

Chalk Grassland Condition Report

OCTOBER 2022

Old Chalk New Downs Project
Hosted by Kent County Council
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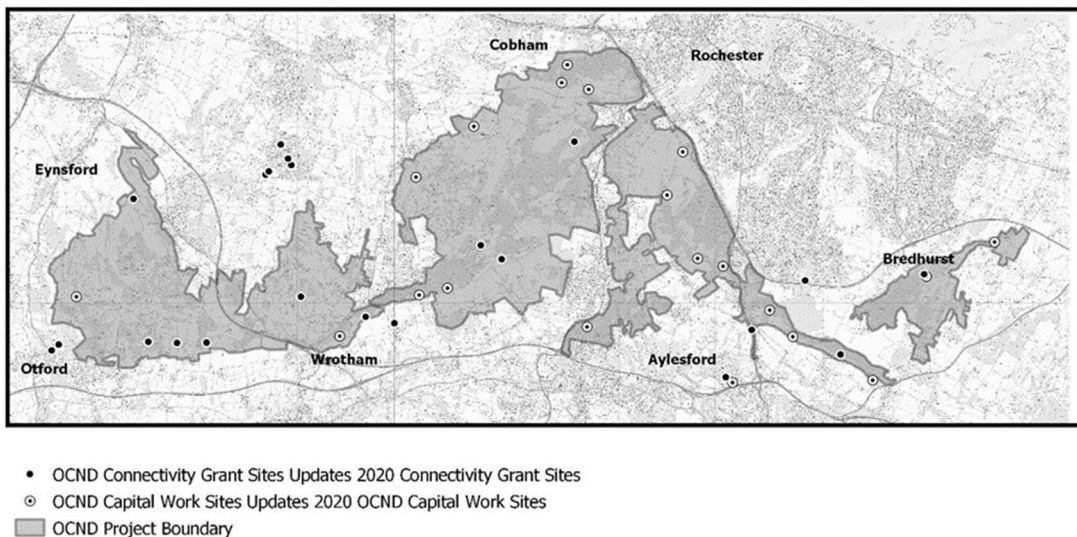
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1.0 Introduction

Chalk Grassland Restoration

Old Chalk New Downs (OCND) is a five-year Heritage Lottery Fund project, hosted by Kent County Council. The project area focuses on almost 10,000 hectares along the North Downs from Otford to Detling. The project supports landowners and land managers, as well as organisations and communities, to protect and enhance downland habitats.

Map 1: Distribution of OCND project sites.



A key focus of the project has been the restoration of chalk grassland habitat. Kent is home to almost 5% of the UK's total calcareous grassland habitat, with the most species-rich areas being found on the North Downs escarpment (Kent Habitat Survey, 2012). Old Chalk New Downs has funded small- and large-scale habitat improvement work (interventions) across the project area. These interventions have included scrub clearance, stock fencing and water connections to facilitate management. To evaluate the impact of this work, and to assess the current state of chalk grassland within the North Downs, the project has carried out chalk grassland condition assessments on all relevant project sites.

“Chalk grassland is the European equivalent to tropical rain forest”

Professor David Bellamy (on a visit to Kent in 1994)

Condition assessments are used as periodical monitoring tools by organisations such as Natural England, for example on Sites of Special Scientific Interest (Natural England 2019). Rapid condition assessments are increasingly used to determine the impact of development on a given habitat. They allow the surveyor to monitor changes in management. Therefore, they can be useful when used as a tool to assess and monitor habitat improvements.

Chalk grassland exists largely as a combination of geology and the history of woodland clearance and animal grazing on the chalk slopes. The human impact on the landscape has a long history, dating back to the early human settlements of the Neolithic period (Rackham, 2000). The poor-quality soils of the North Downs, containing clays, flints and gravels have limited the agricultural development, even as time progressed. Managing chalk grassland sites on the escarpment today is often challenging. Rotational grazing is typically preferred for the maintenance of a low sward height and to prevent the encroachment of woody species. Traditional rare-breed sheep, rather than commercial breeds, are best suited to the exposed locations and plant assemblages. Similarly, goats and native cattle breeds cope well with the conditions. But appropriate grazing animals are not always readily available. In these cases, mechanical cutting is often the fallback. But steep slopes and poor access are typical of the North Downs escarpment, often putting fields out of reach of both livestock and readily available machinery. OCND has been working with local land managers to expand the range of options available to them for practical habitat management.

When the OCND project was in development, it was identified from the 2012 Kent Habitat Survey that there were 122 hectares (Ha) of chalk grassland habitat in rapid decline. The ambitious target for OCND was to develop the 122Ha into favourable condition by the end of the project and increase the overall extent of quality chalk grassland within the project area.

