The Game & Wildlife Conservation Trust and The Philip Wayre Upland Trust Partnership Project

Can rush management enhance habitat conditions for breeding waders?

Year 2 report – September 2020

1. Introduction

Most species of breeding waders are in steep decline, not only within the UK, but in Europe as a whole. Historic declines have been most precipitous in lowland grasslands, where intensification of production through higher yields, increased stocking or earlier mowing are all likely causes of lower breeding success and reduced habitat suitability. Until recently, upland grasslands have maintained relatively high densities of farmland waders that have buffered against national declines. However, within the last three decades, numbers in these marginal areas are also in steep decline. Documented reasons include habitat change, including habitat fragmentation as many areas have been afforested, increased in agricultural production, land abandonment and increased numbers of generalist predators. Habitat changes associated with changes in and reduction in livestock grazing are particularly relevant in many parts of the northern uplands and here one component of this has been the spread of rushes, chiefly, but not exclusively, the soft rush. The Game & Wildlife Conservation Trust wish to work with partners to establish rush management trials, designed to benefit breeding waders, particularly those that require shorter swards for nesting and chick-rearing.

2. Objectives

- Through patch level trials, define best practice for managing rushes through conducting experimental management involving mowing, weed-wiping and follow-up grazing.
- At the level of the field, measure changes in distribution and abundance of key wader species in relation to experimental rush management trials.
- At the level of the patch (of managed rush), consider critical sizes of managed patches that will host breeding wader species. Will they nest within it, will they rear their chicks within it?

3. Methods

Fieldwork in 2020 was limited to compartment-level bird and vegetation surveys, due to the COVID 19 pandemic and associated restrictions.

3.1 Rush management:

Compartments 1635 (southern half only), 1505 (northern half only) and 0232 were cut with a tractor mounted flail in February 2020 to remove rush growth (Figure 1). No other rush cutting was undertaken within the study area.

3.2 Bird surveys:

Bird surveys methods are as detailed in Baines 2019, but in 2020 three survey visits were made (22 April, 15 May & 30 May). Bird sightings were recorded at the level of compartment, defined by the land parcel identification number on the Rural Payment Agencies' Rural Land Register (RLR), but also recording whether they were on cut or uncut areas within each compartment. Map and results are presented in this report for the six enclosed fields where rush encroachment is particularly severe (Figure 1). Additional records of grey partridge were collected separately (GWCT 2020)

3.3 Vegetation monitoring

3.3.1 vegetation structure and composition

Vegetation structure and composition was measured along two transects, running east-west across each compartment, one transect approximately one third of the way up the compartment from its southern boundary, and the other approximately two thirds of the way up from the southern boundary (for compartments 1635 and 1505, these transects were similarly spaced but restricted the hatched portion of each compartment indicated on Figure 1). Along each transect, 25 sampling points were spaced equally, so that total number of sampling points within each compartment was 50. Taking account of the different sizes of each compartment, the sampling points observed the following approximate spacing, to ensure equal coverage along each transect line:

Compartment 1635 - 8 m spacing (n=50)

Compartment 0406 - 11 m spacing (n=50)

Compartment 1505 - 17 m spacing (n=50)

Compartment 0232 - 20 m spacing (n=50)

Compartment 5242 - 17 m spacing (n=50)

Compartment 2561 – 6 m spacing (n=50)

The GPS location of the start and end point of each transect was recorded.

Vegetation surveys were undertaken twice in 2020. In May, surveys were restricted to those three compartments (1635, 1505 and 0232) in which rush cutting had been undertaken, and were restricted to recording the dominant vegetation and its height, and the percentage cover of rush within a $1m^2$ quadrat at each sampling point.

The second surveys were a direct repeat of those undertaken in 2019 (GWCT 2019) and were conducted on 1 & 9 September 2020. For these surveys at each sampling point, the following variables were measured within a $1m^2$ quadrat:

- Vegetation height: the dominant vegetation was identified according to approximate % coverage when viewed from above. One measure of the representative height of this vegetation type within the quadrat was recorded to the nearest 1 cm using a measuring cane.
- % cover (to nearest 5%) of each rush species (*Juncus effusus, J. squarrosus* and *J. articulatus*), grass, herbs, moss, bare ground, standing water.
- Canopy density, estimated by placing a 50 cm x 50 cm 'chequerboard', divided into 100 squares on a 10 x 10 grid, vertically in the vegetation at the edge of the quadrat and estimating how many squares are obscured by vegetation, when viewed from 3-4 m away from the board.
- Presence / absence dung (sheep, cattle)

3.3.2 Overall rush cover

This was not assessed during the May 2020 survey visits but in September, methods used in 2019 were repeated. Each field was divided into approximate 1 ha cells (100m x 100m), with the number of cells being determined by the size of the field. Each cell was observed from the road, or a high vantage point, and the percentage cover of each of rush estimated to the nearest 10%, although 5% was recorded as a minimum. Rush density and height within each cell was then assessed and scored (Tables 1 and 2). Maps showing approximate location of these cells have been retained by GWCT and can be made available on request.

