locations. This attraction, drawing in many visitors, is therefore a great source of income for the local economy and supports a large number of small business and accommodation facilities.

Trees

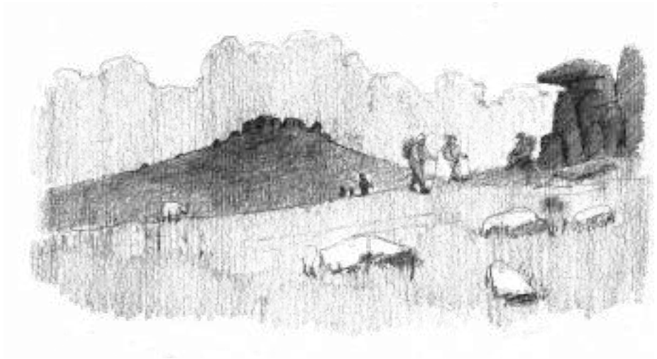
Trees, much like wildlife, are a great source of attraction for many visitors to Dartmoor, with many popular walks guiding visitors through the deeply wooded river valleys such as the Dart or the Teign. As a result, these woodlands also are a rich source of wildlife and beautiful landscapes which greatly support the health of visitors to the Moor. Timber from Dartmoor is less of a resource for people nowadays and therefore is not nearly cut so much for fuel or construction material, with the exception of the Forestry Commissions plantations on the high moor. Potential exists to better utilise this. There exist many groups who endeavour to plant more native species of tree on Dartmoor (e.g. Moor Trees) and this, coupled with reduced grazing pressure in areas has seen the slow afforestation of the river valleys.

Peatland

The relationship between people and peatland on Dartmoor is an ongoing matter and is an important contemporary topic, which is currently being addressed with concerted effort, but which also draws much vocal attention. People benefit from Dartmoor's peatlands by the fact that the high moor peat bogs retain an enormous amount of water and, when in good condition, help prevent flooding to downstream communities and provide much of Devon's drinking water.

Rivers

Rivers and water are a lifeline for people and determine many of their links to Dartmoor, attracting wild swimmers, anglers, canoeists and wildlife spotters. As a result their shorelines are well-trodden and experience some degree of heavy erosion in places which requires continued maintenance. Being inextricably linked to peatlands and hydrology, rivers also determine the quality of human life downstream and when they experience intervention such as with peat cutting or poor farm practices producing run-off, local water quality is affected and flood risk for downstream communities is increased.



3. WILDLIFE

Dartmoor's wildlife is arguably one of the triggers for seeking unilateral structured change to the management of Dartmoor's habitats. The wildlife context is one of European significance, highlighted in the myriad of statutory designations which provide legal protection for specific rare habitats, protected species and habitat mosaics.

Defra and Natural England as the Government agency and their advisors for nature conservation, hold a legal duty to monitor and conserve, and in some situations seek enhancements for designated wildlife sites such as SSSI's and SAC's. To fulfil this duty they must work with those who own and manage the land within. In most situations the aim is to achieve a good ecological result using a collaborative approach, which acknowledges the desired land-use, and any constraints of the farming system. However, if important features of sites are not being maintained or conserved and the condition of the sites are declining, additional legal powers can be used to enforce a particular management action.

It may be particularly challenging to meet favourable status where outside influencing factors contribute to the unfavourable conditions, or there is deep rooted cultural land-use. This chapter sets out the wildlife perspective of the landscape and points to some opportunities for beneficial actions.

Pied Flycatcher

Although Dartmoor is painted as the foremost 'wilderness' of the South West, the wildlife of this pastoral landscape can seem elusive. However, the longer one spends on the land, enjoying it or working it, the more we begin to see and understand the complex webs of species that this place is home to. The sight of a skylark towering overhead, the fleeting colour of a butterfly moving along the shrub tops, or the flash of a lizard at your feet are glimpses into the world of Dartmoor's wildlife glimpses of something much larger and intertwined with humans and our domesticated animals, interconnected to the same landscapes on which we live, work, and depend.

In supporting Dartmoor's wildlife, we can manage for the conservation and recovery of key species, such as Curlew, which has received much support in the face of steep declines. A key to the sustainability of species-focused projects is the restoration of ecosystems functioning at a landscape scale. This is embodied by the concept of 'build it and they will come.' Wildlife needs functional self-sustaining ecological systems, which are well-connected across the landscape to be resilient to a changing climate or other non-linear change, which cannot be predicted.

Within a self-sustaining ecosystem, resilient habitats are underpinned by a functioning food web of species. From the tiniest organisms, which often represent the largest biomass, to the largest species, which are often in smaller numbers: if certain species are lost, the whole food chain may fall out of balance or even collapse. It is this imbalance that makes habitats and the species within them increasingly vulnerable to pressures, such as invasive species or disease. When we consider the wildlife of Dartmoor be they crawling, flying, floating, or scuttling along we see them not in isolation but intrinsically linked to the landscape and supporting each other.

Atlantic Salmon

Blue Ground Beetle

Farming

Grazing has significant influence on vegetation structure and composition. Grazing practices can maintain habitats for wildlife by managing competitive vegetation, and in some cases, as with nesting Curlew, a low sward height is integral to their nesting success. They often create beneficial ecosystem disturbance with sporadic areas of bare ground for invertebrates. Hoof action and animal movement creates gaps in swards helping to increase plant species-richness, which in turn supports habitat biodiversity. Livestock also, when appropriately managed, reduce fire risk by creating tracks and removing fuel build up. They provide nutrient-rich dung for many invertebrates (when free of wormers) and support soil microbial communities. Methods to improve agricultural land and create modified grasslands and leys, such as drainage, degrade habitat type and functionality. Farming practices such as swaling can be beneficial to wildlife by managing overgrown vegetation and creating new growth for food and nesting habitat. (See the farming chapter for more detail on swaling), however this must be seen within the wider management picture to deliver long term benefit. In some cases, grazing alterations can replace the need to burn.

People

The opportunity to observe wildlife is one of the things that draws visitors to Dartmoor. People may interact with the wildlife of Dartmoor in responsible ways, or in some cases people may disturb or disrupt wildlife through these interactions; even the most well-intentioned actions such as feeding Dartmoor ponies can have undue negative consequences. Optimistically, supporting connection to wildlife facilitated by being in places like Dartmoor can inspire people and communities to feel motivated to protect wildlife and the habitats they rely on. People have historically relied on wildlife for food on Dartmoor, but today hunting is limited and fishing is recreational, but still part of the draw to Dartmoor for many. People have caused localised extinctions and extirpations of wildlife on Dartmoor, the introduction of invasive species, but also more recently are responsible for the reintroduction of wildlife to Dartmoor, such as the pine marten.

Otter

Hazel Dormouse

Trees

As another key ecosystem architect that has shaped the past, present and will shape the future of Dartmoor, trees are influential in determining which vegetation and wildlife communities Dartmoor has, can, and will support. Trees, in all their varying forms and presence in habitat types across Dartmoor, provide vital forage and habitat for wildlife. The extent of tree cover across Dartmoor, the composition of woodland and scrub vegetation communities, as well as tree health, diversity, and climate resilience of tree species on Dartmoor will all influence the type of wildlife that can and will survive on Dartmoor. As the climate warms, the rate at which trees are able to encroach on open moorland wildlife habitats such as heathland, grassland, and wetland environments will have to be maintained in a delicate balance to avoid complete vegetation shifts and in some cases species loss as open mosaics transition to something else.

Peatland

On Dartmoor, peatland forms the backbone of much of the upland wildlife habitats. Wildlife that feed, breed, or reside within the upland peat bogs, mires, and pools as well as wildlife downstream all depend on functional and intact peatland. As peatland degrades; dries up, erodes, is drained or over-burned, it loses hydrological function to become less able to support its unique wildlife, and can lead to vegetation shifts to move toward other upland habitat types such as dry heath. Efforts to re-wet and restore peatland function on Dartmoor can help keep vegetation communities in balance, provide vital refuge for wildlife and invertebrates, and help to ensure peatlands can be more resilient habitats in the face of projected climate shifts.