During project delivery, OCND worked with 21 sites to manage their chalk grassland habitat, with a total of 48 fields surveyed between 2018 and 2020, covering approximately 100Ha. Map 1 shows the distribution of grant recipients and partner sites across the project area.

2.0 Survey Method

Condition Assessments

The rapid condition assessment used by OCND to categorise chalk grassland is adapted from the Lowland Calcareous Grassland Guidance included in *A Protocol for Condition Assessment of Key Habitats & Local Wildlife Sites in Kent* (ARCH & Salix Ecology, 2011). This protocol was created when Kent County Council commissioned Salix Ecology to develop a quick and simple system to assess the condition of UK BAP habitats and Local Wildlife Sites across Kent. This work was funded by the ARCH Project (Assessing Regional Habitat Change).

The Lowland Calcareous Grassland Guidance closely follows the methods used by Natural England for Farm Environment Plan condition assessment (Natural England, 2010) and the Common Standards for Monitoring SSSIs (Natural England, 2019) and incorporates the thresholds used at the time by Kent Wildlife Trust to classify Local Wildlife Sites as being in favourable condition.

When a field is surveyed, the surveyor walks through the field in a W shape. 10 stops are made, at which point the following attributes are recorded within 1m²:

- Presence of positive indicators
- Presence of negative indicators
- Percentage of wildflowers and sedges
- Average sward height
- Other notable species of plant, animal or insect that can be identified

There are 36 positive indicator species, and 6 negative indicator species (see Appendix 1). Positive indicator species includes any orchid species, and plants such as kidney vetch (*Anthyllis vulneraria*) and hairy st john's wort (*Hypericum hirsutum*). Negative indicators include creeping thistle (*Cirsium arvense*), ragwort (*Senecio jacobaea*) and common nettle (*Urtica dioica*). The presence or absence of these species at each stop determines their dominance in the sward. If a species is recorded in only 1-2 stops it is rare, 3-4 occasional, 5 or more it is frequent. There are set targets for the attributes of percentage of wildflower coverage and sward height and scrub cover. If one or more of the attributes are not met, the site will have a lower category.

Condition Categories

There are six possible categories for field condition:

Condition	Description
Favourable	All attributes passed. If surveyed previously, there is no decline from the last assessment.
Favourable-declining	This condition should be recorded if: <ul style="list-style-type: none"> - All attributes passed but one or more show a decline in condition from previous assessment e.g. fewer or less frequent positive indicator species recorded, greater scrub cover etc but still within acceptable limits defined by the target and/or - All attributes passed except sward structure: average height. This attribute is an early warning that management may be sub-optimal, and lack of action may result in unfavourable condition in future.
Unfavourable-recovering	The site has been previously assessed as unfavourable but the target for one or more attributes which previously failed has now passed.
Unfavourable	One or more attributes have failed with the exception of sward structure: average height.
Unfavourable-declining	The site has been previously assessed as unfavourable but one or more attributes which passed has now failed.
Destroyed	The habitat has been permanently destroyed and is unrecoverable.

Only fields surveyed more than once can be recorded with a condition of recovering or declining as these are relative condition measures that require a baseline survey. (With the exception of otherwise favourable sites that have a sward height above 15cm, which can be recorded as favourable-declining without a baseline survey.)

OCND Surveys

The OCND condition assessment surveys were carried out between 2018 and 2022. 48 fields were surveyed within 21 individual sites. We define sites as continuous landholdings that are in close proximity but that are separated into fields or other types of management units. In total, the area of land surveyed was approximately 100 hectares. 50% of the fields were in private ownership, 42% charitable and 8% public. Approximately half of the sites were designated as a Site of Special Scientific Interest (SSSIs). All fields were surveyed at least once and 24 of the fields were surveyed twice.

Second surveys were carried out in fields where practical management or a change in land management had occurred (e.g. introduction of grazing) initiated by OCND.

3.0 Results

Chalk Grassland Condition

The overall field condition for all chalk grassland meadows surveyed within the OCND project are shown in Fig.1. The distribution of fields surveyed across the project area is shown in Map 2 (condition shown is the most recently recorded). The majority of fields (46.8%) are in unfavourable condition. 27.6% are in favourable or favourable-declining condition.

