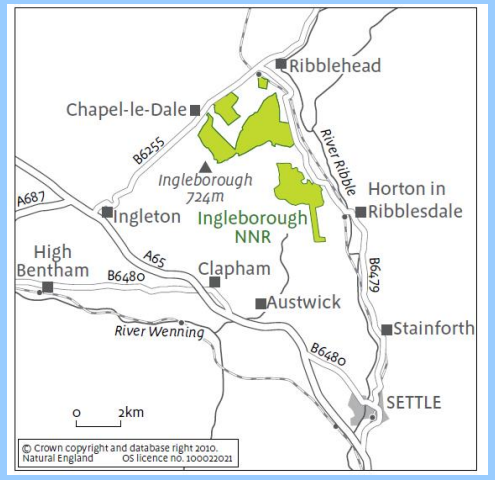
What drives ecological restoration, and what holds it back?

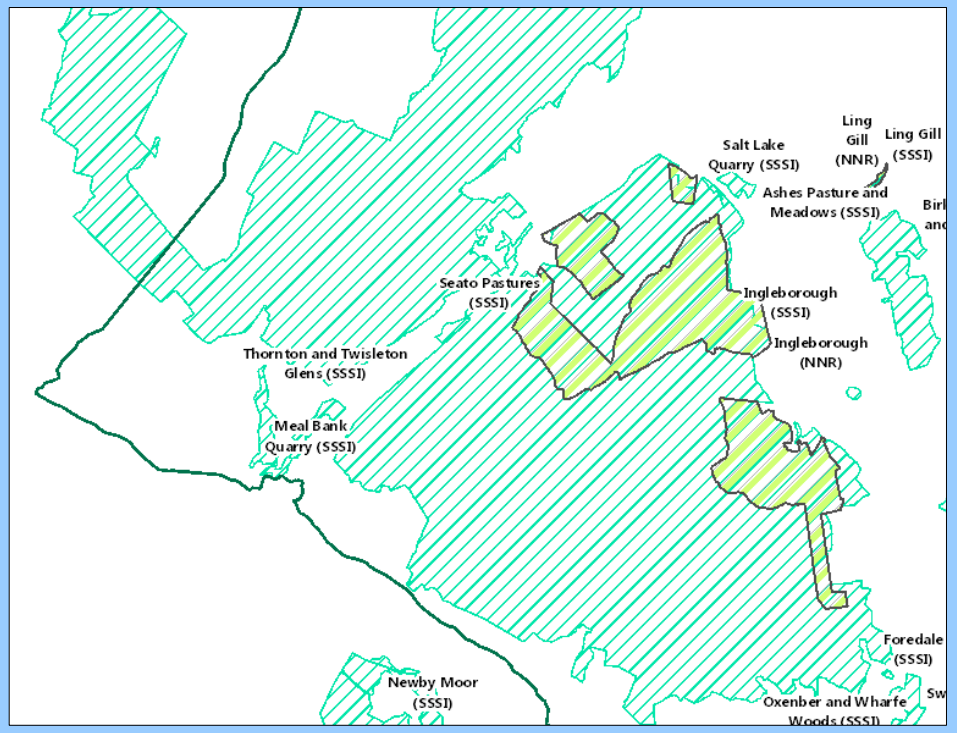
Dr Mark Fisher, October 2015
Wildland Research Institute

Ingleborough National Nature Reserve

Nesting of protected areas

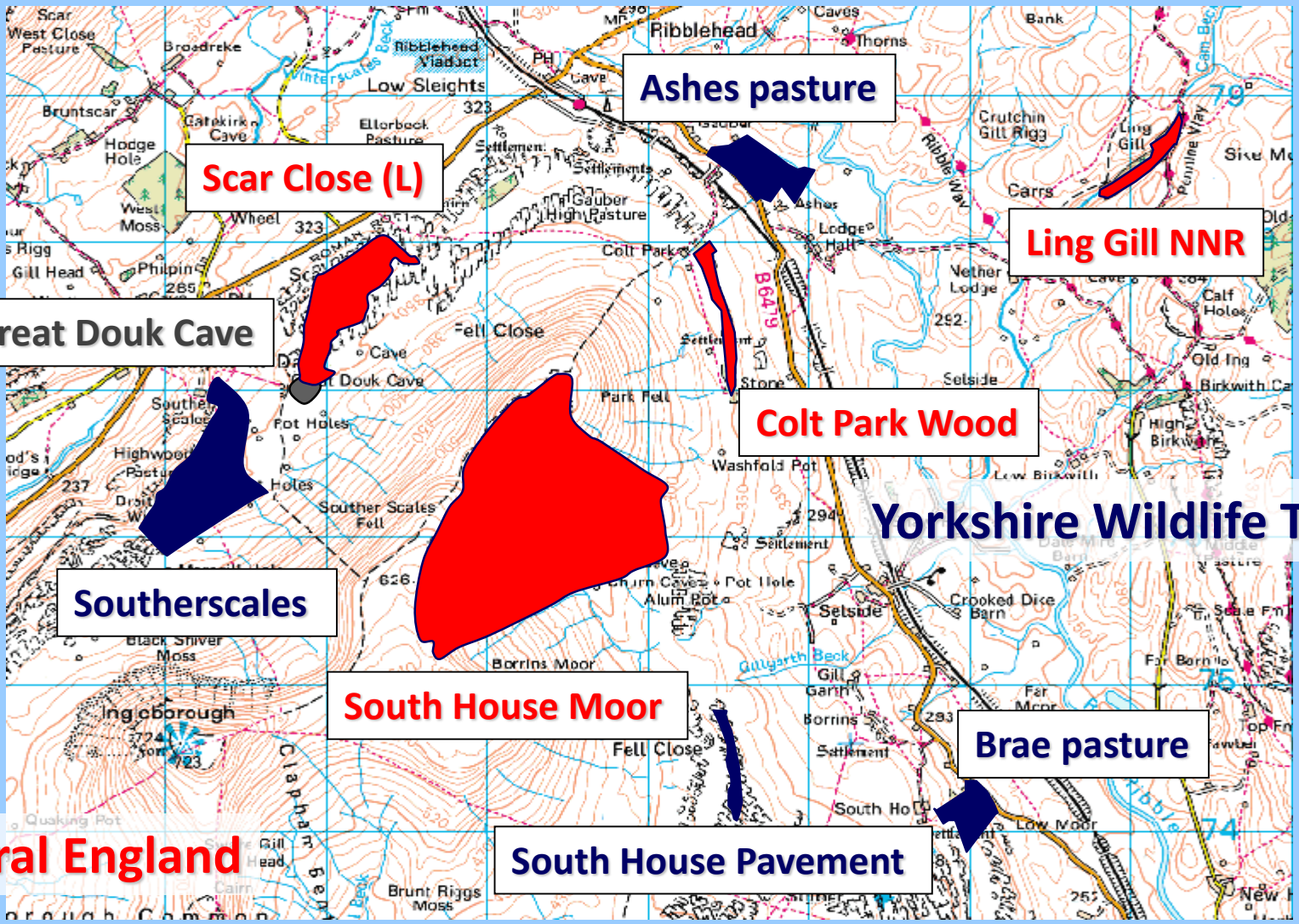
- Ingleborough NNR covers 1,012ha - officially opened 1993
- NNR is inside the much larger Ingleborough SSSI
- the SSSI is inside the Yorkshire Dales National Park