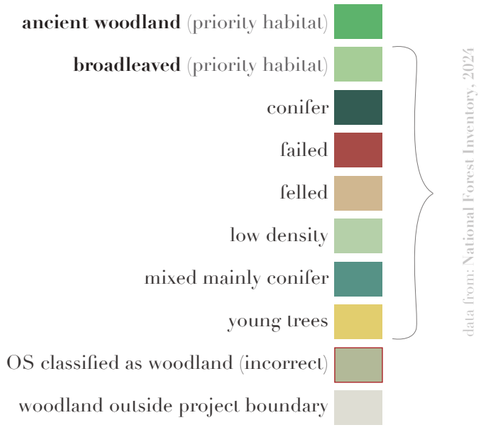
Pine Marten

4. TREES

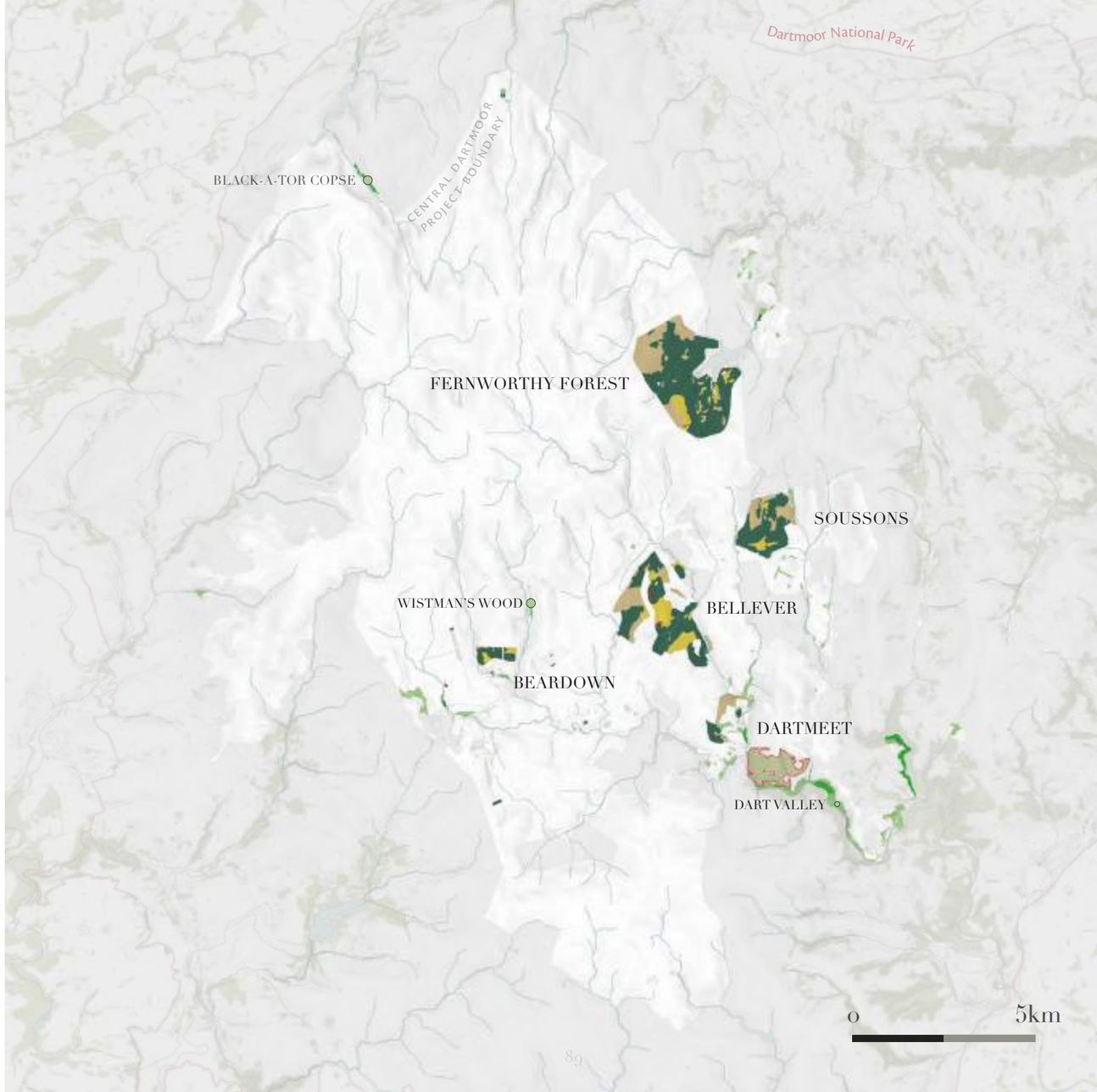
There is a vision of historic Dartmoor, which has materialised and grown strong in recent years, of an entirely wooded landscape. This perspective seems to evoke an idea of an alternative to the landscape which we experience today, and perhaps triggers a feeling of loss for some. Certainly, the upland landscape of today is not one of trees, instead its character is one of openness, of high moorland, with long views over heather and bog, almost a tree-less landscape, with trees confined to the steep valleys of the lower river reaches and foothills of the moor. Is this how it should be, or is there an alternative which could be considered for a resilient future?

The expanded version of this report explores the historic, the archeological and the paleo-ecological record in an attempt to piece together a picture of Dartmoor's historic landscape character, how it has changed, and why, with a view to understanding today's Dartmoor treescape and how it might serve a future landscape. This deep study has influenced the ultimate landscape vision of this report, with the following thoughts.

There are large areas of Dartmoor where restoring extensive tree cover and woodland would not be ecologically appropriate, may not be possible due to soil type and hydrology, and, if pursued, would likely be to the detriment of another habitat or ecological asset. However, as climate predictions indicate a strong move towards warmer and wetter conditions across Dartmoor, it is expected that where the right trees are in the right place, woodland expansion will be hard to arrest. It is logical and most likely to succeed, to target new woodland planting in association with existing



Woodlands, ancient woodlands and commercial forestry on Dartmoor

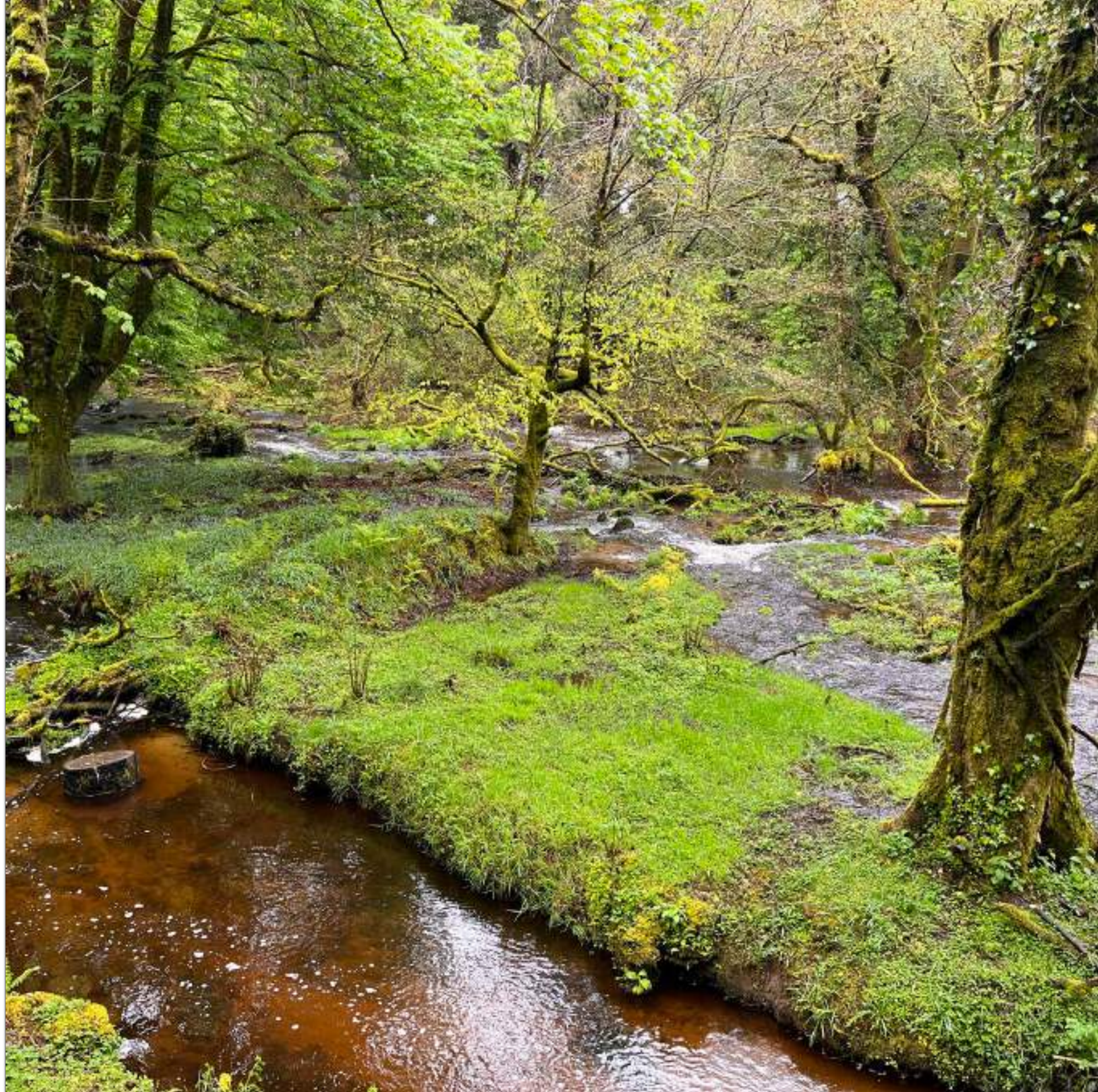


woodland parcels as this will be supported by native natural seeding, suitable soil conditions and will often offer shelter. With woodland expansion, or woodland creation, an understanding the soil conditions will be essential to success. Deep peat should be avoided as well as in-tact or restorable bogs and mires. Bracken can indicate deep and free-draining soils suitable to support woodland or wood-pasture creation, and mapping of these opportunity and constraint indicators will help with making these decisions.

From an ecological perspective it's exciting to consider a dynamic natural cycling approach to woodland expansion on Dartmoor, with existing closed canopy woodland opening with time due to disease and undermanagement to become wood-pasture, with a greater proportion of open-ground before re-growing to closed woodland if grazing allows, until the cycle begins again. However, this approach may not best serve a fully integrated sustainable future. There continues to be great resource within Dartmoor's existing woodlands, which have the potential to support local economy, supply sustainable renewable fiber, and foster a living landscape approach to rural livelihoods.

Although the mainstay of historic woodland economies, charcoal, has waned on Dartmoor, the current era has significant opportunity for bespoke markets for woodland products. These may arise from softwood plantations, realizing timber potential for low-impact low-carbon timber-based construction, or native broadleaves offering hardwood timber for high-end bespoke joinery and craft, willow for wicker, charcoal for restaurants and events, firewood for log burners or supply of emerging innovative products such as gluelam for low-cost low impact construction.