FIG.1. OVERALL FIELD CONDITION ACROSS OCND PROJECT SITES

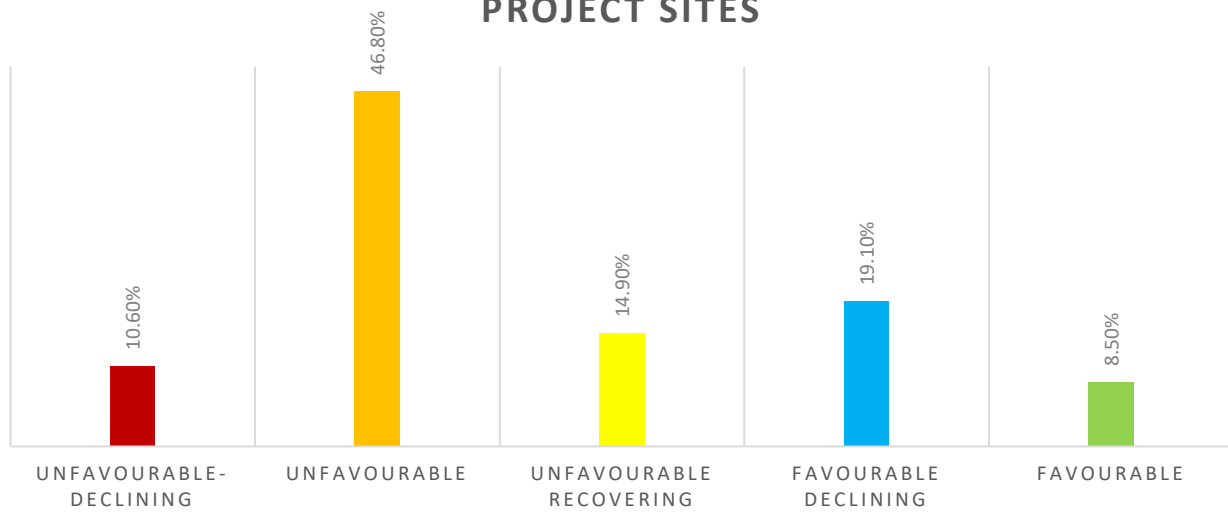
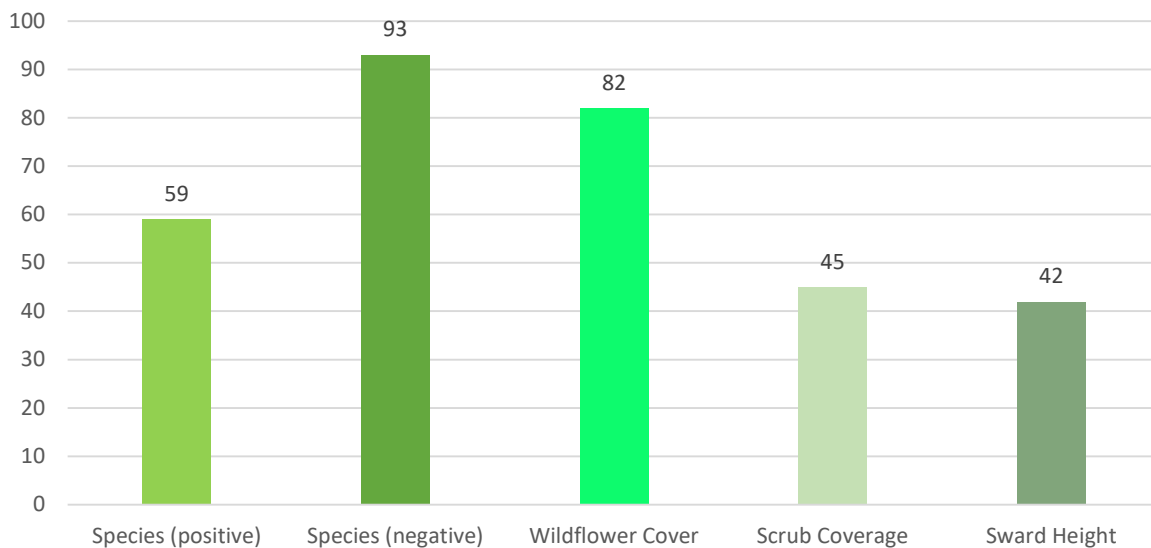


Fig. 2. Percentage of fields 'favourable' for each attribute



Map 2: Condition assessment results on chalk grassland fields within the OCND project.