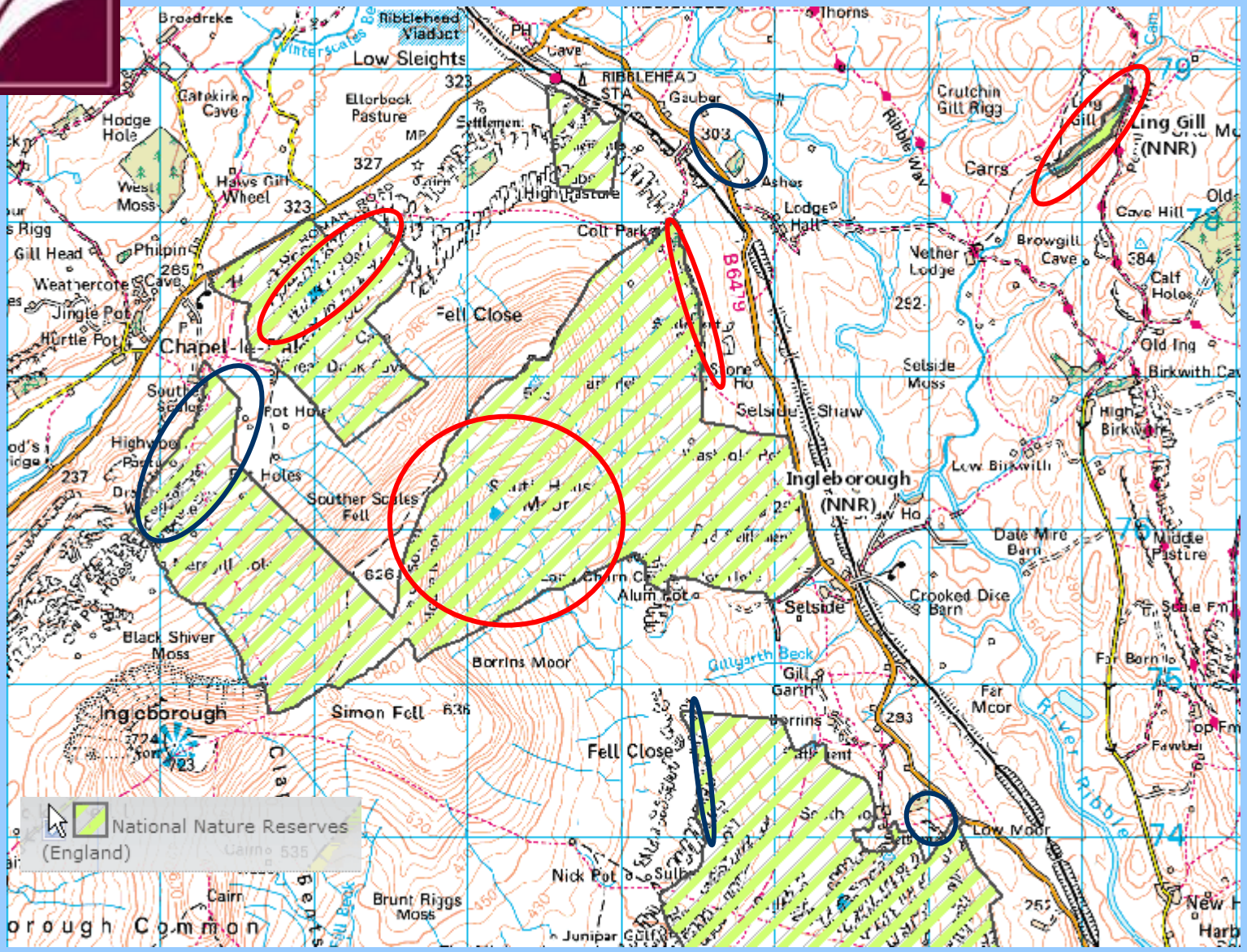
- most of the NNR is **publicly owned** and managed by Natural England
- some areas are on long leases to NE
- two reserves in the NNR are owned and managed by the Yorkshire Wildlife Trust

Land ownership (or leasing) of protected areas



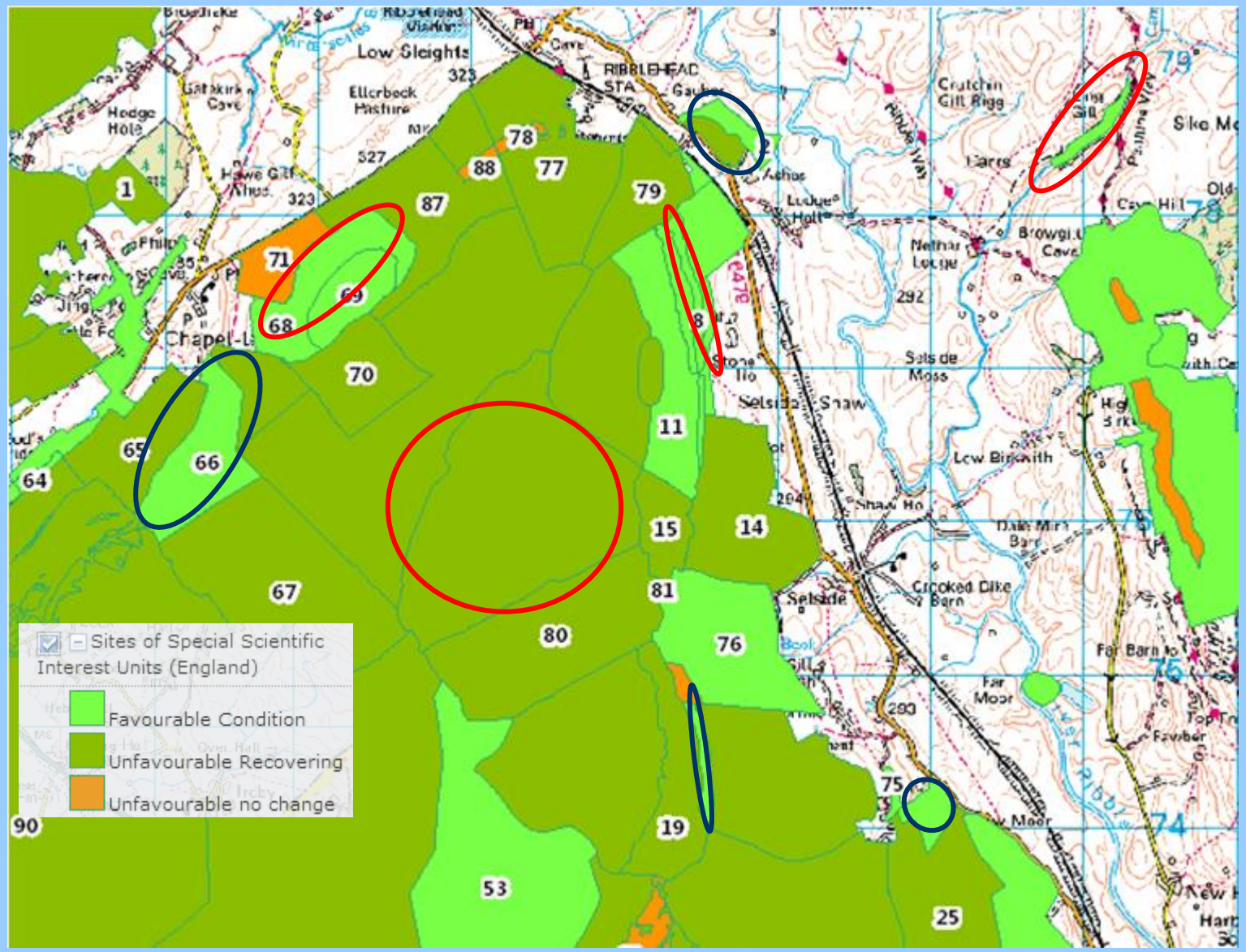
What do we know about their **management?**

