

Factsheet: Case studies of woodland creation through natural colonisation

Natural colonisation: what to expect?

Natural colonisation has the potential to create biodiverse, locally-adapted woodlands, and help expand woodland cover across the UK, but the outcomes of the resulting woodland habitat are usually uncertain. These six case studies provide an overview of the timescales and outcomes of creating woodland through natural colonisation (in some cases, still at a grassy/scrub stage) in a range of habitats. In some sites, naturally-colonised woodland can resemble mature woodland after 50 years (Monks Wood, Case Study 4), but in others, areas can have very low tree cover after 30 years (Noddle Hill, Case Study 5).



Map of case studies (numbered green dots)

Key successes

- Deer management is key to success, where they are present in large numbers in the landscape
- All sites were adjacent or near to existing woodland, providing local seed sources
- At least one site 'capitalised on circumstances', choosing to leave areas for natural colonisation where it was already taking place

Key challenges

- One site experienced unexplained lack of colonisation in some areas, although woodland was present historically
- Fast-growing species may dominate in early stages, resulting in low diversity of colonising species
- Squirrel damage may be prevalent

Key aim: restoring biodiversity

Biodiversity restoration was a key aim of woodland creation in all of the case studies, which were sometimes located on sites of previous woodland that had been lost. Other aims were habitat connectivity, water management, carbon sequestration and creating a recreation area.

Combining natural colonisation and tree planting within projects

All projects used natural colonisation as part of a wider biodiversity project, and four out of seven sites had some areas of tree planting too.

Variation in timescale and species mix of the developing woodland

The time to develop closed-canopy woodland varied among sites, and in some examples has still not taken place after ~30 years. The species that colonise successfully are difficult to predict, and are usually only a subset of those that are present as nearby mature trees.



~20 years of natural colonisation in the Scottish Highlands (Case Study 1, NatureScot)



19 years of natural colonisation in Kent (Case Study 2, Woodland Trust)

Case study 1

Creag Meagaidh (CM) National Nature Reserve, Badenoch, and Invereshie and Inshriach (I&I) National Nature Reserve, Strathspey, Scottish Highlands

Case study provided by NatureScot

Publicly accessible

Grid refs. NN 48295 87279 and NH 85260 01245



Invereshie and Inshriach: prior to natural colonisation in 1994 (left); in 2021 (right)

“Some areas remain un-colonised by woodland, which remains a mystery as conditions appear to be suitable, it was woodland (prior to felling in WWII), and trees are colonising neighbouring areas. We tried undertaking trial intervention plots (burning, cutting and controls), but there was no significant colonisation in any plot.”

Aims of the natural colonisation: Nature restoration and conservation

Site description: Mosaic of habitats, mostly dry heath, with some wet heath, upland rough grassland and ancient woodland. Site areas: ~4,000 ha (CM) and ~3,500 ha (I&I)

Area of natural colonisation: Over 50 ha (CM) and over 100 ha (I&I)

Year that natural colonisation began: Late 1990s and early 2000s

Other methods of woodland creation: Some Scots Pine was planted 30-40 years ago at I&I, otherwise all by natural colonisation

Seed sources for natural colonisation: Nearby established ancient woodland. At CM, mostly birch, also rowan, willow, alder and small numbers of other broadleaves; at I&I, mostly Scots pine and birch, with small numbers of rowan, willow and aspen

Preparation actions prior to the natural colonisation: No ground preparation, but there was sustained wild deer management prior to successful natural colonisation

Maintenance during establishment of natural colonisation: Sustained wild deer management (unfenced sites). Have recently started using cattle to encourage more natural colonisation and regeneration at CM.

Which species have successfully colonised? Species mixes have followed those present as seed sources

Successes and reasons behind them: Deer management is key in these areas to get deer impacts to low levels and allow seedlings to establish. This requires significant and sustained effort.

Failures and reasons behind them: Some historic woodland areas have not naturally colonised, in spite of trialling interventions (burning and cutting).



Creag Meagaidh in 2020

Case study 2

Hucking Estate, Hucking, Kent

Case study provided by Clive Steward, Woodland Trust

Publicly accessible
Grid ref. TQ 84356 57403



Area of natural colonisation left since 2004, in 2023

Year that natural colonisation began: Approx. 5 ha set aside in 2004 and 35 ha in 2017

Seed sources for natural colonisation: Nearby woodland of oak, ash, hornbeam and field maple (2004 area); nearby mature individual pedunculated oak trees (2017 area)

Preparation actions prior to the natural colonisation: None

Maintenance during establishment of natural colonisation: None

Which species have successfully colonised? Oak, hawthorn, willow, blackthorn, field maple, hazel

Successes and reasons behind them: There are no deer in the area (fallow deer 15 miles away), which has been key to success. Would have used deer control measures if there had been deer present.