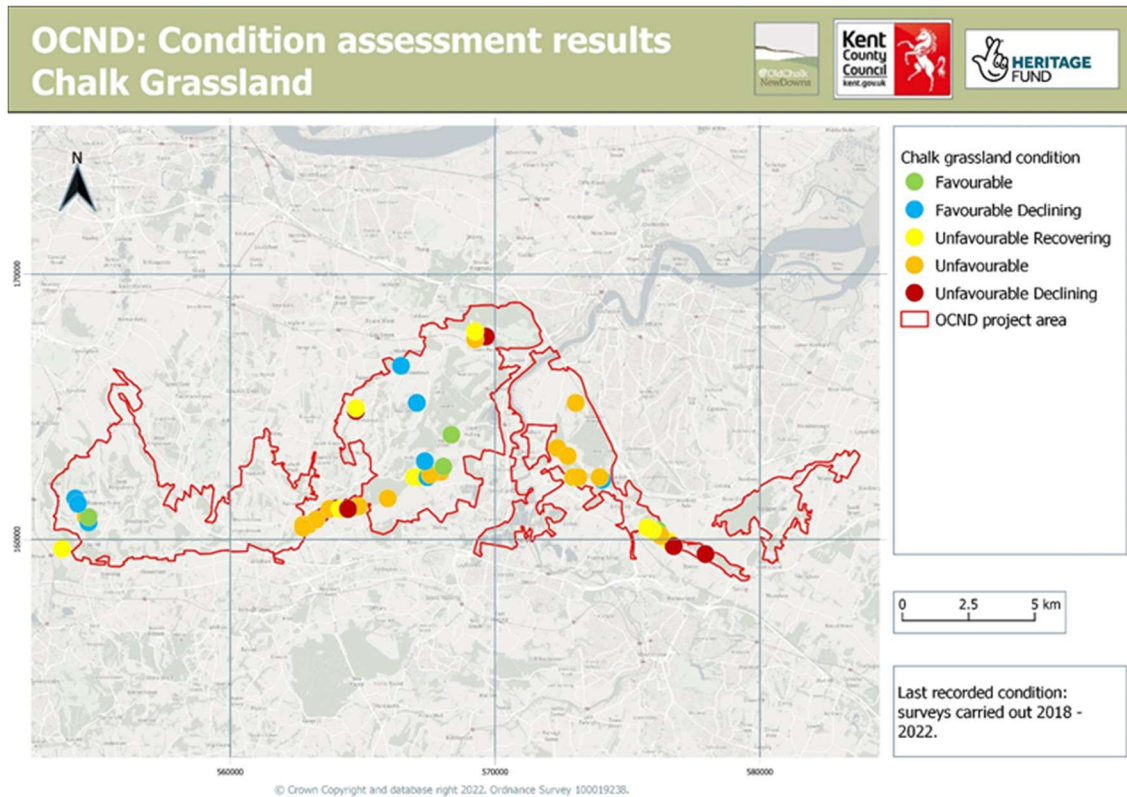
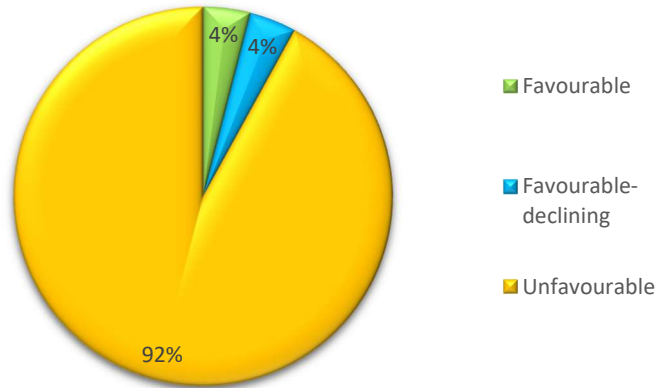


Fig. 2 shows the percentage of fields that were favourable for each attribute. Scrub coverage and sward height was the least favourable attribute, with only 42% of field surveys found to be favourable, followed by scrub coverage in the field, with 45% of fields favourable.

Fig. 3. 24 sites were surveyed before and after habitat interventions took place. The initial surveys showed that the 24 sites were overwhelmingly in unfavourable condition (92%). However, on second survey, 32% were in unfavourable condition. 20% were in unfavourable-declining condition (meaning at least one attribute had declined since the first survey). 36% were in unfavourable-recovering condition (meaning at least one additional attribute had improved since the 1st survey) and 12% were now in favourable or favourable-declining condition.

**Fig. 3 Sites surveyed before and after intervention:
1st Survey Results**



2nd Survey Results

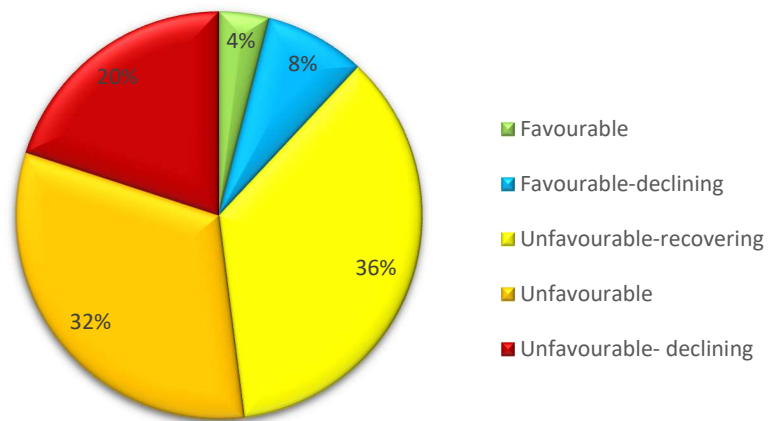


Fig. 4. Compares the change in favourable attributes before and after habitat interventions took place. Wildflower coverage and scrub coverage both show improvement. Negative species shows a slight decline.