National Nature Reserve



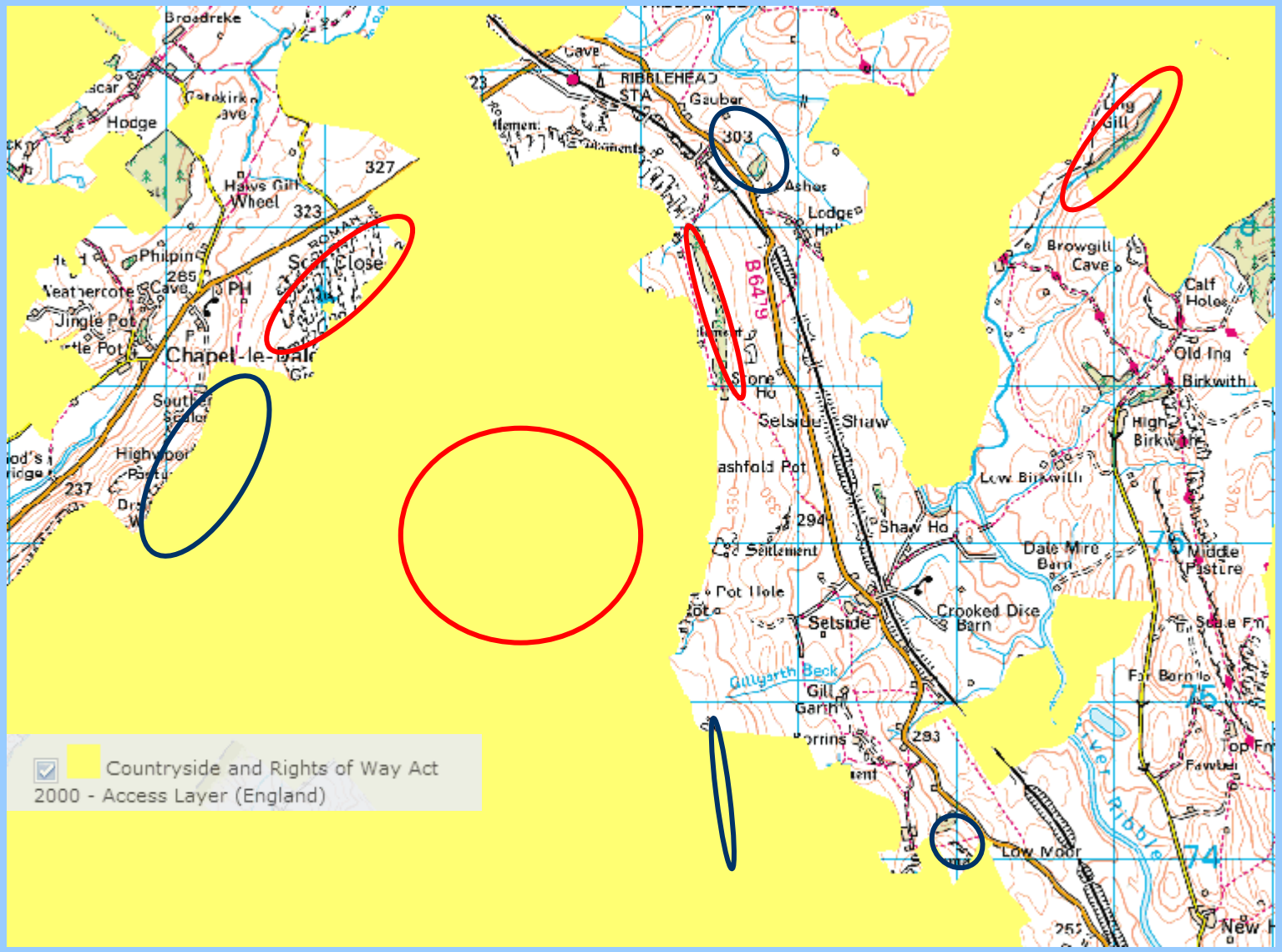
Ling Gill and Ashes, Braemar Pastures of YWT not in NNR

SSSI - broad habitats and Common Standards Monitoring



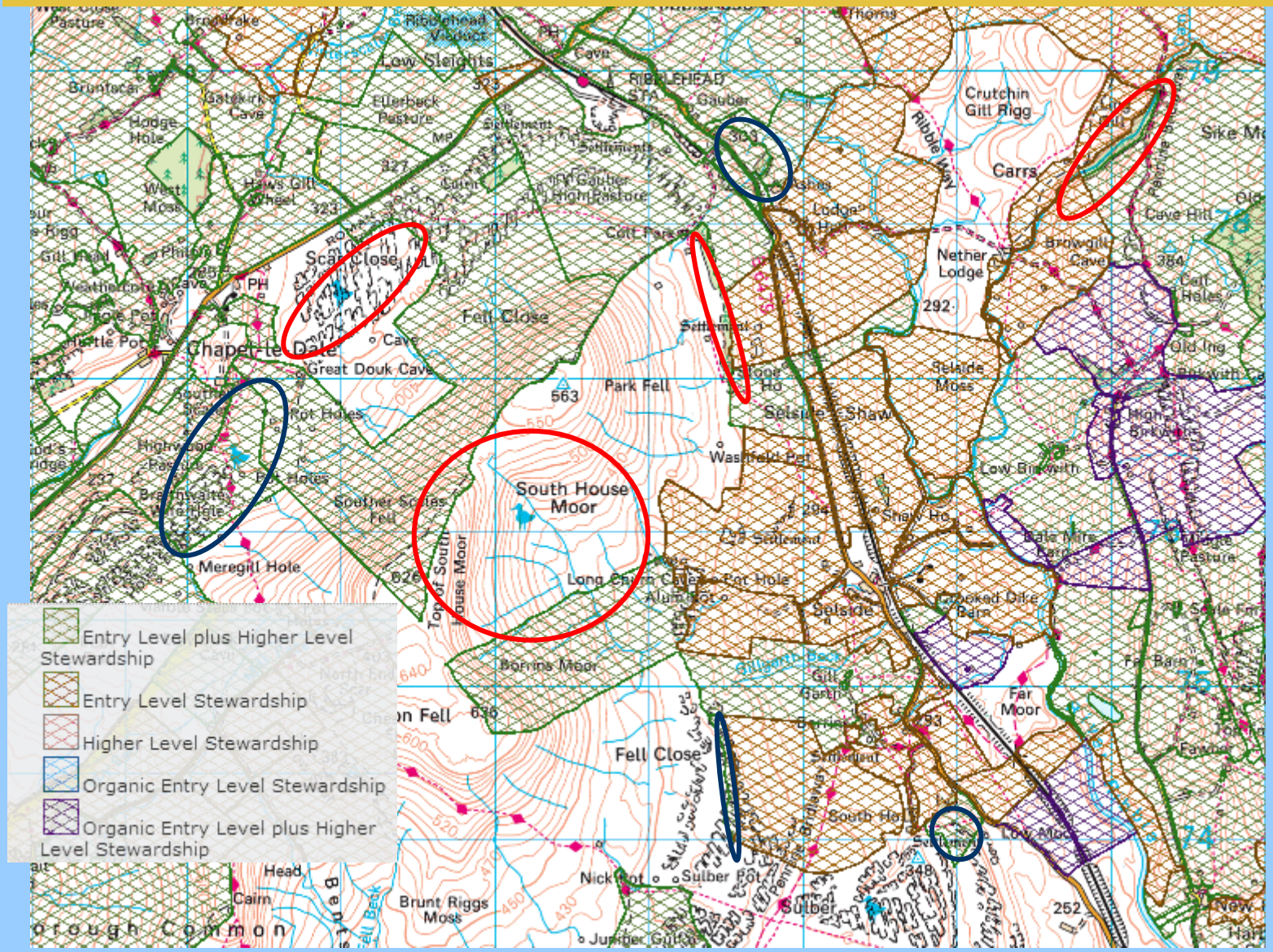
Compositional-driven landscape based on fixed criteria