Worked and well-managed woodland can deliver for people and nature, in sustainable and productive systems. Many species of woodlands have evolved alongside traditional forestry rhythms, with fritillary butterflies relying on the violets of coppice coops and forestry rides, and the hazel dormouse prospering in the heavy fruiting shrubs of regenerating worked woodland. Alongside wildlife provision, through fostering a living landscape approach, Dartmoor's folk can sustain and the perspective on economic viability can change. Where a large exporter or sawmill company may not find value in a hard to access Dartmoor woodland, a smaller local woodland enterprise may prosper. The living landscape is underpinned by people who wish to live and work in the landscape providing valued services to the community. From firewood and timber to education and informed access, small scale woodland enterprise should be supported and encouraged. By tapping into bespoke markets and upvaluing woodland products, we can once again create sustainable woodland economies on Dartmoor, bringing back management which has created the biodiverse woodlands of today.



Moss covered woodland on Dartmoor
Credit: Digg & Co.

People

The ability of humanity to survive and prosper throughout history is as much due to their relationship with wood and trees as it is with food. Trees provide the timber for construction and the fuel for warmth and cooking. No doubt, this is why trees and woodland exist centrally within our culture, being revered in folklore and place names and immortalised in song and structures. The value of trees to people will rarely have been overlooked, until perhaps the most recent era of industrialised materials. When trees were plentiful and pasture was lacking, the people of the time cleared trees for farmland, but they would have maintained a plentiful resource. When industry demanded more from woodland it is likely to have expanded. Today, although the value of trees as a commodity may be less, people hold trees as a symbol of hope. There is a deep cultural connection which associates trees with resilience. Within the conservation movement, trees being planted, or woodland and trees being conserved are a flagship for landscape restoration and recovery. People hold the key to Dartmoor's tree-scape, and how trees are valued will be central to their future.

Wildlife

Trees offer diversity in structure to a landscape and woodland is the climax vegetation within the temperate biome of Britain. Britain's wildlife has evolved alongside trees and woodland, and although some species have found a niche in open prairie or moor, the greatest number depend on trees. This is fundamentally due to the advanced nutrient cycling which occurs in woodland over other habitats and once trees and woodland have become established, it takes a great effort to revert back to an open landscape, and perhaps this effort has only ever been achieved by great herds of herbivores and humanity. The balance between grassland and woodland is held by natural vegetation cycling. Today, as we place our natural systems under increased pressure, with the remaining wood parcels being principally small and disconnected, they become vulnerable to so-called pests and disease and these are the biggest drivers of change for woodland. The grey squirrel, Chalara (ash die back), Dutch elm disease, Sudden Oak Death, Pytophthora romorum to name a few. Traditional species-focused conservation of rare or endemic wildlife may also influence trees through specific habitat management, which may need to maintain an open habitat structure.

Farming

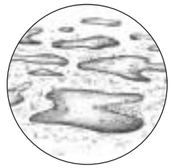
Throughout history, the balance between farming and trees is the battle of light and dark. Our livestock are principally ruminants who are adapted to thrive on grasses in an open landscape of light, whilst trees bring the darkness of woodland cover. Therefore, as farming has expanded this has simplistically removed trees to allow light to reach the ground to promote grass growth (or crop growth). Field boundaries and steep ground have become the stronghold (or last bastion) of trees and shrubs, and even these have been pressurised throughout the last century as our innovation allows better access to these previously hard to reach areas. The current era is beginning to re-evaluate the benefits of trees within farmland, not least to offer shade and shelter to livestock. Advanced understanding of soil ecology and nutrient cycling has begun to bring trees back into farmland, as an integral feature within agroforestry systems, realising the myriad of benefits trees can offer to production in both pastoral and arable systems.

Peatland

The physical processes which form peatland do not support the establishment of trees. Peatland is defined by the production of peat in anaerobic inundated soils, where nutrient cycling and organic decomposition is drastically slowed. This does not sustain the rates of nutrient cycling which trees require to survive. Therefore, where soil conditions become suitable for peat production, they also become unsuitable for tree growth. Where peatland has dried and is no longer functioning as an active bog, trees will prevail if allowed, however where bogs are active, and inundated or waterlogged, woody plants are typically restricted to dwarf shrubs such as heather, cross leaved heath and bog myrtle.

Rivers

Rivers are considered to be in their most natural state when they are lined by trees, forming a diversely structured riparian zone, buffering or protecting the watercourse from outside influences which could be detrimental. A natural, unaltered river, well-connected to its floodplain, will meander and move where it's not confined. With this, trees may fall and re-grow, forming natural dams and slowing the flow along with providing filtration to surface flow. Due to this, the imperative for river restoration may also drive tree planting and woodland restoration. Great weight is given to trees and woodland within water catchments, recognising their ability to slow and clean water, and given the dire state of our water courses currently, it is likely that the drive for river restoration will result in expansion of tree cover and woodland extent.

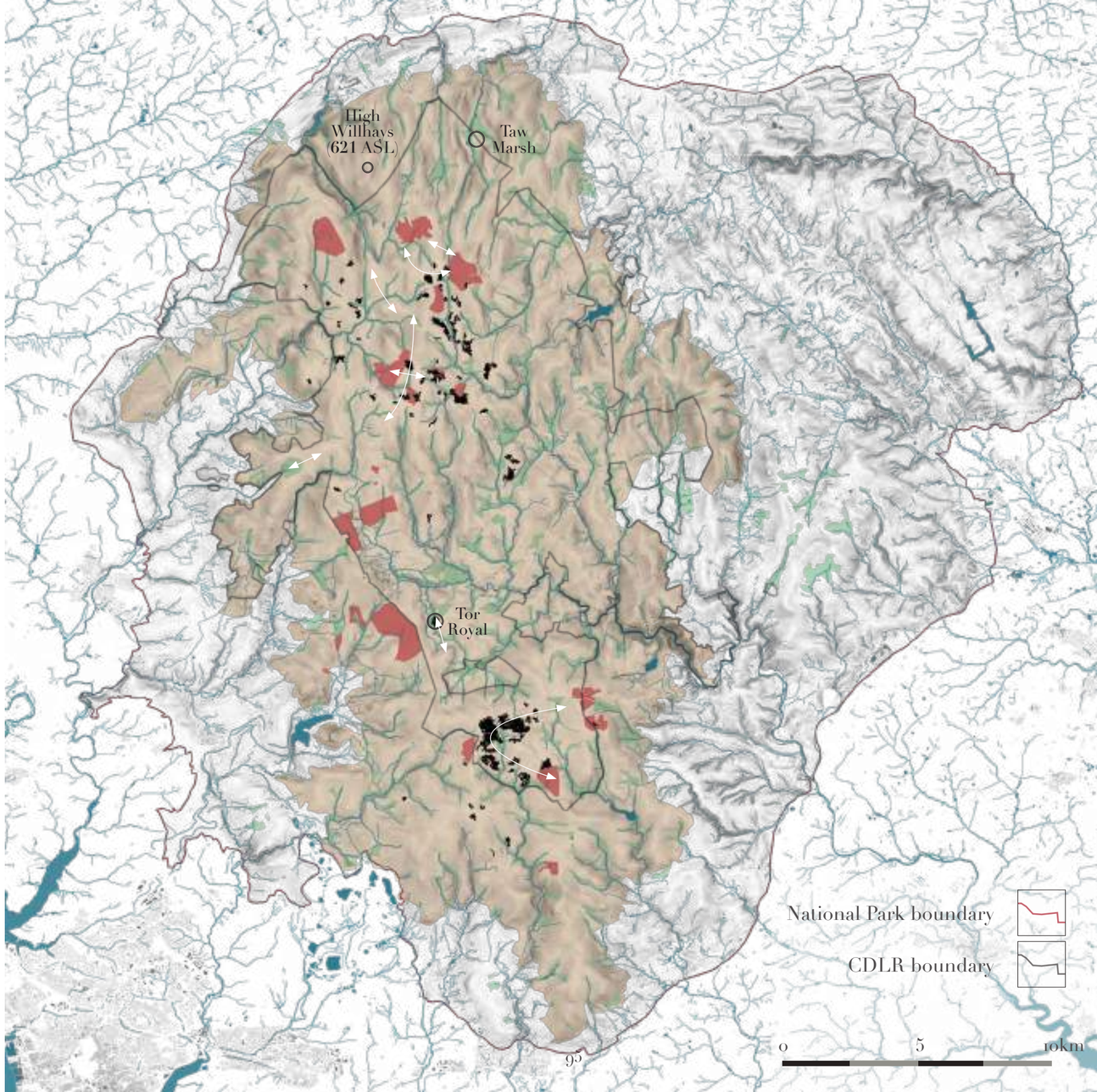


5. PEATLAND

Dartmoor's relationship with its peatlands is both ancient and ecologically intricate. Over thousands of years, layers of semi-decomposed organic material known as peat have formed in rain-fed, waterlogged conditions in upland areas of Dartmoor. Sadly, human activities such as fuel cutting and drainage have led to the degradation of these fragile peatland habitats, leaving them at greater risk from climate change.

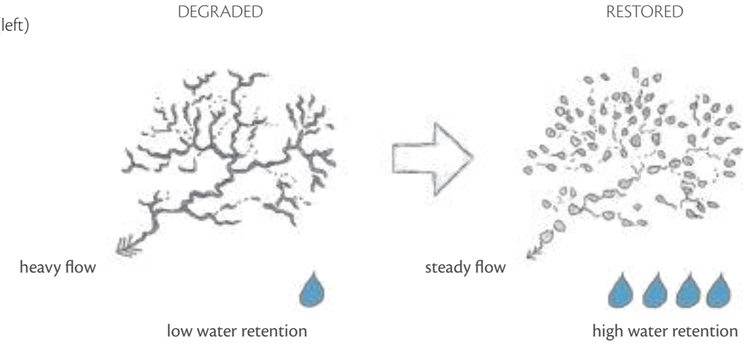
Dartmoor's peatlands play a critical role in storing carbon. As the world's largest land-based carbon store, peatlands hold more carbon than all forests combined, despite covering just 3% of the Earth's surface (Palmer, 2024). However, rising temperatures and shifting weather patterns threaten to alter peatland extent and functionality, impacting carbon storage, water regulation, and biodiversity. Restoration efforts on Dartmoor aim to revitalise these ecosystems to maximise their potential while we still can. These initiatives focus on enhancing the peatlands' ability to retain water, store carbon, and support wildlife. Additionally, restored, functional peatlands provide downstream benefits by improving water supply and strengthening climate resilience.