Fig.5 shows the lack of clustering of field richness based on geographical location. Neighbouring fields are not more likely to share similar levels of positive indicator species richness.

Fig.4. Change in no. of favourable attributes before and after habitat intervention (n=24)

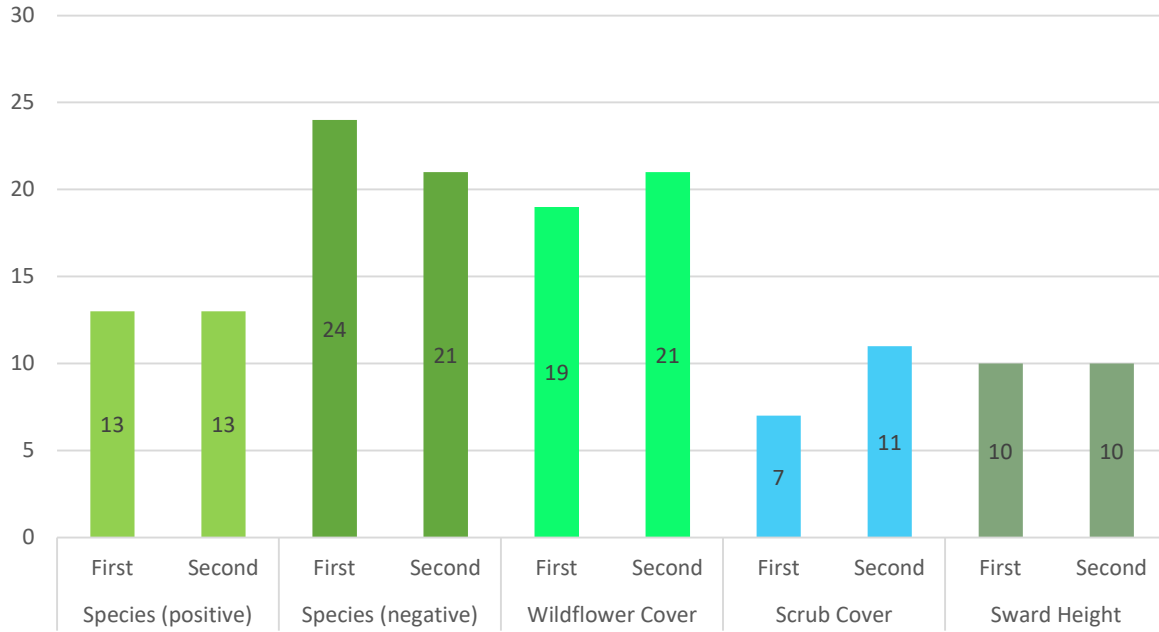


Fig.5. Ranking of chalk grassland fields by species richness (no. of positive indicator species recorded)