Failures and reasons behind them: None so far

Aims of the natural colonisation: Woodland habitat creation as part of a wider nature recovery project across the whole site, including improving habitat connectivity and sequestering carbon.

Site description: Improved grassland and arable prior to natural colonisation, although some areas (including some naturally colonised) were woodland until the mid 20th century. The surrounding landscape is mostly arable farming, with isolated patches of woodland and chalk grassland. Site area: 305 ha

Area of natural colonisation: Approx. 40 ha

Other methods of woodland creation: Tree planting in nearby areas to the natural colonisation

"So far no failures. You have to be patient. You end up with woodland composed of trees which are nearby. If there are species not present which you need then these would need to be introduced through planting or direct seeding if you are brave enough!"



Area of natural colonisation left since 2017, in 2022

Case study 3

Swannymote Wood, Whitwick, Leicestershire

Case study provided by Simon Greenhouse, National Forest Company

Publicly accessible
Grid ref. SK 44357 16895



Image to left: Time-series taken from location 1, from top to bottom: 2008, 2012, 2013, 2020



Aims of the natural colonisation: Capitalising on circumstances to create woodland, as natural colonisation was already taking place in certain areas. Also enhancing biodiversity, providing recreation and increasing landscape forest cover

Site description: Pasture to natural colonisation. The surrounding landscape is mostly pasture with some woodland. Site area: 22.7 ha

Area of natural colonisation: 2.5 ha

Year that natural colonisation began: 2007

"We saw evidence of natural colonisation during the woodland creation planning, and assessed which areas might be most suitable, to capitalise on circumstances."



Other methods of woodland creation: Tree planting in other areas of site

Seed sources for natural colonisation: Adjacent oak/birch SSSI woodland

Preparation actions prior to the natural colonisation: Grass mowed to create coupe boundary

Maintenance during establishment of natural colonisation: Small amount of respacing in year 5

Which species have successfully colonised? Silver and downy birch, willow, oak, Scots pine

Successes and reasons behind them: We chose areas where there was already evidence of natural colonisation during woodland planning

Failures and reasons behind them: Oak seedlings were initially numerous, but quickly suppressed by faster growing species. Willow and birch are heavily affected by squirrel damage, which appears greater in the areas of natural colonisation than planting, possibly due to the difference in species mixture.

Time-series taken from location 2, from top to bottom: 2007, 2008 showing mown coupe boundary, 2012, 2016, 2020

Case study 4

Monks Wood, Woodwalton, Cambridgeshire

Case study provided by Emma Dear, Natural England

Publicly accessible
(1961 area of colonisation)
Grid ref. TL 20158 79655

Aims of the natural colonisation: Restore biodiversity, and conduct scientific research into the process of natural colonisation

Site description: Monks Wood NNR is an ancient woodland, with species-rich rides. Surrounding landscape is mixed farmland (pasture and arable) with woodland pockets.

Area of natural colonisation: Two fields adjacent to the ancient woodland were left to naturally colonise: a 4 ha barley field, and 2 ha of unimproved grassland (6 ha in total).

Year that natural colonisation began: 1961 (4 ha barley field) and 1996 (2 ha grassland)

Other methods of woodland creation: None

Seed sources for natural colonisation: Adjacent ancient woodland, dominated by oak, ash and field maple, with hawthorn and hazel understory (some wild service and birch in the interior). The barley field is surrounded on 3 sides by woodland, and the grassland on one side only, but is bounded by hedges with some hedgerow trees.

Preparation actions prior to the natural colonisation: The barley field was abandoned after ploughing, and the grassland after mowing.

Maintenance during establishment of natural colonisation: Some deer management in adjacent ancient woodland from late 1990s but none in the areas of natural colonisation

“Natural colonisation establishes slowly. Ecologically and in biodiversity terms this should be viewed as a positive. This is a low cost way of establishing semi-natural woodland.”



62 years of natural colonisation of the barley field (Richard Broughton, 2023)



Aerial view of scrub in blossom, after 24 years of natural colonisation in the grassland (Richard Broughton, 2020)



Grassland after 27 years of natural colonisation (Emma Dear, 2023)

Which species have successfully colonised? Mostly oak, ash, field maple, hawthorn and blackthorn. Animal-dispersed species are more abundant than in the adjacent ancient woodland, particularly in the more recently colonised site (2 ha grassland). Wind-dispersed and suckering species (ash, elm, willow, field maple) are near seed sources.