Open Access – Countryside Rights of Way Act 2000



No access to Scar Close, Colt Wood, Ling Gill and two of YWT

Agri-environment subsidy – stewardship Schemes



NO agri-environment subsidy on NE land

Summary of ownership, designations, access and schemes

	Public own/control	Access	HLS
Ling Gill	**Y**	N	N
Colt Park Wood	**Y**	N	N
Scar Close	**Y**	N	N
South House Moor	**Y**	Y	N
Great Douk Cave	**N**	Y	Y
Ashes pastures	**N**	N	Y
Brae Pasture	**N**	N	Y
South House Pavement	**N**	Y	Y
Southerscales	**N**	Y	Y

- all are units in Sites of Special Scientific Interest (SSSI)
- none are registered common land

Is there any indication from this summary about how they are managed – how wild they are?

Yorkshire Wildlife Trust

Environmental Stewardship Agreements (England)

Agreement Reference	AG00334945
Scheme	Entry Level plus Higher Level Stewardship
Customer Name	YORKSHIRE WILDLIFE TRUST
Town	York
Start Date	01/04/2011
Total Cost of Agreement (£)	129034.50
Amount Paid to Date (£)	55861.40
Total Area Under Agreement (ha)	61.61

Agri-environment subsidy payment for grazing over 10 years of the agreement

Yorkshire Wildlife Trust

Who we are | What we do | How you can help | Nature Reserves | Wildlife | Disco

Southerscales Nature Reserve

paid to graze

Parcels – SD74762836 & SD74772901 (Southerscales)

January	February	March	April
Maintain an average sward height 2-15cm, without overgrazing or poaching. Max – 40 sheep	Maintain an average sward height 2-15cm, without overgrazing or poaching. Max – 40 sheep	0-40 sheep	0-40 sheep
May	**June**	**July**	**August**
20 sheep	10 cattle only	10 cattle only	10 cattle only
September	**October**	**November**	**December**
10 cattle & 50 sheep or 100 sheep	10 cattle & 50 sheep or 100 sheep	Maintain an average sward height 2-15cm, without overgrazing or poaching. Max – 40 sheep	Maintain an average sward height 2-15cm, without overgrazing or poaching. Max – 40 sheep

Max livestock Units per hectare per year = 0.172

Yorkshire Wildlife Trust

Who we are | What we do | How you can help | Nature Reserves & G

Brae Pasture Nature Reserve

paid to graze

Parcel – SD79740104 (Brae Pasture)

January	February	March	April
Maintain average sward height of 2-15cm without overgrazing or poaching	Maintain average sward height of 2-15cm without overgrazing or poaching	Maintain average sward height of 2-15cm without overgrazing or poaching	No Stock
May	**June**	**July**	**August**
No Stock	No Stock	5-6 cattle	5-6 cattle
September	**October**	**November**	**December**
5-6 cattle	5-6 cattle	Maintain average sward height of 2-15cm without overgrazing or poaching	Maintain average sward height of 2-15cm without overgrazing or poaching

Yorkshire Wildlife Trust

Who we are | What we do | How you can help | Nature Reserves

Ashes Pastures Nature Reserve

paid to graze and **NOT** graze

Parcel – SD77780961 (Ashes Pasture)

January	February	March	April
Max – 20 sheep	Max – 20 sheep	Max – 20 sheep	No Stock
May	**June**	**July**	**August**
No Stock	No Stock	No stock Mid July 10-15 cattle	10-15 cattle
September	**October**	**November**	**December**
10-15 cattle & 20 sheep	10-15 cattle & 20 sheep	10-15 cattle & 20 sheep	Max – 20 sheep

HC8 - Restoration of woodland

Land parcels and associated features managed under this option:

RLR Field Number: SD77787340

HC11 - Woodland livestock exclusion supplement

Land parcels and associated features managed under this option:

RLR Field Number: SD77787340

Features: T08 Native semi-natural woodland

Yorkshire Wildlife Trust

Who we are | What we do | How you can help | Nature Reserves & Gateways | Wildlife

South House Pavement Nature Reserve

paid to graze - grazing set to none!

South House Moor Re-wilding Project

SSSI Unit 16

"Within living memory the dwarf shrub communities on Ingleborough and the surrounding hills have been devastated by overgrazing"

Project objectives:

- demonstrate the ecological impact of **removing farming pressures**
- upland vegetation communities re-establish and develop to a more **natural state**
- recreate natural mixture of upland plant communities of **scattered native woodland** grading into **Juniper scrub** communities and **dwarf shrub moorland**