Blanket bog covers 8,500 hectares of the upland areas above 400 metres and is notable by a thick layer of peat, at least 50 cm deep. Valley bogs form along drainage systems in narrow, linear zones that sometimes expand into larger hollows. These areas, such as Taw Marsh, benefit from horizontal water movement, bringing in minerals that support diverse plant life. Valley bogs have not been extensively studied. Raised bog is a rare dome-forming peatland type, with Tor Royal Bog being the only example on Dartmoor.



Data from South West Water
Peatland Partnership & Field Studies Council

Drained peatalands (left) vs natural/restored peatlands (right)



PEATLAND - DRIVERS OF CHANGE

People

Frequent traffic (ATVs, 4x4s, cycles, foot) in peatland areas leads to the exposing and degrading of peat, reducing its ability to retain water and increasing the likelihood of erosion. The creation of unofficial paths exposes bare peat, which is vulnerable to weathering and further degradation. Recreational activities can exacerbate degradation and cause additional damage. This will always be a continuing issue and can be managed with education, signage and alternative routes perhaps with the use of new firebreaks, which naturally act as novel pathways for walkers.

Farming

The inherent nature of agricultural expansion throughout history has inevitably encroached on peatlands throughout the UK, leading to drainage and land conversion that degrade peat-forming wetlands. In a Dartmoor context, this land drainage may be less, but livestock grazing can also degrade peatlands through poor management and sub-optimal timings of grazings. Flash points are likely where out-wintered stock are fed on peat and should be avoided. Fire, depending on intensity, can dry out peat and disrupt its ability to store carbon (Holden et al. 2015), (for more on fires, see the farming chapter).

Wildlife

Dartmoor's peatlands support rare and specialised species such as the Bog Hoverfly, Dunlin and Snipe. When peatlands become degraded, these species lose essential habitat, threatening their survival. Localised overgrazing by deer or livestock can alter the vegetation composition, reducing biodiversity. Conversely, restored peatlands are capable of supporting a richer variety of flora and fauna, providing a more stable and diverse ecosystem.

Rivers

Blanket bogs are sustained by consistent annual rains. This maintains the waterlogged conditions needed for retaining the peat and provides a natural slowing of the flow as the rainwater interacts with the surface vegetation. This natural sponge limits overland flow rates and filters nutrients from the rainwater. The wider the scale of in-tact peatlands across Dartmoor, the more resilient rivers are in the face of extreme rainfall.

Trees

Historically, afforestation the planting of trees on peatlands was encouraged for timber production. However, this practice had negative consequences for peatlands. The land had to be drained first to allow trees to grow, and this drainage accelerated the loss of water from the landscape. As a result, the peat continues to degrade in these abandoned drainage scars, leading to carbon loss. While the waterlogged conditions of peatlands prevent most tree species from establishing themselves, it is suggested that some woody vegetation including heathers, bog myrtle and small willows can optimise peatland functioning. These shrubs can play a role in slowing the flow of water across the peatland surface, acting as natural dams that retain water in key areas and reduce erosion. Their root systems aid in water infiltration, helping to re-wet the degraded peat after hydrological restoration.

VIII Management actions

VIII Management actions

This part of the document sets out tangible and actionable management directions in line with our research and analysis.

This fixes actions to the ecosystem architects and throughout you will see how these actions dovetail across varying layers of land management. We have typically maintained a landscape led approach, which holistically includes things such as the use of vernacular and local materials and renewable energy upgrades. We do not drift into tenancy or built asset management as it is not our area of expertise. However we would suggest that direction is taken from the landscape led approach to devise future strategies for elements of management, which directly affect the Dartmoor ecosystem.

We attach a timescale of 20-50 years for delivery, however some projects will mature far beyond.

KEY **CLIMATE** ACTIONS & IDEAS

These actions have been decided according to the current state and future predictions for climate change in the Southwest, delivered by the Met Office. They are predicated on a belief that Dartmoor must work harder to become more resilient to the ramifications of our changing climate and can improve habitat and landscape conditions to better protect communities and ecologies from natural and human-influenced volatility.

1. Use time-honoured farming techniques, which reduce the requirements for off-farm inputs.

2. Cease tillage and/or intensive grass production on sensitive erosion areas and restore native habitats such as species rich grasslands and Rhos Pasture. Consider agroforestry/ slyvopasture.

3. Use trees and scrub habitats to help mitigate impacts from climate change such as increased flood risks and soil run-off into watercourses.

4. Allow species colonisation from southern climates by creating a dynamic mosaic of connected habitats which cater for the largest amount of ecological complexity.

5. To maintain open habitats, respond to warming days and longer growing seasons by increasing the number of cattle grazing the moor during the growing season and plan holistic and structured grazing across the landscape with shepherding.

6. Create annual farming and landscape enhancement gatherings with the Duchy of Cornwall, Met Office, South West Water, Dartmoor's farmers, academics and researchers, local communities and other interested parties to discuss restoration, enhancement and on going climate resiliency projects. Share best practice and updates on any new data on climate projections for Dartmoor. Give managers the best data available. Plan progressive grazing trials.

7. Energy: Do not undermine the integrity of the open moorland landscape for energy. Retain a negative stance to wind turbines on uplands. Use only domestic systems or retrofits and renovations. Roof-top, barn-top solar etc.

KEY **GEOLOGY** ACTIONS & IDEAS

Given that the geology of Dartmoor is somewhat unchanging, future suggestions might look towards how geology influences other aspects of the Moor such as farming, hydrology and tourism, all critically viewed in the context of a changing climate. With hotter summers and wetter winters, the easily effected 'growan' granite subsoil will continue to be threatened by erosion and all efforts should be channelled into analysing how the ground condition of Dartmoor can be maintained and improved.

Key to this will be grazing management and its effects on vegetation and topsoil quality. Over-grazed areas will be subject to higher degrees of erosion due to hoof-fall and a weak and reduced root zone, failing to hold together its organic matter. Reducing tourism pressure on popular sites and walks may also help improve the geological state of Dartmoor and may be executed by strengthening common foot paths, reinforcing routes and seasonally reducing access to certain threatened areas. These interventions are already being implemented by the DNPA to some extent.

1. Reduce the affects of eroding growan-based soils by reinforcing footpaths, and keeping stock moving on the Moor, thus promoting a reinvigorated root zone and vegetative growth.

2. Continue to restore river systems where possible to help build up river-bed deposits, strengthen existing floodplains, protect abandoned streaming sites and prevent further river valley incision.

3. Investigate the possibility of shifting future developments in the area towards a more vernacular use of locally sourced granite for sustainable building practices. This may be executed in conjunction with sustainably sourced, locally managed timber products from a proposed, mixed species forestry scheme.

KEY **HYDROLOGY** ACTIONS & IDEAS

Dartmoor's rivers, reservoirs, bogs and high precipitation makes it the foremost strategic water resource of the South West. South West Water, responsible for water distribution, is investing millions of pounds in natural and engineered systems to continue to provide resilience to this requirement.

It is of utmost importance that this resource is managed carefully and that habitat and landscape management are totally aligned to continually deliver water throughout the year for both ecological and human reasons.

1. Continue to restore the upland peatlands and remove damaging historic drainage in all landscape types. Concentrate on deep peat areas.

2. Promote upland and lowland natural flood management options at significant scale. Catchment-led plans to deliver this will be vital.

3. Use natural succession of woodlands and wet woodlands, where grazing has naturally declined to provide high quality water protecting habitats for rivers.

4. Evaluate hydrologically modified systems and consider lifting water tables through stage zero and hybrid stage zero projects.

5. Promote native, species-rich grasslands and riparian wetlands where appropriate. It is often the landscape which can work harder, not the river itself.

6. Use ecosystem resilience indicators such as Riverfly - aquatic invertebrates - to gauge success of large scale river restoration projects.

7. Refresh the Duchy Estate's river management plan.

KEY **FARMING** ACTIONS & IDEAS

These actions are based on the wider landscape vision that farming in the uplands retains a traditional set of production systems with low to zero external inputs across the spectrum of protein production. This is consistent with the thousands of years of farming on Dartmoor and is suggested to reduce the risk of future intensification, which has degraded the natural environment in lowland habitats surrounding Dartmoor. This natural system of agriculture is supportive of other crucial ecosystem services delivered by this landscape and balances ecology and farming.

This approach may take time and require breeding, but the low input, high value model could be best placed to gain the best prices from every animal or carcass leaving the Moor. The area is particularly special and eroding value by adopting more intensive practices like those of lowland farms would inevitably leave farmers struggling, as fighting against the Dartmoor environment is well documented as folly.

To support this, Dartmoor could adopt a strategy similar to a protected appellation, building on the developed Dartmoor Farmers' Association brand where livestock can be sustainably finished whilst also looking to lowland partner farms to join the story and finish animals in the traditional forage reared manner. Opportunity exists with added investment, branding and marketing impetus to carve out a high value brand for all stock owners. Landscape Recovery and LUMG funding will be key to this.

Some things to potentially improve or closely look at to aid this:

- High Herd Health requirements for all stock using the moor.
- Facilities to allow for more rapid veterinary actions on the commons and Newtakes.
- Grazing rights review - to promote active management of commons.