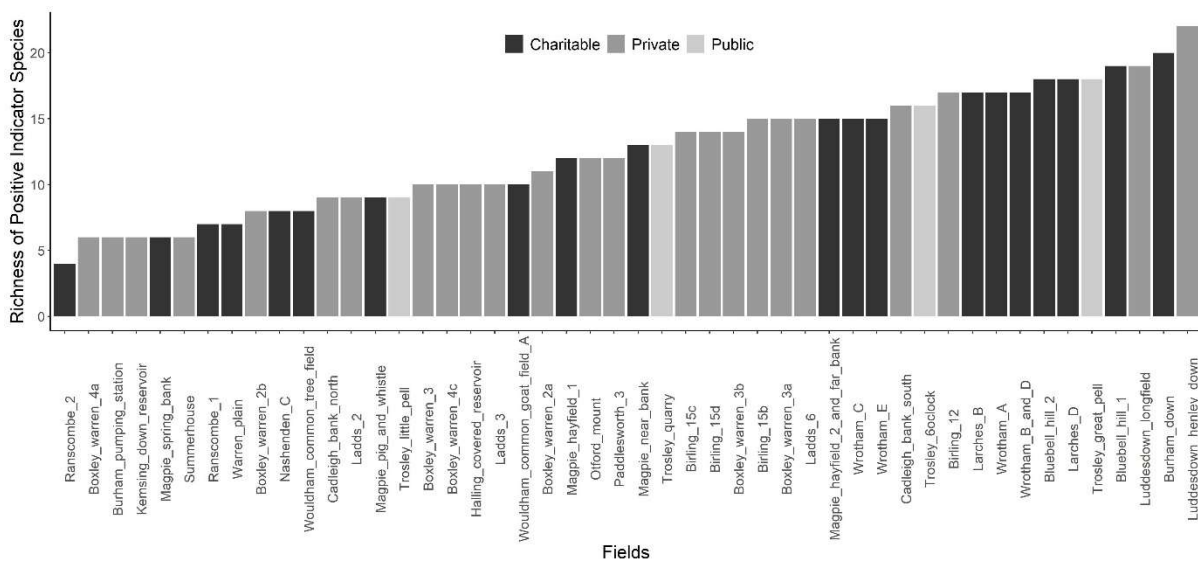
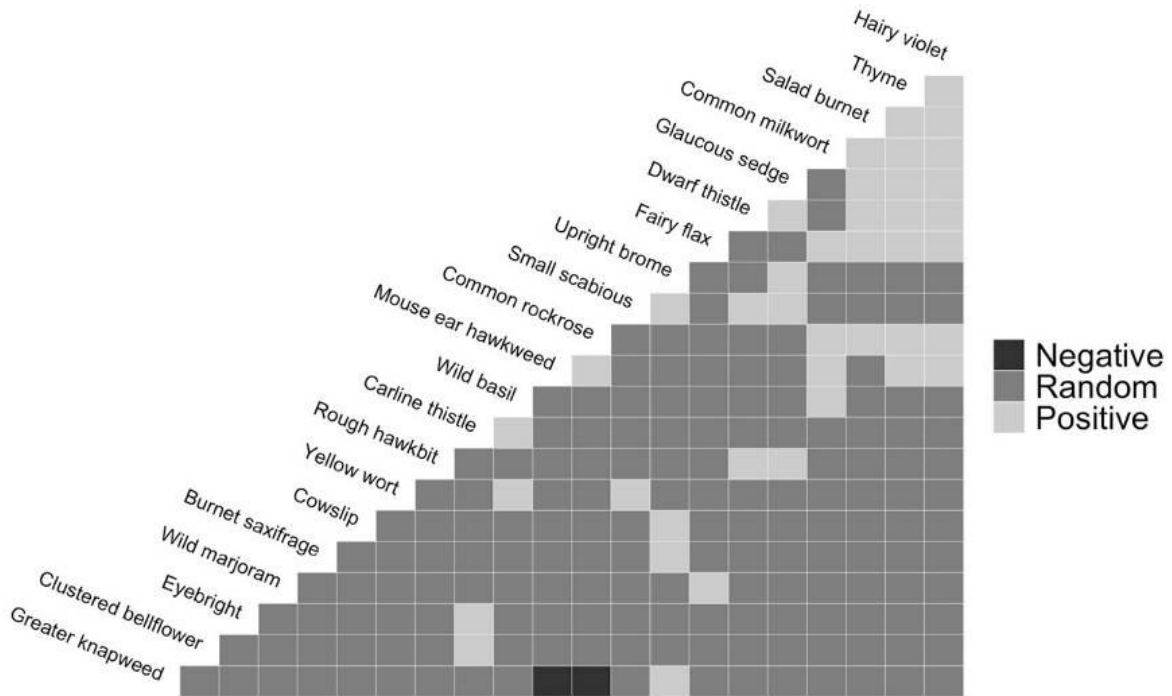


Fig. 6. Relationships between positive indicator species occurrences in the data set using co-occurrence analysis (Griffith et al. 2016).



It was of interest to find out if some of the positive indicator species were more likely to be present together than not. It was found that for most species' pairs co-occurrence was random (in 89% of pairs). Greater Knapweed (*Centaurea scabiosa*) was never found alongside Common Rockrose (*Helianthemum nummularium*) or Mouse-ear Hawkweed (*Pilosella officinarum*) (this makes sense as Greater Knapweed is a species of more nutrient rich meadows whereas Mouse-ear Hawkweed and Rockrose require extremely short swards / infertile soils.) Upright brome (*Bromopsis erecta*) was treated as a positive indicator species but can often be a sign of unmanaged or under-grazed chalk grasslands going into decline. Upright Brome was positively correlated with Common Knapweed. Clustering of positive correlations between Common Rockrose, Hairy Violet (*Viola hirta*), Thyme (*Thymus sp.*), Fairy Flax (*Linum catharticum*), Glaucous Sedge (*Carex flacca*), Common milkwort (*Polygala vulgaris*) and Salad Burnet (*Sanguisorba minor*) (seen at top right hand of fig. 5) mean these species tend to co-occur in the same fields. Results of this analysis can be seen in figure 6.

