

Investigating Moorland Cutting Regimes on Invertebrates at RSPB



Geltsdale

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Fig 1: Heath Goldsmith *Carabus nitens*
Photo by the author



Fig 2: Geltsdale moor
Photo by the author

Introduction

RSPB Geltsdale in the North Pennines AONB, Cumbria (Fig 2), is a non-commercial moor, managed for threatened species such as Black Grouse, while Hen Harriers and upland wading birds nest there in the summer. To increase numbers of ground nesting birds, the reserve has been cutting heather as opposed to burning since around 2000. This also reduces carbon emissions and damage to the underlying peat.

Aims

The RSPB wished to know how these cutting regimes impacted abundance and diversity of invertebrates, as they are major food sources of the ground nesting birds. So finding out which aged cuts were best could influence future management regimes.

Methodology

Five plots (see Fig 5 for variation) were chosen (2000, 04, 08, 12, 15), and a further recut of 2000 (cut in 2015) was surveyed for comparisons between a first time and second time cuts.

A central transect on each plot allowed erection of three equal markers. At each, four pitfalls were inserted, and emptied weekly (Fig 4), while sweep sampling (Figures 3 and 4) was done during fine weather. The samples were identified to family level, and analysis done with the statistics package 'R'.

Vegetation structure and species composition were surveyed using 1 metre quadrats, to show how plots differed in regeneration.



Fig 3: The type of sweep net used to collect the airborne and vegetation invertebrates (NHBS supplies)

Results

Figure 6 shows the 2000, 04, 08 and 2015 plots are closely grouped, while there is some spread between the 2012 and 2000 recuts.

Figure 7 shows vegetation structure is characteristic to age, with only older plots having vegetation points at 20-40 and 40-60cm heights, and points at 0-20cm decreasing after initial rise from 2000 to 2004. The 2000 recut has more of these than the 2015 plot.

Figure 8 shows numbers of invertebrates found over the 'edge effects' plot. This shows variation in numbers of invertebrates to be low on the 2015 and higher on the 2000 cut as would be expected. However the edge itself has much higher numbers due to a combination of vegetation types.

Figure 9 shows that for all the invertebrates surveyed, the diversity is highest in intermediate aged cuts, and is generally lower in older and more recent plots.

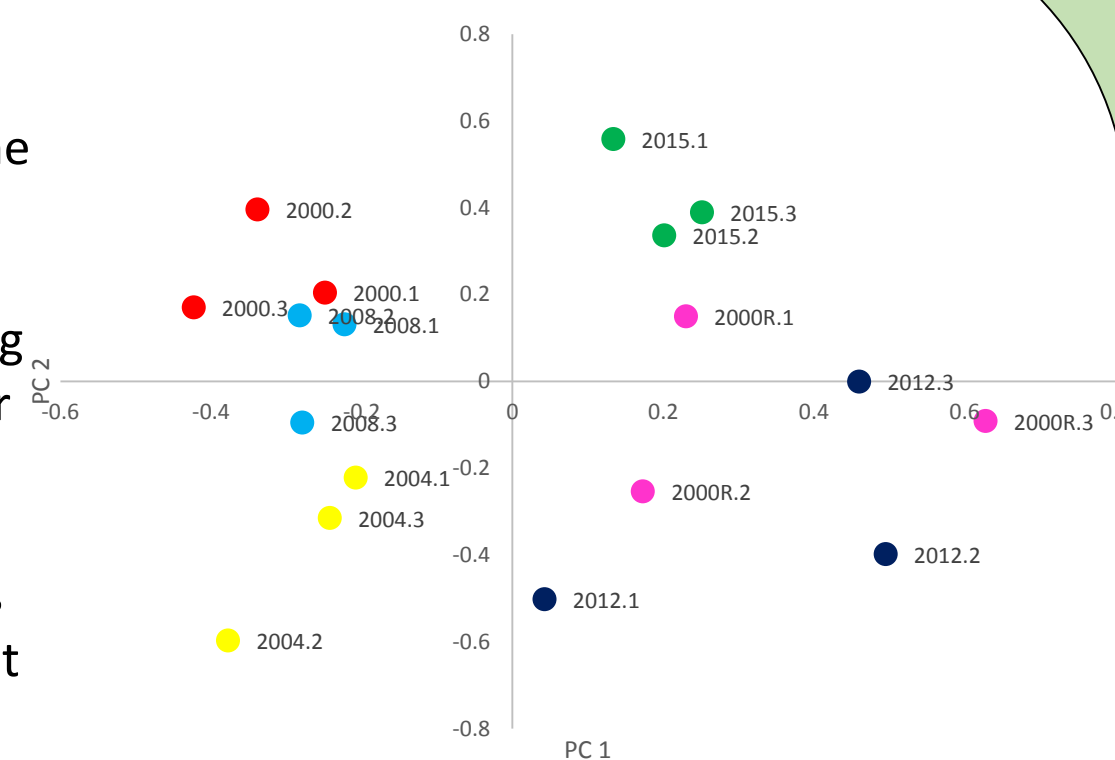


Fig 6: PCA Analysis for all Invertebrates at all sites



Fig 4: Pitfall (left- containing Sextant Beetles) and Sweep net (right – containing an Emperor moth *Saturnia pavonia* caterpillar) samples
Photo by author



Fig 5: Structural difference between 2015 (left) and 2000 (right) cut plots
Photo by author