Generally, before more location specific suggestions are made, there is a need to up skill farmers so they can recognise and record key species and what 'good' habitats look like, with ongoing learning and experimentation on how to best manage for these. This could build on the payments by results model developed by the Dartmoor Future Farming trial and adaptation of a monitoring app used by farmers around Ingleborough and in the The Lakes.

In bye

1. Promote the restoration and long-term preservation of species-rich grasslands and meadows.

2. In enclosed and improved grasslands, use lime to best manage on farm nutrients through soil pH adjustments and to support river health due to current low pH issues. Soil samples required to ensure correct land parcel applications.

3. Restore and reconnect hedgerows and historic field patterns where lost. Provide more shade and shelter for stock.

4. Invest in stone walls and banks to reduce the use of fencing. Reduce short rotation farm investment cycles. Use Landscape Recovery capital for this.

5. Use in-bye land in coordination with open upland grazing systems (seasonal transhumance) and look to create better opportunities for winter keep in down country, including cattle.

6. Use holistic grazing principles throughout the seasons to best manage the climate, wildlife forage and ground conditions.

7. Promote rotational crop growing where crops will be directly used by people (ancient grains etc.). NOTE: Be especially vigilant in the face of more extreme rainfall and shorter ground prep windows.

Wildfire Risk - Generally

1. Implement controlled burns at the right place, time, and frequency to manage grasslands and decrease fire fuel loads. This should be combined with post-burn grazing to further manage vegetation and support biodiversity.

2. Support the restoration of natural water systems, prioritising raising the water table. This will protect Dartmoor from the severity of wildfires.

3. Apply targeted grazing by livestock specifically after controlled burns, to control plant species like Molinia and promote the growth of other vegetation types, contributing to better habitat diversity and fire fuel load management.

4. Test and experiment with new types of firebreaks, which can help reduce the spread and severity of wildfires, and work alongside other fire management methods. Integrate fire management within land management plans.

The High Moor

1. Managing access and erosion with other interests to work collaboratively towards best overall outcomes.

2. Maintain the 3 mouths (sheep, cattle, ponies). Ponies are crucial due to their hardiness. Vary overall densities over multi-decadal cycling.

3. Re-kindle herding and shepherding techniques to promote high welfare and animal value from the Dartmoor brand.

4. Use herding and shepherding to target vegetation monotony. Using cutting and swaling to encourage stock movement and the creation of a mosaic. Herd all three species together in certain cases.

5. Promote open moor trials in logical areas to learn new techniques such as flail and flail collecting to develop better fire management, access and to re-open grazing areas lost to the spread of Molinia.

6. Work with other national moorland associations to develop best practice techniques for moorland and upland grassland management in the face of climate change and within restored peatlands.

7. Restore heathlands by grazing sensitively. If heathlands are declining in condition or extent, winter grazing should be limited or halted.

8. Where appropriate, allow wet woodland, valley woodlands and open woodland habitats to develop in order to protect rivers and streams in the uplands and to provide varied grazing habitats for stock. Create local short term exclusion zones with herders and shepherds.

9. Use management of archaeology to grazing advantage and respect sensitive areas through annual grazing plans.

Newtakes:

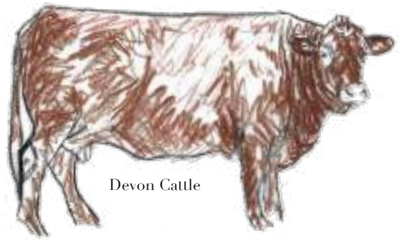
1. Take advantage of Newtakes enclosed nature to restore complex habitats requiring specific management - e.g. upland heaths and valley mires.

2. Promote scrub and wood pasture systems to blend uplands with lowlands and provide seasonal grazing options when upland productivity or weather is sub-optimal.

3. Use newtakes as demonstration and trial locations to highlight efforts and provide learning for farming community of new techniques. (cutting Molinia, swaling etc.).

4. Where slope and conditions allow, continue to develop the mosaic habitats already found within these enclosed landscapes, such as natural regeneration of trees and scrub as well as open grassland and heath. Use indicator areas to inform restoration more broadly. Use species indicators such as Marsh Fritilliary/Whinchat to monitor successes.

5. Use management of archaeology to grazing advantage and respect sensitive areas through annual grazing plans.



Devon Cattle

Pony

KEY **PEOPLE** ACTIONS & IDEAS

People are integral to the existence of Dartmoor as the cultural and lived in landscape we know today and have of course shaped its evolution over thousands of years. People will continue to be an influence on the changing nature of the Moor however, we must continue to look at impacts from a constructive, multifaceted perspective. Current authorities such as the Dartmoor National Park execute regular surveys of visitors - this should continue to be a regular practice to help build up a picture of the visitor demographic. These surveys will also help reveal how the Moor is a great resource of research, learning, experimentation, health improvement and recreation.

In support of the tourism and educational industries of Dartmoor, enhanced effort and resources should be allocated towards the repair and prevention of erosion from heavy footfall, especially in ecologically sensitive areas. The accessibility of rare bird nesting sites in spring for example, should be questioned as they currently remain threatened. This is a regularly upheld practice on coastlines nationally. Continued efforts should be made to simultaneously encourage learning about the Moor's many fascinating aspects, but also increased attention and respect to land use, access rights and the practice of local farmers and land-custodians.

Efforts should continue to flow towards generating a future Dartmoor with four foundational values with respect to people - community, economy, recreation and learning. These of course do not exist in a vacuum from each other and may intersect in many ways, including encouraged rural skills apprenticeships, enhanced collaboration between farmers, restoration groups and educational institutions, and a committed support to building relations between visitors and a diverse market of produce and services, made and sold locally. A rekindling of Dartmoor as a landscape buzzing with species-rich, multifarious habitats as well as a site of production and connection. One opportunity within this work would be to gauge local needs more regularly through round tables or an online forum.

1. Recognise and manage increased recreational usage by ensuring the robustness of popular sites with regular upgrades to path networks.

2. Continually improve and enhance learning centres, information boards and digital learning resources.

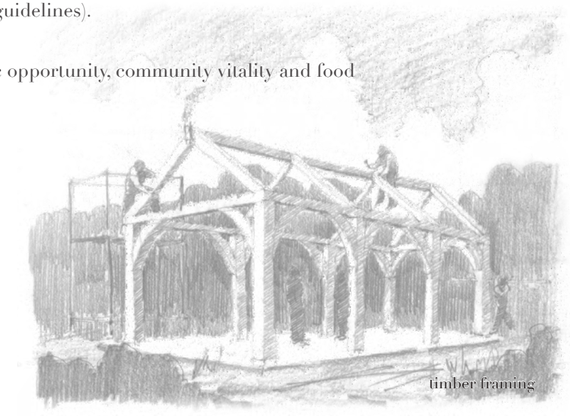
3. Continue to educate visitors on Dartmoor as a working and ecologically sensitive landscape, to be respected according to the 'countryside code' and to keep motorist and dog related incidents to a minimum.

4. Investigate opportunities to establish and enhance 'outdoor days' for curious visitors who may want to engage in activity-based learning opportunities throughout the Moor - peatland restoration, farm volunteering or species monitoring to name a few possible options.

5. Encourage and support local industries through existing and proposed networks, infrastructures and outlets for Dartmoor-based products and services.

6. Optimise the economic value of tourism to Dartmoor through extending the length of stay, quality of experience and use of local accommodation/produce. Migrate stays from short term let housing stock within the Park to farm stay options, such as curtilage located cabins and huts (within prepared planning and design guidelines).

7. Connect landscape restoration to local economic opportunity, community vitality and food provenance.



timber framing

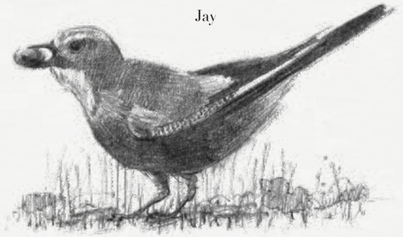
KEY **WILDLIFE** ACTIONS & IDEAS

The flora and fauna of Dartmoor exist within a patchwork mosaic of habitats; a mosaic that was developed on Dartmoor over millennia, and one that is complex and completely interwoven with our continued existence within these habitats. Human activity on Dartmoor has shaped and will continue to influence the very character and integrity of the habitats that Dartmoor's wildlife depend on. It is in this inextricable influence over habitats that we see opportunity to better manage the outcomes of this influence; by collaboratively working across the landscape scale and by shifting land management actions for the wildlife of Dartmoor.

The following management actions may help to guide the development of land management plans, Estate and landscape scale strategies and inform management actions that are connected across habitats to help create a more resilient, wildlife-rich Dartmoor. Although not listed here, there has been and continues to be vitally important species-specific conservation work being done on Dartmoor, such as the Dartmoor Curlew Recovery Project and Butterfly Conservation's fritillary butterfly recovery work, and these targeted conservation efforts can and should still be applied within this suggested habitat-scale approach to management. Rather than focusing on the conservation solely of specific species, the following actions broaden this work to take a landscape-scale, habitat-focused approach to management of Dartmoor with wildlife in mind.

Snipe

Cuckoo



Jay

1. Establish an up-to-date habitat baseline, prioritising areas not mapped in the most recent surveys, in order to gain an understanding of the current extent and condition of Dartmoor's wildlife habitats.

2. Identify and understand key wildlife 'hotspots' on Dartmoor so that management actions for these areas do not harm any rare, vulnerable, or keystone species, or compromise the habitats that support them.

3. To support wildlife alongside farming, consider the integration of a more habitat-specific, holistic grazing approach on Dartmoor; wherein the management focus is on appropriate grazing intensity, rest period, and grazing season as determined by a site's ecology and managed by the grazier/s accordingly.