4.0 Discussion

4.1 Limitations

It is difficult to assess the impact of OCND funded habitat interventions for several reasons. There is a lack of baseline condition data for many sites, and only sites that were participating in the project were surveyed. The surveys took place between 2018 and 2022 by a variety of surveyors. Sites surveyed before and after habitat interventions were carried out were surveyed within a 3-year period, which is too short a time to determine long-term habitat change.

Survey inconsistencies were reduced by using a standardised method (see Appendix 1), as this produced comparable results. Focusing on the indicator species and physical attributes aided surveyors with limited identification skills.

Not all chalk grassland habitat within the OCND project boundary became part of the project. The OCND surveys are not a complete picture of chalk grassland condition across the area, however the range of sites included does provide a convincing sample of condition across a variety of landowners and management styles.

4.2 Findings

The majority of chalk grassland sites are in unfavourable or unfavourable-declining condition. Sward height and scrub coverage were the survey attributes found to be unfavourable most often. However, these two features are also the most likely to show rapid change under improved management.

Good indications for habitat restoration are the fact that negative indicator species are rare, with 93% of surveys favourable for this attribute (i.e., lacking significant negative species). Wildflower coverage is also high (82% of surveys showed favourable wildflower coverage) 59% of the fields were favourable for chalk grassland indicator species, a good indication that key species are still present in many sites.

The survey results suggest that habitat intervention can improve condition. The 24 sites surveyed before and after habitat intervention work took place show a noticeable change with 32% of sites in recovering condition following habitat restoration work. The two attributes that improved most often on recovering sites were scrub coverage and sward height.

However, these attributes will only remain favourable if management improvements are ongoing. Measurable changes in wildflower coverage and species composition are expected to take longer than the time period of the OCND project to show significant change. The expectation would be that if scrub coverage and sward height remain favourable, there could be gradual improvements in species richness and wildflower coverage. However, there are additional factors such as soil composition, habitat connectivity and environmental conditions that could also impact these.

It is important to note that regardless of condition, all areas are valuable habitat and land managers should not be discouraged. Some sites may benefit from bespoke surveys that reflect targets that are more relevant to their site or management style e.g., higher scrub coverage thresholds may be desirable for sites targeting reptile species.

OCND recommends the condition assessment to other land managers as a useful tool for providing baseline data and as an indicator of the effectiveness of practical management. However, the condition assessment is a rapid-assessment method based on the vascular plants of chalk grassland. Management and environmental changes also impact non-vascular plants and animal species that are part of the chalk grassland ecosystem. Secondary surveys would be needed to evaluate the impact of management changes on these species and niche habitats.

It would be of interest for ongoing monitoring to include a record of the specific type and timing of land management happening on the ground. For example, the condition of fields with different grazing regimes could be compared (e.g., year-round grazing vs autumn/winter grazing, or sheep vs mixed grazing), with alternatives such as mechanical cutting (topping or cut and take). This might allow for further analysis of how management affects condition. Hawes et al. 2018, for example, found that even where the overall condition of chalk grassland sites had improved, the abundance of coarse grasses increased. These grasses appeared to be best controlled by spring-summer grazing. Several sites in the OCND project area already have or are moving towards spring-summer or year-round grazing regimes. It will be interesting to see if this leads to further improvements in field condition.

It is difficult to confidently measure the impact of management regimes over a short number of years as weather patterns and annual temperatures are likely to create inter-annual variations. Longer periods of surveying would help us to be more confident about the link between management activities and shifts in condition attributes. For example, chalk

grassland sites in Wiltshire that were monitored over a period of 46 years (Ridding et al. 2020) have shown that a decline in species richness and diversity were linked to reduced grazing pressure, but equally important was an increase in soil nitrogen, which has a similar effect on vegetation.

4.3 Summary

The condition of chalk grassland sites within the OCND project area of the North Downs is sub-optimal. Historical and recent changes to land-use and agriculture, reduced grazing pressure, increased recreational pressure, and climate change have all had a part to play. Removal of encroaching scrub habitat and restoration of grazing regimes initiated by OCND has resulted in some positive changes to field condition. To evaluate whether those changes continue in the long-term, the relative value of different grazing regimes, and the impact of other environmental factors will require long-term monitoring.