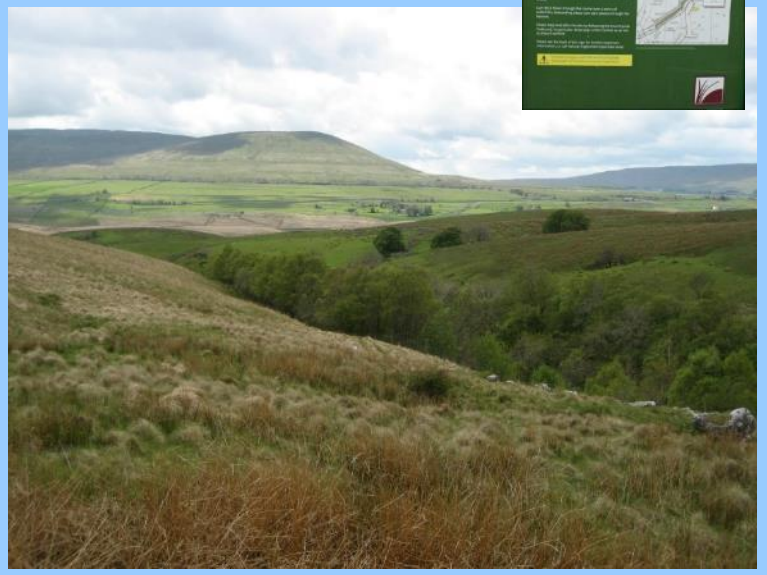
- **sheep grazing** ceased Summer 1999
- **10,000 native trees and shrubs** planted in copses and along gill sides (10ha) Autumn 1999-2002
- aim to establish where **conditions** are **appropriate** W1, W4, W4+W7, W9, W11, W19/W17
- **juniper** and **willow scrub** established on **scree slopes**
- **first generation trees act as seed parents** so that **natural regeneration** can take place over the **long term**

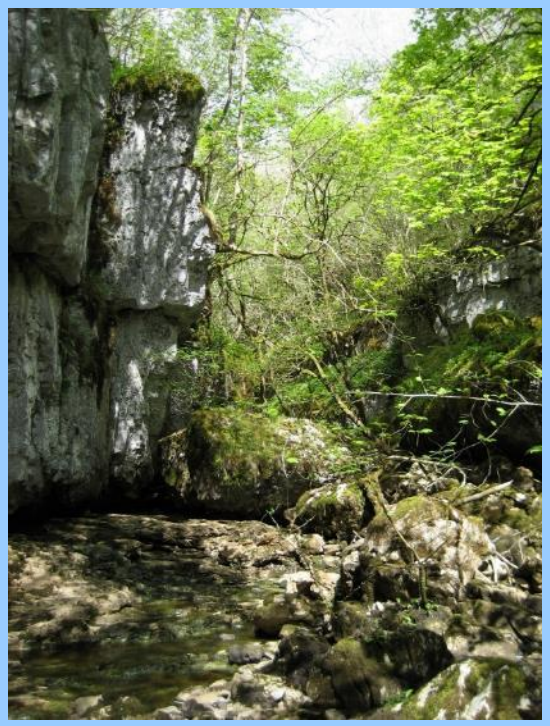
TROPHIC CASCADES – between grasses, slugs, field voles, common shrews and short-eared owls

Landscape in transition to greater structural complexity

Ling Gill National Nature Reserve

- **ancient** ash woodland in a steep-sided gill
- **inaccessibility to grazing** is probably the reason for its survival
- **Ancient Woodland Indicator** plants, freshwater crayfish





Wild! Rocks, water, woodland

Colt Park Wood – an NNR before Ingleborough

- ancient ash wood on the deeply fissured limestone pavement

-luxurious growth of lichens, moss, ferns and carpets of wild flowers like golden saxifrage, shining cranesbill, woodruff and wood sorrel

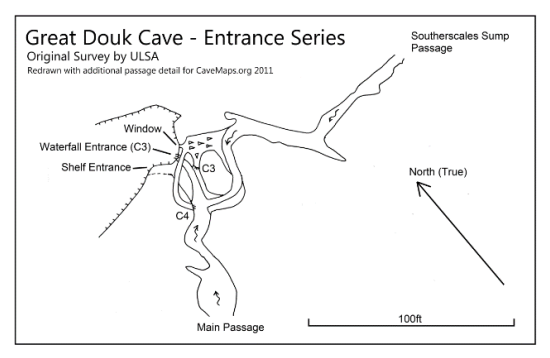
-grazing excluded

High scar to the east keeps sheep out

deer toe print

Wider grikes are roe deer avenues!

Great Douk Cave



SSSI Unit 87

Great Douk is walled off, the limestone pavement above the cave system is fenced

-grazing excluded

Cave entrance is in a large collapsed depression

Water flow comes in and quickly disappears

Ecological restoration through removing grazing

ENGLISH NATURE

Limestone walk

Ingleborough National Nature Reserve

Scar Close

Glance to your right to see wooded Scar Close. Grazing livestock have been excluded for many years allowing ash trees and hazel bushes to escape from the confines of the grikes.

This area now looks more like the landscape which existed prior to man's clearance of the upland woodlands that once covered the Yorkshire Dales. English Nature and other wildlife organisations are encouraging more land to move to a semi-wooded state, richer in plant, bird and insect life.

Ungrazed since 1974

SSSI Unit 68/69

Ecological restoration on Scar Close through recruitment of ash trees

Biological Conservation 175 (2014) 95–109

Contents lists available at ScienceDirect

Biological Conservation

journal homepage: www.elsevier.com/locate/biocon

Review

Ash dieback in the UK: A review of the ecological and conservation implications and potential management options

R.J. Mitchell [a,*], J.K. Beaton [a], P.E. Bellamy [b], A. Broome [c], J. Chetcuti [c], S. Eaton [d], C.J. Ellis [d], A. Gimona [a], R. Harmer [e], A.J. Hester [a], R.L. Hewison [a], N.G. Hodgetts [f], G.R. Iason [a], G. Kerr [c], N.A. Littlewood [a], S. Newey [a], J.M. Potts [g], G. Pozsgai [a], D. Ray [c], D.A. Sim [a], J.A. Stockan [a], A.F.S. Taylor [a], S. Woodward [h]

Fig. 2. Map of nine *Fraxinus excelsior* relevant regions within the UK. 1 = lowland Scotland, 2 = upland Scotland, 3 = upland northern England, 4 = lowland northern England, 5 = upland Wales, 6 = lowland Wales, 7 = clay England, 8 = calcareous England, 9 = Northern Ireland.

Ash is *key* to restoration of ecosystem function on limestone

-seedlings regenerate in **light or heavy shade** in only **small depth** of well-drained soil

- readily create **seedling bank**, giving ash an advantage in **filling gaps** in **woodland canopy** as they arise

- has **higher litter degradability** and more rapid nutrient cycling than most other temperate native species

- higher rates of decomposition of ash litter compared to beech associated with **greater densities** of bacteria, fungal mycelia, protozoa and nematodes at x4 – x15

- casts **light shade** allowing more spatially-varied colonisation beneath the canopy

- build-up of **humus** and **soil-making** results initially from **ash leaf fall**, but then proceeds on the **herbaceous cycle** of plants combined with **leaf fall**

-plants grow on **pavement surface** instead of in grikes

List of plant species of Scar Close and Southerscales

Species return mediated through the natural force of **wind**, and from **birds** and **mammals**

Southerscales - grazed

Scar Close – not grazed

Ash	Lesser meadow rue
Baneberry	Limestone oak fern
Blackthorn	Raspberry
Dog's mercury	Rigid buckler fern
Figwort	Rowan
Fragrant orchid	Sycamore
Gooseberry	Violet
Hawthorn	Welsh poppy
Hazel	Wood anemone
Heart's tongue fern	Wood sage
Ivy	Wood sorrel