4. Structure and implement a deer management plan.

5. Introduce or increase collaborative management actions to control invasive species.

6. Pro-actively manage tourism on Dartmoor to ensure that people may continue to experience the wildlife of Dartmoor, but are not drawn to the most sensitive areas at specific times.

Greater Horsehoe Bat

KEY **TREE** ACTIONS & IDEAS

Woodlands within the Duchy landholding and the Landscape Recovery area occupy a small percentage of the whole. Four principal commercial conifer woodlands, Fernworthy, Soussons, Bellever and Brimpts, are managed and governed by Forestry England, and although Soussons is leased from the Duchy, these woodlands do not form part of the Landscape Recovery Project at the moment. The remaining tiny fragments of ancient woodland and native woodlands typically are found at lower elevations and along steep river valleys.

The commercial woodlands are currently being worked under the Forestry Commission's Dartmoor Forest Plan 2016 - 2026. This plan encompasses overarching management objectives for the woodland resource, as well as very detailed plans for each separate woodland. The objectives of this plan are supported and should form the basis of any subsequent plans for these woodlands following 2026.

Management of other conifer plantations across the wider area should be directed by the core principles of the Forestry England Dartmoor Forest Plan. These focus on: -

- Production of sustainable and marketable woodland products;
- Conserve cultural and heritage assets;
- Provide and maintain recreational facilities;
- Diversify woodland species composition; and
- Enhance woodlands for their habitat value.

The following landscape and ecology recommendations are for native woodland expansion, such as building on the recent Wistman's wood expansion project, which will support the increase of native tree cover on Dartmoor. Alongside this, the value of the existing woodland resource is acknowledged and recommendations are made for increased management under viable, sustainable woodland enterprise.

1. Support the objectives of the Dartmoor Forest Plan 2016 - 2026 - The overarching objective is to create woodland with increased conservation and landscape benefits, whilst maintaining a viable timber output.

2. Support and encourage small woodland enterprise, with a living landscape approach. Support in-woodland up-valuing of woodland products including charcoal burning, milling, timber/wood storage and drying and diversified woodland revenue including access to nature, education and rural skills.

3. Re-establish coppice rotation where associated with viable woodland economy, as above.

4. Identify core areas of viable woodland expansion. Avoiding deep peat and active bogs. Target areas connected to existing wooded habitats along steep valley slopes and riparian corridors between wooded sites.

5. Encourage soft edges to existing woodland to create gradient from closed canopy woodland out to open land.

6. Support and accelerate natural woodland succession and generation to create native, diverse well-structured woodland. Consider short-term, small-scale fencing to protect successional developing woodland.

7. Any tree planting should carefully consider tree species guilds, adopting a correct balance between climax canopy species, pioneer or nurse species and understory or shrub species, mimicking natural processes. Regard should be given to capacity so as to achieve productive outputs to help sustain onward management and the local economy.

8. Wood-pasture should be valued and retained where already establishing. This includes rowan and hawthorn shrubs establishing in grassland and heath.

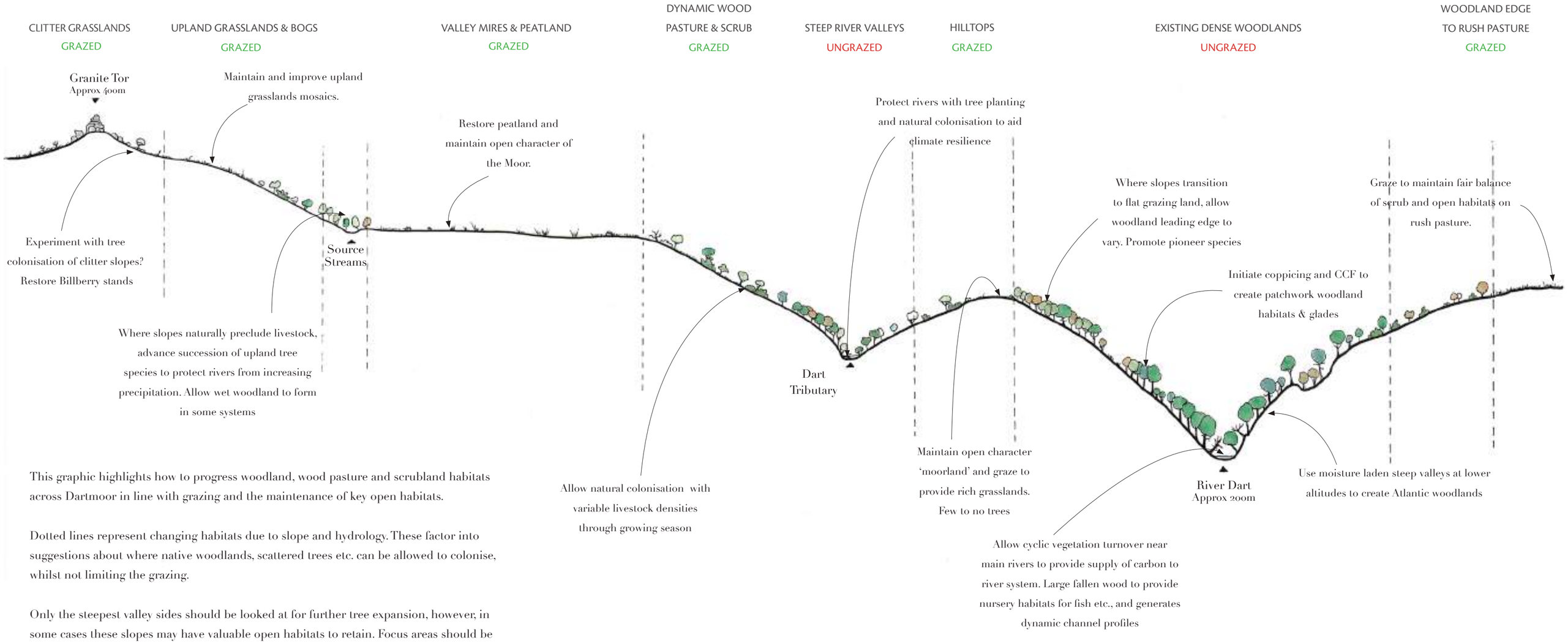
9. Manage grazing, especially during summer, to avoid areas of regenerating woodland, but be flexible and work collaboratively to use grazing sensitively in mature woodland to promote species and structure.

A POTENTIAL FUTURE TREESCAPE OF DARTMOOR

Amplified 3x to show variance in elevations

GRAZED = Grazed to maintain richness of habitat mosaic

UNGRAZED = Grazing unnecessary but can be allowed sporadically



This graphic highlights how to progress woodland, wood pasture and scrubland habitats across Dartmoor in line with grazing and the maintenance of key open habitats.

Dotted lines represent changing habitats due to slope and hydrology. These factor into suggestions about where native woodlands, scattered trees etc. can be allowed to colonise, whilst not limiting the grazing.

Only the steepest valley sides should be looked at for further tree expansion, however, in some cases these slopes may have valuable open habitats to retain. Focus areas should be mapped to begin trial areas.

Bog Hoverfly

KEY **PEATLAND** ACTIONS & IDEAS

Today, the peatlands face significant challenges with climate change conditions getting worse, but through careful collaboration and informed action, there is a clear opportunity to maintain and restore these habitats to slow down the erosion of peat long-term.

1. Ensure restoration sites and managers work closely with graziers to implement correct post creation/restoration management to ensure appropriate establishment and long term success of restored sites.

2. Monitor physical processes for sharing successes, challenges, and learnings. Monitor water closely related to peatlands for quality and quantity.

3. Collaborative planning before starting projects to create comprehensive plans for each site. Include Restoration Officers, commoners, Historic Environment Officers, and Monitoring Teams.

4. Link with Historic Environment Officers to ensure restoration is sensitive to preserved artefacts.

5. Consultations with landowners, farmers, and commoners, to ensure plans align with best practices and the needs of all stakeholders.

6. Keep the intention of planning to be designed to benefit wildlife, people, and the climate.

7. Tailor methods for each site to reflect the specific needs. Factors include peat depth, drainage extent, historic features, access, and topography.

8. Local natural materials should continue to be used and monitored to block large ditches.

9. Low-impact machinery, with less impact than the footprints of groups of people, should be used to help create pools that raise the water table.

10. Incorporate livestock passes on all large restoration projects where needed.

11. Incorporate shrub habitats within peatland restoration sites as per expert advice from peatland experts, where carbon drawdown increases with this vegetation community.

12. Continuous improvements should be made to engage people in learning, particularly about the climate impact of peatland degradation.

13. Sensitively share drone imagery of restored and intact sites and successes from grazing movements to wider audiences for learning.

14. Involve local scientists in developing the vision of peatlands with up-to-date climate change predictions.

Meadow Pipit

Duke of Edinburgh
Credit: Annie Spratt

IX Stakeholder engagement

Spring in a Dartmoor rainforest
Credit: Louis Pearson

IX Stakeholder engagement

The following pages outline the process of the stakeholder engagement meetings conducted over several months. The meetings focused on the three recognised landscape forms of Dartmoor: **High Moor, Enclosed Uplands,** and **Valleys and Foothills.** This was so the resultant, engaged visuals could be used to inform management across the whole of Dartmoor.

The stakeholders are listed at the beginning of this document and comprise a wide range of representation from farming, commoning, conservation, Governmental and non-Governmental.

Simple line-drawn visualisations of these areas were prepared and presented to participants. Each participant was encouraged to annotate these drawings with their ideas and suggestions for Dartmoor, either through sketches or written notes.

Met Office data was summarised and presented to the stakeholders who were all asked the same five key questions about the future management of Dartmoor to maintain consistency.