4.4 Recommendations

Chalk grasslands in the OCND project area require ongoing management to reduce scrub encroachment and maintain a desirable sward height. Cutting (ideally with removal of arisings), grazing or a combination of both is recommended. Given the extent of chalk grassland habitat and the difficulties associated with mechanical cutting on the North Downs escarpment, sustainable grazing options are key. Where the options exist for mixed grazing, with spring-summer or rotational annual grazing this is encouraged. Annual monitoring via condition assessments and recording of grazing and cutting patterns would support land managers to develop the optimal management methods for their sites.

Acknowledgements

Fig.5 and Fig.6 were provided by Rachael Thornley, University of Reading, who also provided additional analysis of the survey data and comments on the text.

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Appendix 1

Chalk Grassland Condition Assessment Survey Form (ARCH and Salix Ecology, 2011)

	Stop number										
	1	2	3	4	5	6	7	8	9	10	
Positive indicator Species	Tick if species present at each stop: Target: At least two indicator species are frequent, and three occasional Totals out of 10 stops 1-2 =rare, 3-4 = occasional, >5 = frequent										Frequency (R, O, F)
Kidney Vetch <i>Anthyllis vulneraria</i>											
Thyme-leaved Sandwort <i>Arenaria serpyllifolia</i>											
Yellow-wort <i>Blackstonia perfoliata</i>											
Upright Brome <i>Bromopsis erecta</i>											
Clustered Bellflower <i>Campanula glomerata</i>											
Common Harebell <i>Campanula rotundifolia</i>											
Glaucous Sedge <i>Carex flacca</i>											
Carline Thistle <i>Carlina vulgaris</i>											
Greater Knapweed <i>Centaurea scabiosa</i>											
Dwarf thistle <i>Cirsium acaule</i>											

Wild Basil <i>Clinopodium vulgare</i>												
Eyebright <i>Euphrasia spp</i>												
Lady's Bedstraw <i>Galium verum</i>												
Gentian <i>Gentiana spp</i>												
Common Rockrose <i>Helianthemum nummularium</i>												
Horseshoe Vetch <i>Hippocrepis comosa</i>												
Hairy St John's Wort <i>Hypericum hirsutum</i>												
Rough Hawkbit <i>Leontodon hispidus</i>												
Fairy Flax <i>Linum catharticum</i>												
Common Sainfoin <i>Onobrychis viciifolia</i>												
Restharrow <i>Ononis repens</i>												
Adders tongue fern <i>Ophioglossum vulgatum</i>												
Orchids (any)												
Wild Marjoram <i>Origanum vulgare</i>												

Mouse Ear Hawkweed <i>Pilosella officinarum</i>											
Burnet Saxifrage <i>Pimpinella saxifraga</i>											
Hoary Plantain <i>Plantago media</i>											
Small Bitter Milkwort <i>Polygala austriaca</i>											
Chalk Milkwort <i>Polygala calcarea</i>											
Common Milkwort <i>Polygala vulgaris</i>											
Cowslip <i>Primula veris</i>											
Yellow Rattle <i>Rhinanthus minor</i>											
Salad Burnet <i>Sanguisorba minor</i>											
Small Scabious <i>Scabiosa columbaria</i>											
Thyme <i>Thymus spp</i>											
Hairy violet <i>Viola hirta</i>											
Other notable species											

	Stop number										
	1	2	3	4	5	6	7	8	9	10	
Negative species	Tick if present at each stop. Target: Frequency no more than occasional. Totals out of 10 stops 1-2 =rare, 3-4 = occasional, >5 = frequent										Frequency (R, O, F)
Creeping Thistle <i>Cirsium arvense</i>											
Spear Thistle <i>Cirsium vulgare</i>											
Curly Dock <i>Rumex crispus</i>											
Broad-leaved dock <i>Rumex obtusifolius</i>											
Ragwort <i>Senecio jacobaea</i>											
Common Nettle <i>Urtica dioica</i>											
Note species present outside stops with an indication of patch size											

Wildflowers and sedges	Measure cover of wildflowers and sedges at each stop. Exclude the undesirable species listed above and creeping buttercup. Target: Cover of wildflowers and sedges make up more than 30% of the vegetation.										Average cover
Cover wildflowers and sedges (%)											

Sward height (pasture only)	Measure at each stop. Target: 2-15cm										Average height
Height (cm)											

Invasive trees and shrubs	Assess cover across site as a whole. All species are considered together. Note most commonly occurring species. Target: less than 5% (tailor to site if necessary).	Total Cover
Species		
Habitat Extent	Note any loss (e.g. scrub encroachment) with details including estimated area and cause if known. Target: No loss in extent of habitat.	Area lost

See main report – Condition Categories (p6) to determine the overall condition.