Ecological restoration - humus reclaiming soil, wildlife, and natural processes

Angelica	Climbing corydalis	Heather	Rock rose
Ash	Daffodil	Helleborine	Rowan
Baneberry	Devil's bit scabious	Herb Paris	Solomon's seal
Bilberry	Dark-red helleborine	Honeysuckle	St John's wort
Birch	Dog rose	Ivy	Stone bramble
Bird cherry	Dog's mercury	Juniper	Strawberry
Birds eye primrose	Early purple orchid	Lesser meadow rue	Sycamore
Birds foot trefoil	Elder	Lily of the valley	Valerian
Bitter vetch	Field scabious	Limestone oak fern	Violet
Blackthorn	Figwort	Lords-and -Ladies	Water avens
Bloody cranesbill	Globe flower	Meadow sweet	Welsh poppy
Bluebell	Greater burnet	Melancholy thistle	Willows x 3
Bracken	Green spleenwort	Milkwort	Wood anemone
Brittle bladder fern	Guelder rose	Orpine	Wood cranesbill
Bugle	Hard head	Primrose	Wood sage
Butterwort	Hawthorn	Raspberry	Wood sorrel
Cinquefoil	Hazel	Red currant	Yarrow
Cowberry	Heart's tongue fern	Rigid buckler fern	Yew
















Summary of management approach

	Public own/control	Access	HLS	GRAZED
Ling Gill	**Y**	N	N	**N**
Colt Park Wood	**Y**	N	N	**N**
Scar Close	**Y**	N	N	**N**
South House Moor	**Y**	Y	N	**N**
Great Douk Cave	**N**	Y	Y	**N**
Ashes pastures	**N**	N	Y	Y/N
Brae Pasture	**N**	N	Y	Y
South House Pavement	**N**	Y	Y	**N**
Southerscales	**N**	Y	Y	Y

no relationship between **management** and **access**

public ownership or control and **no grazing**

grazing and **agri-environment schemes**

The "Macdonaldisation" of nature conservation

JNCC
Joint Nature Conservation Committee

Guidance for Common Standards Monitoring (CSM)

- broad habitats and fixed criteria for species composition inimical to natural processes
- holds areas in managed stasis

HOWEVER…….

CSM Guidance for Upland Habitats Issue date: July 2009

14.14 Interest feature: Limestone pavement

Limestone Pavements are areas of limestone which lie wholly or partially exposed on the surface of the ground and have been fissured by natural erosion. They usually demonstrate a pattern of clints (blocks) and grikes (fissures) although in some sites the clints can be narrow and blade like and the grikes broad and grassy. On steeper sites, there can be a gradation into chasmophytic features.

- Limestone pavements have two characteristic forms: wooded and open. Where a dense canopy cover results in mosses covering the clint tops the pavement is considered to be wooded. Different targets apply for wooded and open pavements. In some cases a pavement feature may contain a mosaic of both types.

Wooded pavement - Vegetation structure and distribution.	On wooded pavements: (1) Seedlings, saplings, mature trees and shrubs should all be present. (2) Clearings or coppice coups should be present over 10%-30% of the pavement vegetation by area.	Targets (1 and 2) assessed over as much of the feature as is visible while standing at the sample locations. The final assessment should be based on the feature as a whole. Regarding Target (2), such structural variation will often be a result of woodland management but can also be natural as an inherent feature of the structure and the function of the pavement itself. Yew or juniper stands can be (and should be) dense and continuous.
Open pavement - Vegetation structure and distribution.	On open pavements: (1) Scrubby and woody cover should amount to between 5% and 25% of the pavement feature	Target (1) assessed over the whole feature This assessment should be made at a landscape scale and not on individual small pavement units. Scrub and woody cover (including Juniper) increases the structural variety of pavement vegetation, provides more vegetation edge for plant species and results in higher invertebrate interest.

Common Standards Monitoring Guidance

for

Upland habitats

Version July 2009

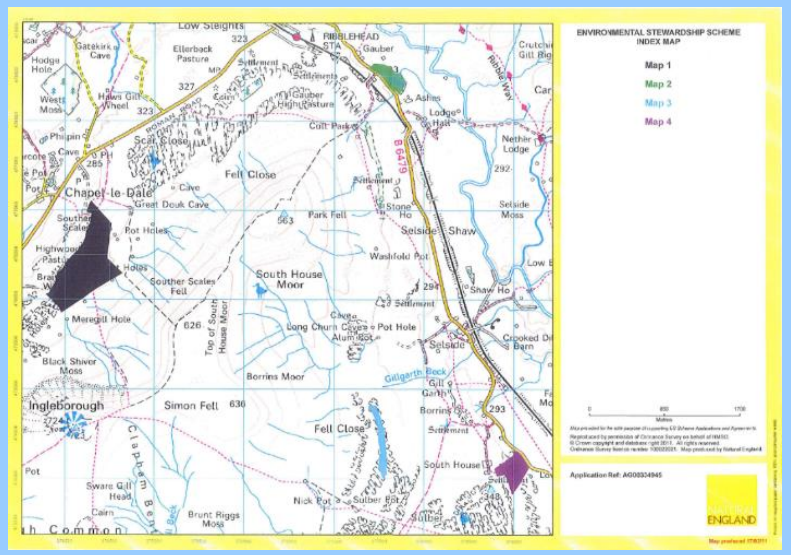
Updated from (June 2008)

JOINT NATURE CONSERVATION COMMITTEE

ISSN 1743-8160 (online)

……criteria for limestone pavement allows for natural transition!

Agri-environment funding is a quasi-designation



PART 3

HLS - Management of environmental features

General conditions on all HLS agreement land

On your HLS agreement land you must follow the general management conditions set out below, unless specifically stated otherwise in a subsequent section of this agreement. HLS agreement land is all land on which Higher Level Stewardship management prescriptions apply, including items within a Capital Works Plan

- **limits flexibility** as main options tied to **livestock grazing scheme**
- reinforces **stasis management**
- **quasi-designation** on non-designated land, tying it to **management prescriptions**
- created a **dependency culture** in funding for **nature conservation** ("business model" Aidan Lonergan, RSPB)
- **NELMS** may just be a re-arrangement of deckchairs on the Titanic!

Protected areas for nature – review

Report from the Panel 27-28 May 2014

Scottish Natural Heritage

[11]Managerialism is the tendency to view management as *the most essential and desirable* element of good administration and government. It emphasises *how* things are done rather than *why*. It solves problems through a rational assessment involving gathering and collating information, listing the options, calculating costs of each, evaluating consequences and choosing the best course of action. Unless the assumptions and value judgements that underpin these techniques are clearly stated then essentially subjective decisions made under a cloak of objectivity will result. Another feature of managerialism is performance management through targets which often leads to a single-minded pursuit of them regardless of the often perverse outcomes of doing so.

53. **Flexibility**. We accept that this sits awkwardly with the rigidity of EU legislation, notably the Birds (1979, 2009) and Habitats (1992) Directives, written for a command-and-control rather than collaborative frame, and not necessarily reflecting the complexity and dynamism of socio-ecological systems over time. However, the boundaries of flexibility should be tested with the EU; some of the rigidity may be a function of the way in which the Directives have been adopted and interpreted by the UK and Scotland. There is more flexibility available in the SSSI system, although this has not necessarily been deployed effectively to date.