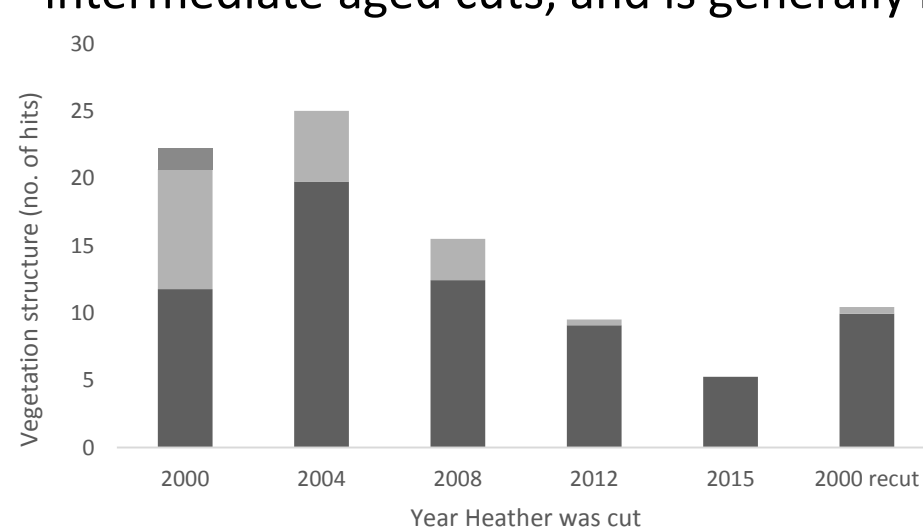


Fig 7: Graph to show the change in vegetation structure, associated with stage of succession after Heather cutting

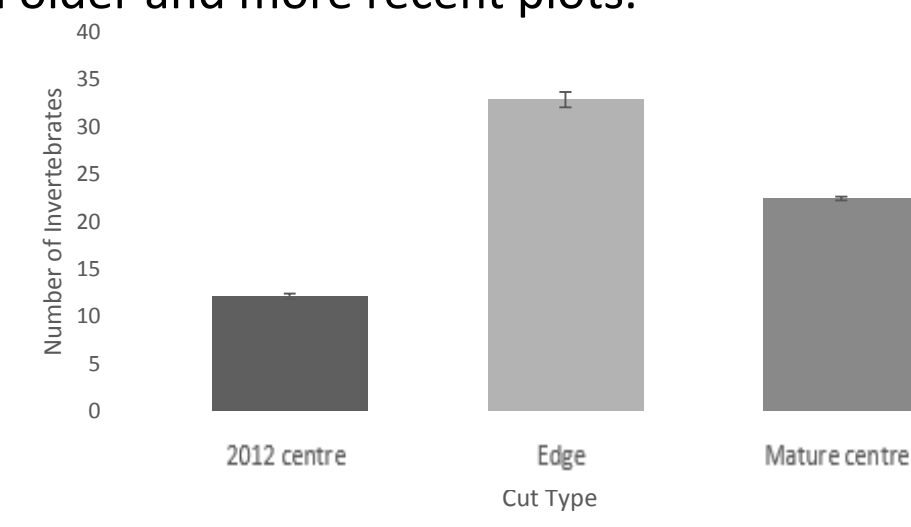


Fig 8: Graph to show the mean number of invertebrates caught across the Edge over 7 samples

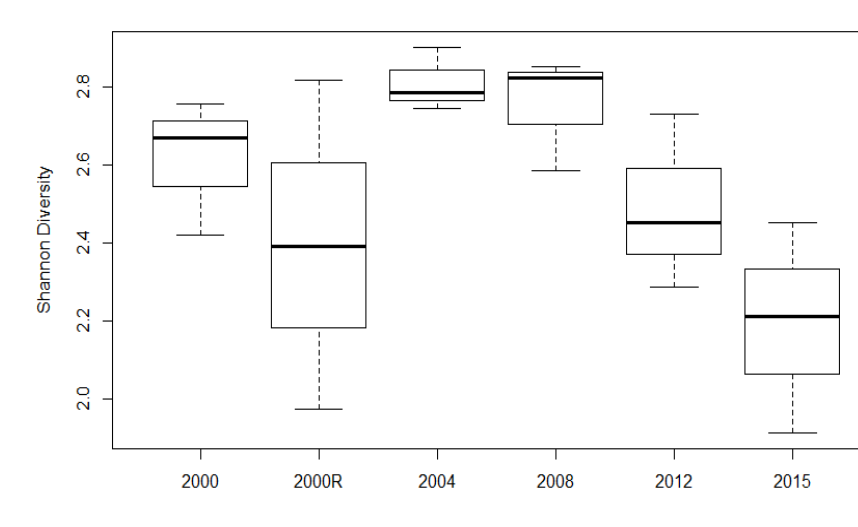


Fig 9: Box plot to show the species diversity changes across the 6 plots for all invertebrates

Discussions and Conclusions

Overall it is apparent that intermediate aged cuts have highest species richness and diversity (Figure 9) so providing the best feeding grounds for nesting birds. This conclusion can be supported by the data being fairly reliable and with little error (Figure 6), suggesting management regimes could be directed to provide more of this habitat.

Findings for the 'edge effects' add to this, as they show the 'edge' to have most invertebrates (Fig 8), supporting the need to create a mosaic of these habitats.

Acknowledgements and References

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Picture of Sweep Net

NHBS (2016) Traditional Sweep Net. <http://www.nhbs.com/title/159654/traditional-sweep-net-bag-and-frame> Accessed 28/09/16.