This input was gathered and analysed to create more detailed visualisations, which were then shared with consultees for feedback. The revised visualisations were accompanied by data gathered from the process and presented in multiple formats tables, diagrams, and written descriptions ensuring that participants could engage with the information in the way most accessible and comfortable for them. The following pages describe this process.

CHOSEN IMAGERY

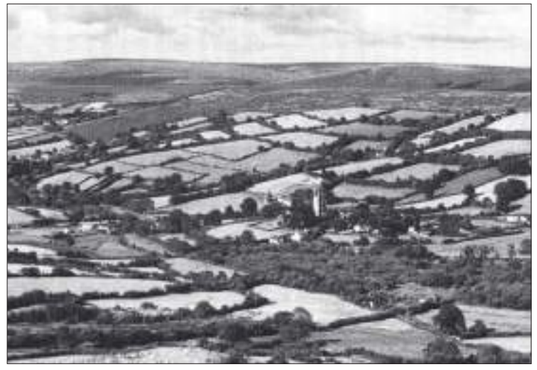
Note: Images taken from Eric Hemery's *High Dartmoor* 1983

HIGH MOOR

The high moor is typically characterised by very soft undulating hill forms which gently intersect with one another. The only contrasting landscape features being punctual tors on the horizon. This condition tends to favour blanket bog formation and heathland, with next to no trees.

ENCLOSED UPLANDS

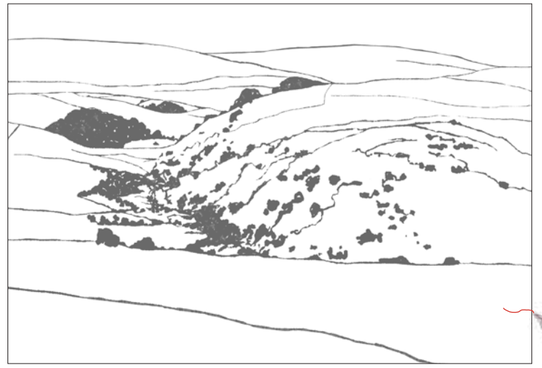
The enclosed uplands is a condition best represented by this image which shows the higher points of moorland and the incised and protected landform of the enclosed Newtakes and valley which lies between these high points. The unsettled valleys tend to be relatively wooded and often with a flowing water source.



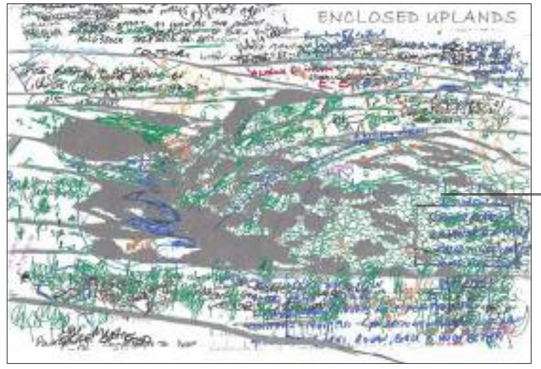
VALLEYS AND FOOTHILLS

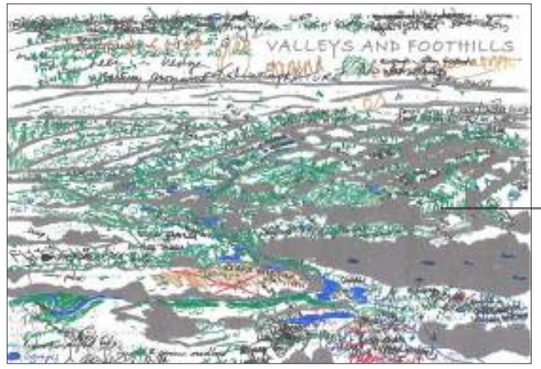
The valleys and foothills of Dartmoor may be best represented by this image depicting the transitional condition of moorland to more domesticated and cultivated lower lands. The topography describes a landscape of subtly folding hillsides. The valleys and foothills tend to have quite mixed habitats of moorland, pasture, woodland, hedgerows and settlement.

SIMPLIFIED LINE DRAWINGS

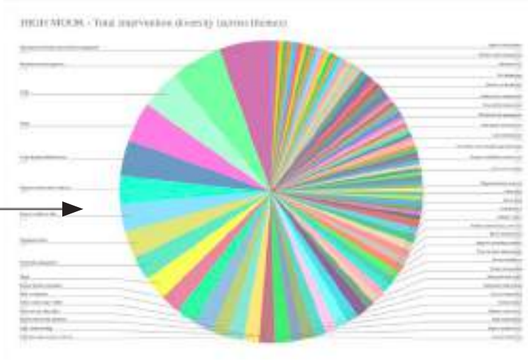


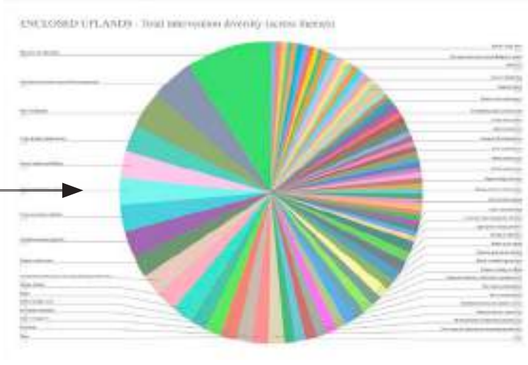
COMBINED ANNOTATIONS

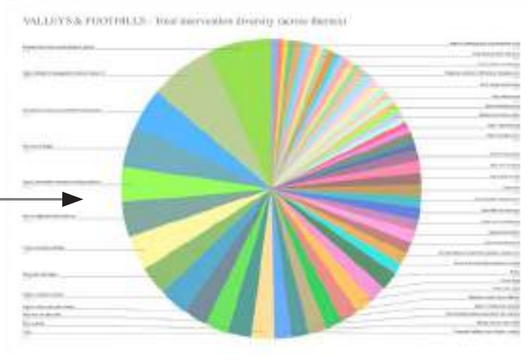




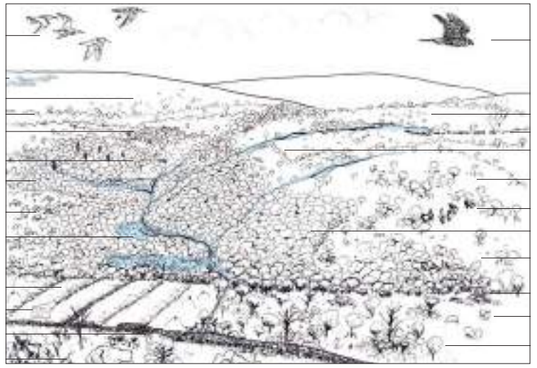
ORGANISED DATA

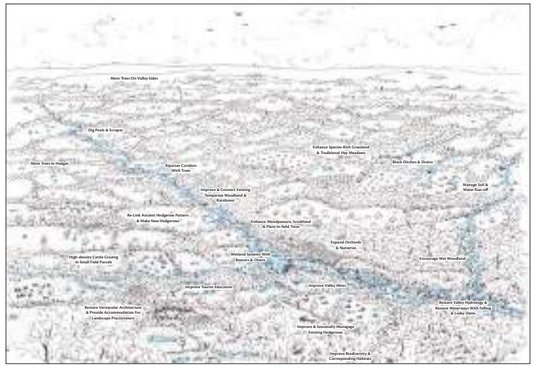






VISUALISED DATA - SKETCHED DRAFT - Stage 1





Note: These line drawings were shown to the Duchy as a work in progress, half way draft

HIGH MOOR

For the High Moor, the subject mentioned the most was ‘hydrological restoration’, then ‘peatland restoration’, then ‘cattle’, then ‘ponies’, then ‘create dynamic habitat mosaic’.

ENCLOSED UPLANDS

For the Enclosed Uplands, the most mentions were ‘more trees on valley sides’, then ‘hydrological restoration’, then ‘more wood pasture’.

VALLEYS AND FOOTHILLS

For the Valleys and Foothills, the most mentions were ‘reconnect and restore ancient hedgerow pattern’, then ‘improve hedgerows (management, rotations, laying etc.)’, then hydrological restoration (general/ flood management).

Note: All stakeholders recognised the key role of farming and appropriate grazing as the underpinning tool of the majority of required management.

X Landscape visualisations

The following visualisations depict the three identified landscape typologies - **High Moor, Enclosed Uplands** and **Valleys & Foothills**. They are the visual output from all the stakeholder engagement events - conversations, participant drawings, voting and many further discussions held with the Duchy of Cornwall and the Landscape Recovery team.

Their purpose is to bring the potential outcomes from future management to life, whilst representing the collective view of the community; an amalgam of a diverse range of opinions. These visualisations provide the opportunity to see change from a visual perspective and be used as an aid for all who are involved in the future management of Dartmoor.