54. **Natural processes.** On sites, features of interest are surrogates for patterns of natural processes: they are a way to simplify and describe complex natural systems. Species and habitats should be used as indicators of site condition to inform management of the site and surrounding areas that have the potential to impact upon it, but they should not be used as targets for management. Their use as targets has led to micro-management for features of interest, which generates difficulties where interests have competing management requirements, especially features that were in succession or transition at the time of designation now held in a state of suspended animation. Focusing on assemblages of species and habitats over a wider area (site and beyond) rather than individual features of interest would reflect better how nature works.

House of Commons
Environmental Audit Committee

An environmental scorecard

Fifth Report of Session 2014-15

Report, together with formal minutes relating to the report

Ordered by the House of Commons to be printed 10 September 2014

Non-intervention has no statutory protection

Written evidence submitted by The Wildland Research Institute, University of Leeds

EXECUTIVE SUMMARY

- There are a number of areas protected for nature conservation in England where there is a locally originated policy of non-intervention, thus allowing freedom to natural processes.
- These protected areas are effectively in breach of protected area legislation so that the gains in wild nature in these areas, such as the return of trophic cascades, could be lost if the local policy is over turned and the legislation is enforced.

2. REASON FOR SUBMITTING EVIDENCE

2.1. It has become clear that there are a number of areas protected for nature conservation in England where there is a locally originated policy of non-intervention, thus allowing freedom to natural processes. An example is South House Moor of the Ingleborough National Nature Reserve in the Yorkshire Dales National Park (3).

Published written evidence

3 Wildland Research Institute (ESC0003)

3. RECOMMENDATIONS FOR ACTION BY THE GOVERNMENT OR OTHERS

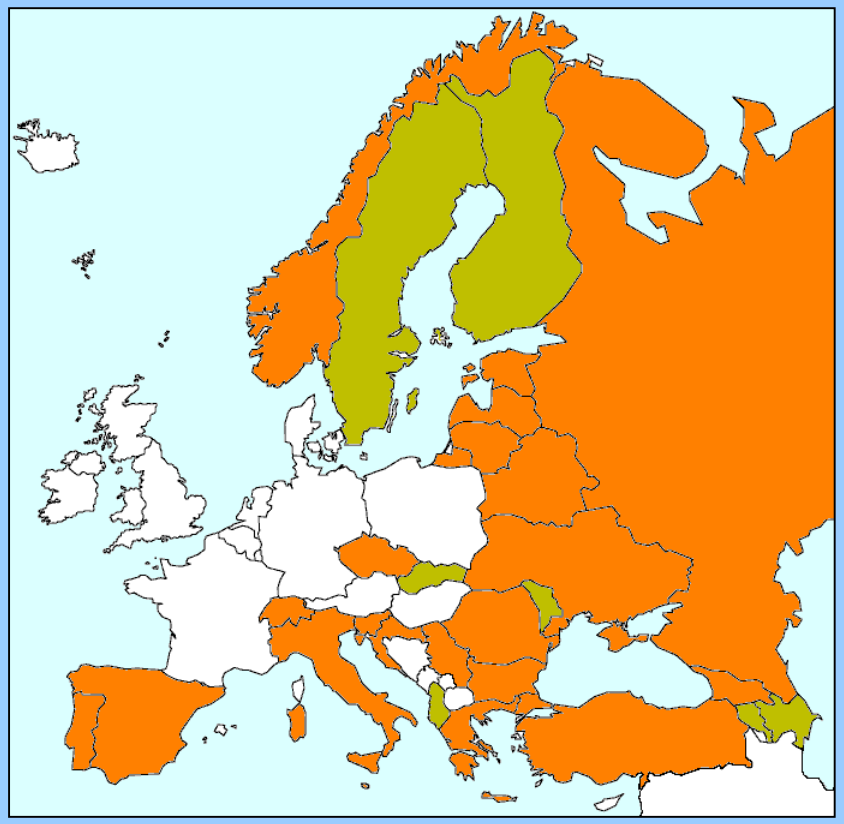
3.1. Protection for the increasing presence of wilder land in England arising through non-intervention will need a readjustment in the way nature conservation is viewed. In the same way that France is seeking to amend its Environmental Code by introducing a dynamic view of ecosystems, there should be a review by the Joint Nature Conservation Committee of the terminology used in nature conservation legislation with the aim that it better reflects the reality of natural systems, rather than the utilitarian approach that it embodies at present, and which avoids any distinction between (near) natural, semi-natural and agricultural landscapes (1, 23).

3.3. Natural England should undertake to identify and inventory all of the protected areas in England currently with a policy or a default state of non-intervention.

3.4. DEFRA and Natural England should undertake a review of the approach to protected areas in England, in similar fashion to that being carried out in Scotland, and which takes into consideration the following:

- characteristics and aims of those protected areas in the non-intervention inventory
- potential for nature conservation legislation to incorporate protected area types that emulate the IUCN categories, especially IUCN Categories I and III.

Activities prohibited in strictly protected areas



Withdrawn from economic/human activity (includes no hunting, logging, grazing)
Belarus
Bulgaria
Croatia
Czech Rep.
Estonia
Georgia
Greece
Italy
Latvia
Liechtenstein
Lithuania
Montenegro
Norway
Portugal
Romania
Russia
Serbia
Slovenia
Spain (Asturias, Catalonia, Navarre)
Switzerland
Turkey
Ukraine

NO Hunting, logging, grazing
Albania
Armenia
Azerbaijan
Finland
Moldova
Slovakia
Sweden

Other activities prohibited in strictly protected areas include fishing, mineral extraction, construction, use of chemicals and fertilizers, lighting fires, introducing non-native species, water abstraction, waste disposal, and transport

Executive Summary

The drivers of change will affect the future approach to nature conservation. Pressures such as Climate Change are causing biodiversity to move and change and in the long-term there may be a need for more natural (less managed) protected areas that focus on improving structures and functions of ecosystems rather than habitats and species. .

A longer term vision for nature conservation is needed. Protected areas are essential for nature conservation in the UK, but their value and role are not widely appreciated. The Natural Capital Committee (England) has called for a 25 year plan[2] to maintain and improve natural capital. Scotland has an equivalent in the Land Use Strategy[3]. Working to further define the role of protected areas in such plans is one of the key actions to take forward.

Thinking about protected areas at different scales is required. Working at different temporal and spatial scales has an effect on the outcomes for protected areas. Understanding the interlinkages between global, national and local scales and the difficulties of cross-scale working is important for nature conservation delivery. It also helps to define effective protection mechanisms with different responsibilities at different scales.

Transparency of costs is essential to identify where to best target resources. There is a lack of transparency on the balance of costs and benefits of nature conservation. A transparent figure of costs, together with broad evidence on the funds needed in order to maintain or restore habitats and species, would help to ascertain the level of funding required for effective nature conservation. A prioritisation exercise would help to identify where to best target resources.