Additionally, the extent of rush cover in each compartment was captured in one or more photos taken from fixed points, for which GPS location and compass direction of view was recorded. These can be compared with baseline images taken in 2019 to visually assess change. These images have been retained by GWCT but can be made available on request.

3.2.4 Other rush management

Information on grazing management was captured from the Higher Level Stewardship (HLS) Upland Options Stocking Calendar Agreement Form, which sets out maximum and minimum grazing livestock numbers and type for each unit. Actual grazing densities closely followed these prescribed levels, with just a slight variation (maximum ten days) around dates.

4. Results

4.1 Bird surveys

Results are expressed in tabular form (Table 3), showing the maximum number of birds recorded in each compartment across all three surveys. Overall numbers of waders remained very similar in both years, with 32 lapwing recorded in both 2019 and 2020, and 16 curlew recorded this year compared with 15 last year. However, although numbers remained stable, there was some redistribution of birds around the site with the most notable change in 0232 (which had been cut) where lapwing increased from 8 to 32. Numbers in 1505, the second compartment which had been cut, also showed a small

increase (0 to 2), but some birds had moved away from the remaining cut compartment (1635). The biggest decrease in lapwing was in 5242, where half the birds had moved.

4.2 Vegetation surveys

Results are expressed in tabular form (Table 3). In 2019, overall rush cover was highest in 0232 but regrowth during the 2020 season resulted in approximately half the amount of cover than that recorded in the previous year. In the other two compartments where rush had been cut (1505 and 1635), overall cover after the growing season was reduced by about a third when compared with the previous autumn. Conversely, in those compartments where no rush cutting was undertaken, overall rush cover had increased by 22% (5242), 42% (0406) and 52% (2561). Of the three rush species recorded, soft rush *J. effusus*, had the highest amount of cover in 1505, 5242, 0406 and 2561, with heath rush *J. squarrosus* dominating in 0232, and *J. articulatus* being the most notable species in 1635.

5. Discussion

The stability in numbers of waders, particularly lapwing, on Lintzgarth in 2020 is a reassuring outcome. While we don't have comparable lapwing data for our other study areas in Upper Teesdale for 2020, due to COVID-19 impacts on our fieldwork programme, lapwing trends in those areas in recent years have been downward.

Although rush management was restricted to just three compartments within the site, the birds appear to have redistributed, tending to focus on those areas where rushes had been cut. Indeed encouraging the birds to congregate in targeted parts of the site may help enhance breeding success as higher bird densities can help to reduce predation risk (Berg *et al.* 1992; MacDonald & Bolton 2008)

Rush cutting will be repeated in compartments in 0232, 1505 and 1635 in winter 2020/21, while the remaining compartments will continue to be uncut, thus allowing us to tease apart the effects of year and treatment on bird response.

References

Baines, D. (2019) Breeding bird surveys at Lintzgarth in spring 2019. Survey conducted on behalf of the trustees of the Philip Wayre Upland Trust. GWCT, Eggleston.

Berg, A. (1992) Hatching success of lapwings on farmland: differences between habitats & colonies of different sizes. J. Anim. Ecol. 61: 469-476.

GWCT (2019) Can rush management enhance habitat conditions for breeding waders? Year 1 report – September 2019. GWCT, Eggleston.

GWCT (2020) Grey Partridge at Lintzgarth 2019. GWCT, Eggleston.

MacDonald, M.A. & Bolton, M. (2008) Predation of lapwing Vanellus vanellus nests on lowland wet grassland in England and Wales: effects of nest density, habitat and predator abundance. J. Ornithology 149: 555-563.