Visualising the landscape
Credit: Digg & Co

THE HIGH MOOR

Upland breeding wader recovery/ predator control

Widespread movement of cattle to promote rest and recovery periods for upland mosaic

Use existing paths to tors as firebreaks

Restore blanket bogs

Appropriate grazing of archaeology

Shepherding sheep

Protect monuments with appropriate grazing

Soften conifer plantations with native woodland creation & outlying wood pasture & scrub

Free roaming ponies

Restore heather & bilberry mosaic amongst grassland ecosystem

Peatland restoration

Create patterned bog complexes

Molinia management: Trials, grazing changes & investment in herding help

Gully & drain blocking

Bracken management for butterflies

More trees & scrub on steep valley sides

Create a more resilient dynamic habitat mosaic across the upland landscape with targeted management

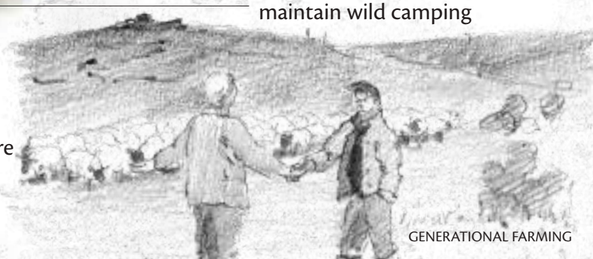
Cattle

Promote responsible access & maintain wild camping

Riparian valleys with additional trees & areas of wet woodland

Natural flood management:
Hydrological restoration
River restoration

Wood pasture developing



ENCLOSED UPLANDS

MARSH FRITILLARY

Jack snipe

WHINCHAT

Peatland restoration

CONNECT ENCLOSED UPLANDS TO HIGH MOOR

Heathland diversity

Manage gorse

Livestock housing

Connect existing woodlands

Mixed size trees

Butterfly connectivity

Hydrological restoration

Protect and enhance traditional hay meadows

Improve people access

Restore field patterns

Holistically planned grazing

Manage Molinia

Fire breaks

CURLEW

Restore heather and billberry

Enhance scrub mosaic

Restore habitat for breeding waders

More woodpasture

More trees on valley sides

Dartmoor ponies

Improve hedgerows

Sheep

Create dynamic habitat mosaic

Generational farming

SILVER-WASHED
FRITILLARY

VALLEYS & FOOTHILLS

LINKING TO UPLANDS & HIGH MOOR

PIED
FLYCATCHER

Improve access to high moor for farmers, walkers & riders

Create pools & scrapes

More trees in hedges

Manage squirrel & deer populations

Plant riparian corridors with trees

Re-link ancient hedgerow pattern & make new hedgerows

Local breed, three species grazing delivers diverse permanent pasture management with rest periods across farms

Restore valley hydrology & waterways with felling, leaky dams & natural flood management methods

Improve & seasonally manage existing hedgerows

Improve visitor education

Restore vernacular architecture & provide accommodation for farmers & rural workers

Enhance cyclical woodland management & support small-scale local economies (coppicing, charcoal etc.)

Mixed species forestry patches with good access

Improve & connect existing temperate woodland & rainforest

Retain standing deadwood

Expand species-rich grassland & traditional hay meadows

Manage soil, nutrient & water run-off

Enhance woodpasture, scrubland & plant in-field trees where appropriate

Enhance orchards & agroforestry to support local produce & biodiversity

Encourage wet woodland

Construct & enhance wetlands

Improve biodiversity with connected habitats

Modern-day farming infrastructure with approved design codes applied

XI Dartmoor all together

The management actions identified above can all contribute, but in many cases are likely to be specific to farming or natural systems, or to a location.

As an enabler we have focused on 15 of the most impacting and wide-ranging actions and offer them as a set of Key Principles to guide future management and project plans. These Key Principles can be found in the early part of the document at page 11 and are repeated overleaf in diagrammatic form as a closing reminder.

FROM LEARNING TO ACTION

The two commissioning organisations for this Study, the Duchy of Cornwall and the Central Dartmoor Farm Cluster, have offered the following commitments. They plan to:

1. Use this Study and the ideas espoused within to inform the production of a new estate-scale strategy for the Duchy of Cornwall's interests on Dartmoor.

2. Ensure these ideas included in this Study are integrated into the land unit management plans arising from the Central Dartmoor Landscape Recovery Project.

3. Share and promote this work into the Land Use Management Group.

4. Work with the Land Use Management Group to help initiate and structure holistic grazing and vegetation management trials.

5. Integrate this work into the Duchy's Curlew Recovery Project.

6. Share the Study report and associated visualisations with participating stakeholders including the Dartmoor National Park Authority.

Our hope is that other land managers across clusters and individual farm holdings, and individual commons, will choose to develop their own land management plans based on these actions and Key Principles. This objective sits perfectly with the ambitions of the Duchy and Landscape Recovery Project with each 'land unit' having a plan that connects with the spatial landscape vision. We hope this work can also be used to inform future National Park management plans and strategies.

And finally, we offer the beginnings of a holistic landscape vision for Dartmoor, shaped by all who have engaged in and contributed to this work. This vision will no doubt evolve and change, just as Dartmoor has and will continue to do. Our hope is that like the findings and thinking set out in this Study, this vision can form part of a 'lifting off' point towards the Dartmoor we all dream of seeing.

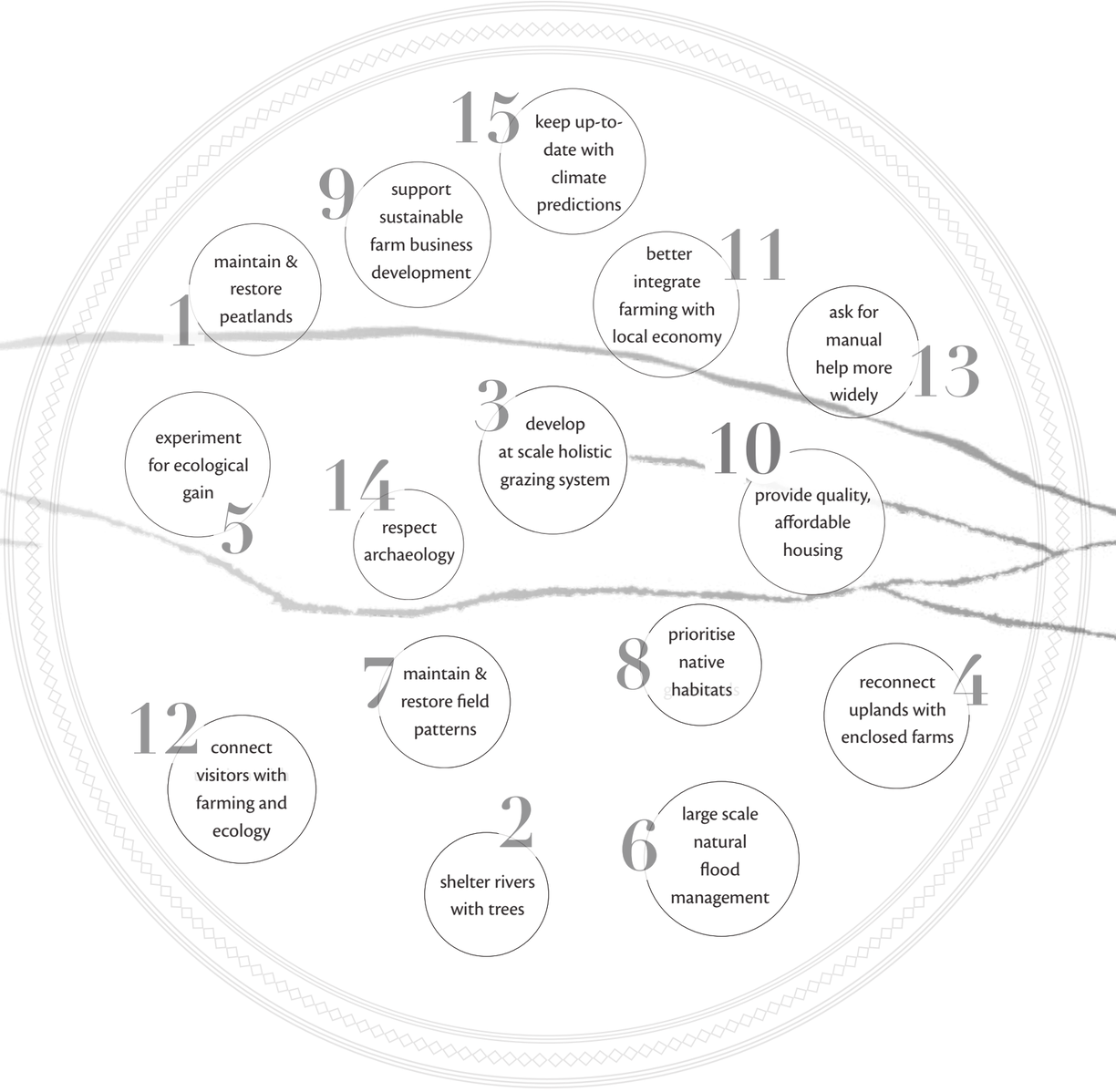
A HOLISTIC LANDSCAPE VISION FOR DARTMOOR

Dartmoor, an extraordinary cultural landscape, farmed and inhabited by people for thousands of years, is undergoing a shift towards a balanced future of habitat restoration and land use change, underpinned by viable and sustainable farming and commoning, enabled by bespoke and holistic support and partnership working.

Improved hydrological recovery will see the Moor work better as Devon's great upland sponge in the face of advancing climate instability. Habitat connectivity will be improved, and woodland links will be made along the steep valley sides between the Moor's prominent conifer plantations. Management of Molinia dominance will see the return of a wildlife-abundant habitat mosaic of upland acid grasslands, heathlands and a host of bog habitats on restored peatland. Future efforts made to restore this wealth of habitats will hopefully see the uplift of many iconic species as well as a home for many migrating in front of changing temperatures.

Farming will be an essential driver for much of this recovery, and will see a shift towards dynamic, holistic grazing methods, with cattle, sheep and ponies, providing diversity. The Moor's commoners and farmers will be supported to execute the necessary landscape management actions, whilst generational farming and cross-industry collaboration will be the linchpin for the prolonged success of the project over the coming decades. As a result, the local export of the Moor's produce will be supported and Dartmoor will become a well managed source of sustainable products and the pillar for wildlife it once was.

Dartmoor's communities and economy will benefit from renewed purpose, investment and recognition. A thriving ecological and farming context will generate opportunities across the economy, including expenditure arising from those attracted to experience all that Dartmoor, its settlements and businesses have to offer.



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Dart Valley towards Bench Tor
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