2 Key Messages

2.1 The drivers of change will affect the future approach to nature conservation

We need to be able to predict where and over what timescale biodiversity will move and change as drivers of change, such as Climate Change begin to have an impact. In the long-term there may be a need for more natural (less managed) protected areas that would maintain ecosystem functionality but with different species and altered (or even new) habitats. Despite the value they provide, SSSIs/ASSIs currently exist as isolated islands and although they are often referred to as a network, they are insufficiently joined, and need to be considered at the landscape scale. They also reflect a traditional focus on habitats and species rather than ecological processes. A different approach may be to work on improving structures and functions of ecosystems.

It would help if this was a recognition of the **failings of a compositional approach**, rather than being in response to climate change as a driver

What drives ecological restoration……

- **public ownership** (or control)
- removal of non-native **grazing animals**
- recruitment of woody species and the reinstatement of the **structural complexity of vegetation**
- reinstatement of **natural processes** such as nutrient cycling, decomposition, trophic cascades etc

……and what holds it back?

- **Sheep** (or cattle)
- designation based on **broad habitats**
- **Common Standards Monitoring**
- dependency on **agri-environment schemes**: don't rely on it as a **business model**!
- managerialism and short-termism
- **inflexibility** within current system
- lack of **strict protection category** (non-intervention) in protected area designation

Why does ash do so well on Scar Close

412

VEGETATION SCIENCE CONCEPTS I. INITIAL FLORISTIC COMPOSITION, A FACTOR IN OLD-FIELD VEGETATION DEVELOPMENT *)

(with 2 figs.)

by

FRANK E. EGLER

(American Museum of Natural History, New York 24)

Vegetatio, Vol. 4, No. 6 (1954), pp. 412–417

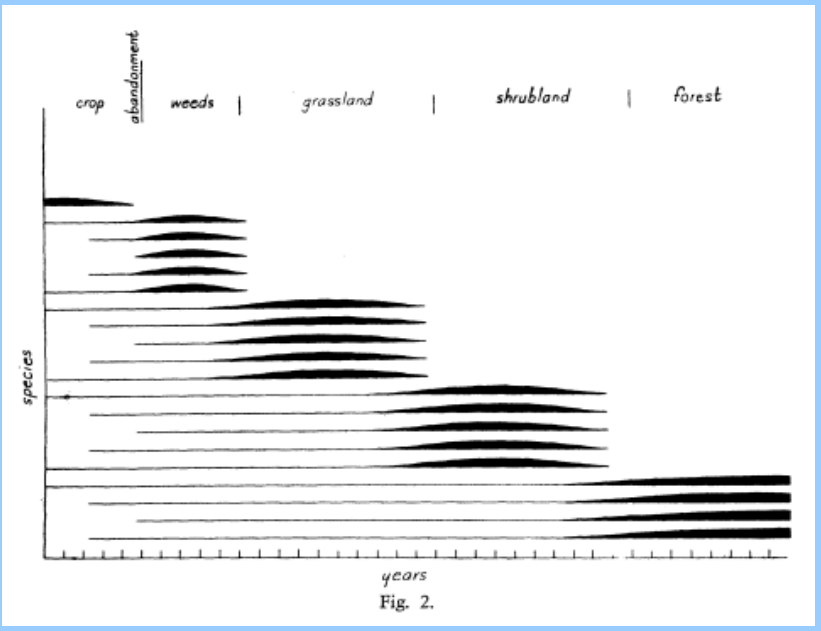


Fig. 2.

As each successive group drops out, a new group of species, there from the start, assumes predominance (fig. 2). Eventually only the trees are left. Developments in non-forest regions have analogous series of stages.

The proximity of seed sources, differential timing of maturity and age of reproduction, annual seed production, and timing of disturbance have all been found to **influence the spatial and temporal aspects of community development**

My observation is that **ash seems to have influenced the amount of opportunist non-native sycamore seeding in to Scar Close**

Being first on the scene and growing, is maybe the only factor in occupation between those two trees, and is given weight by the **Initial Floristic Composition Model** of Frank Egler

He noted that those **late-successional species already present in the seed bank** or arriving shortly after a disturbance event were able to establish in sufficient numbers that **later arrivals were not able to change the course of community development**, a priority effect that is essentially about **getting there first**

Differing views on biogeographic distribution of species

Field Studies 5 (1980), 323-348

AN ASSESSMENT OF CONSERVATION VALUES WITHIN A LARGE SITE OF SPECIAL SCIENTIFIC INTEREST IN NORTH YORKSHIRE

By M. B. USHER
Department of Biology, University of York, York YO1 5DD

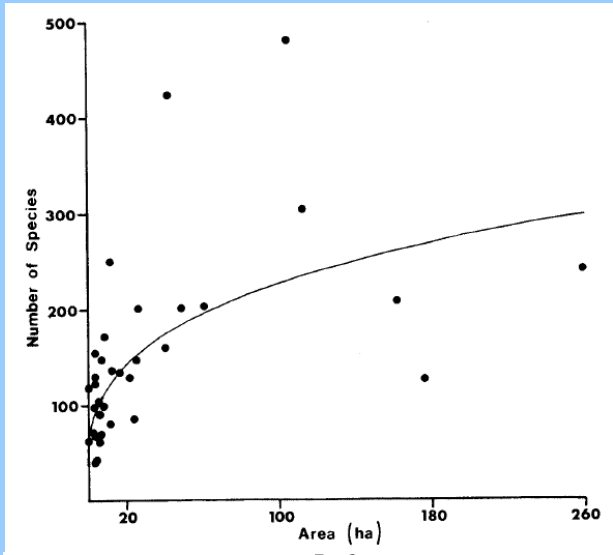


FIG. 2
Species-area relations for the higher plants on 35 nature reserves in Yorkshire.

Size

As a rule-of-thumb, larger areas are more important for conservation than small areas. There are two reasons for this statement.

First, as an area of land increases so does the number of species that one might expect to find on it. If the number of higher plant species found on nature reserve, the data show an increase which tends to flatten out with increasing area (Fig. 2a). How-

THE CLASSIFICATION AND MANAGEMENT OF LIMESTONE PAVEMENTS – AN ENDANGERED HABITAT

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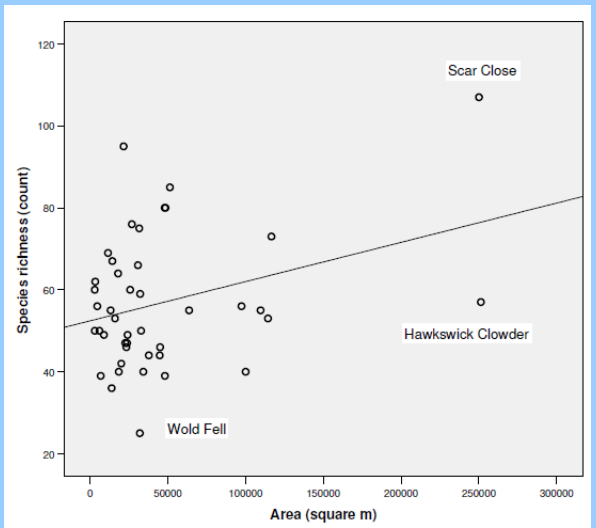

Figure 4-1: The relationship between pavement area and species richness i.e. the number of species on each limestone pavement, with line of best fit. Notable outliers are labelled with the pavement name.

"limestone pavement size is only one of a number of factors dictating the number of plant species present on limestone pavements"