Resulting woodland structure: The older (barley field) site became wildlife-rich shrubland after 10-15 years and closed-canopy broadleaved woodland after 40-50 years, with densities of 390 trees/ha after 59 years (132/ha after 25 years in grassland).

Successes and reasons behind them: The transitional scrub habitat has high biodiversity value, particularly for invertebrates, and the woodland that followed is structurally diverse, created at low cost. The young woodland was resilient to drought periods. Protective thicket of thorn scrub meant that herbivory was not an issue for larger trees to colonise, in spite of presence of brown hares, rabbits, grey squirrels and deer.

Case study 5

Noddle Hill, Bransholme, Hull

Case study provided by Richard Broughton, UK Centre for Ecology & Hydrology

Publicly accessible
Grid ref. TA 10853 34832

“Although closed-canopy woodland remained a distant prospect even after 33 years, the habitat mosaic [of shrubland, grassland and wetland] could be considered a valuable outcome.”†



33 years of natural colonisation: reedbed wetland (above), and grassland with scrub (below) (Richard Broughton, 2022)

Aims of the natural colonisation: Expanding woodland cover and restoring biodiversity

Site description: Noddle Hill Nature Reserve is a 48 ha estuarine floodplain site, with ‘rewilded’ areas, a recreational fishing pond, tree planting, and permitted pony grazing. The site was previously farmland, and is currently surrounded by arable farming, pasture, amenity sports fields and residential housing. Low-lying land, with high groundwater and shallow seasonal flooding.

Area of natural colonisation: 25 ha left to ‘rewild passively’ across seven contiguous fields

Year that natural colonisation began: 1988

“Blossom- and berry-rich thorny shrubs could provide important ecosystem services of enhanced biodiversity, pollinator resources and cultural services for many decades before any closed-canopy woodland develops.”†

Other methods of woodland creation: None within the 25 ha, although adjacent fields were planted with trees in 2000

Seed sources for natural colonisation: Far: the nearest mature woodland is 1.5 km away. In 1988, the site included 2.7km of hawthorn-dominated hedgerow, one mature crack willow, and only 1% mature woodland cover with a 1 km radius of the site. Trees planted in adjacent fields in 2000 have not yet matured.

Preparation actions prior to the natural colonisation: In 1988, clayey soils were imported and spread over 70% of the site at a depth of ~1m, intended for future development. The initial ground surface was a patchwork of bare soil, seasonally wet grassland/ex-arable, and existing hedges and ditches.

Maintenance during establishment of natural colonisation: None (herbivores generally scarce)

Which species have successfully colonised? Predominantly bramble, with hawthorn and dog/field roses, followed by elder, crack willow, ash, oak, some silver birch, grey willow and blackthorn.

Successes and failures: After 33 years, trees remained scarce! Thorny scrub thickets covered 53% of the site (average woody vegetation height 2.1 m). This has supported high diversity and abundance of songbirds but is not woodland creation as such (yet). The lack of tree colonisation is in spite of large areas of bare soil available for colonisation, and probably due to combined lack of seed sources and animal dispersers.

† Broughton *et al.* (2022) PLOS ONE 17(11): [e0277545](https://doi.org/10.1371/journal.pone.0277545) (see for further information)

Case study 6

Dunkard, Cross Ash, Monmouthshire

Case study provided by Jenny Knight, Stump up for Trees

Not publicly accessible

Aims of the natural colonisation: Restoring a previous woodland site (pre 1970s), water management, creation of biodiversity corridors, ecological restoration, stock improvements

Site description: Pasture to natural colonisation. The surrounding landscape is also mostly permanent pasture. Site area: 4.05 ha

Area of natural colonisation: 0.5 ha

Year that natural colonisation began: 2022

“We are examining whether including seed source of a wider variety of native species will encourage further development, as part of a 12-year monitoring programme that we have just started”

Other methods of woodland creation: Various woody habitat created by planting (various densities and species mixes): dispersed scrub woodland, 5m wide hedgerow, wood pasture, mid density native broadleaf, wet woodland

Seed sources for natural colonisation: Adjacent woodland and hedgerows

Preparation actions prior to the natural colonisation: None

Maintenance during establishment of natural colonisation: We are currently reviewing the need for fencing/tree guards as protection from livestock

Which species have successfully colonised? Mostly goat willow so far (but note that natural colonisation only began in 2022)

About this document

This is part of the knowledge exchange work package for the Treescape Expansion through Planting and Natural Colonisation (TreE PlaNat) project, funded by UKRI Treescapes. This collection of case studies was stimulated by discussion with the project’s Knowledge User Board of land managers, on the need to share examples of natural colonisation. For blogs, webinars and other outputs, see the project website and Twitter page:

www.naturalcolonisation.co.uk  @natcolonisation

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