Figures and tables

Figure 1. Waders and rush management study area within Lintzgarth Fell reserve

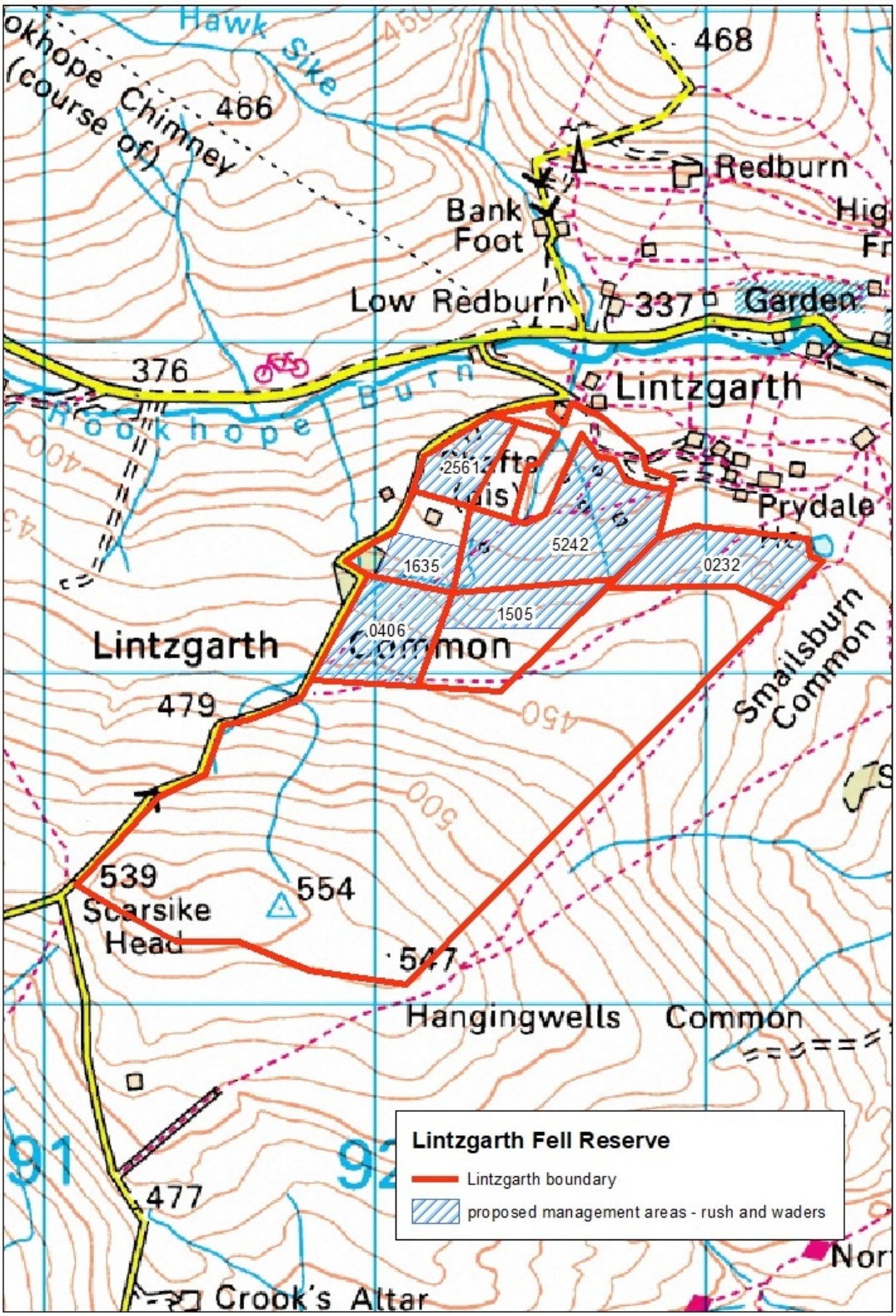

Table 1: The rush density scoring system.

None	No rush present within the cell.		**0**
Patchy	Rush tussocks distributed sparsely within the cell.		**1**
Mixed	Some rush tussocks alongside larger rush patches.		**2**
Dense	Large connected areas of rush.		**3**

Table 2: The rush height scoring system.

Short	>50% of the rush within the cell is ankle height or shorter.	**1**
Medium	>50% of the rush within the cell is between ankle and knee height.	**2**
Long	>50% of the rush within the cell is knee height or taller.	**3**

Table 3: Wader and gamebird species abundance and overall % rush cover (2019 values in parentheses), mean % canopy cover, most frequent dominant vegetation, mean vegetation height, mean % cover of each of *Juncus effusus, J. squarrosus* and *J. articulatus* (based on 50 1 m^2 quadrats) for each of six enclosed fields (compartment numbers 0232, 1505, 5242, 1635, 0406 and 2561. * denotes compartments in which rushes were cut)

	Compartment number						Site total
	***0232**	***1505**	**5242**	***1635**	**0406**	**2561**	
Birds:							
Grey partridge	0 (0)	0 (0)	0 (0)	1 (0)	1 (2)	0 (0)	2 (2)
Curlew	6 (2)	2 (2)	2 (2)	1 (2)	4 (2)	1 (4)	16 (15)
Lapwing	13 (8)	2 (0)	5 (10)	4 (8)	5 (2)	3 (4)	32 (32)
Golden plover	0 (0)	1 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (0)
Redshank	1 (0)	0 (0)	0 (0)	0 (1)	0 (0)	0 (0)	1 (1)
Snipe	1 (0)	2 (0)	1 (1)	1 (3)	0 (2)	0 (1)	5 (7)
Oystercatcher	3(2)	0 (0)	1 (0)	1 (2)	1 (0)	1 (0)	7 (4)
Vegetation:							
Overall % rush cover (compartment)	34 (67)	37 (58)	49 (40)	36 (53)	44 (31)	16 (34)	-
Mean % canopy cover	36	69	53	40	50	23	-
Most frequent dominant vegetation	Grass	Grass	Grass	Grass	Grass	Grass	-
Mean vegetation height (cm)	25	47	41	32	35	19	-
Mean % cover *J. effusus*	15	32	33	15	31	12	-
Mean % cover *J. squarrosus*	18	0	15	4	13	0	-
Mean % cover *J. articulatus*	0	5	0	18	0	3	-