

# **Moor Water**

*Non-herbicide Bracken Control Trial Report:*

*Two Thorne Fields Farm – Fixed-Point Photography*

**2025**

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## **I. Summary**

- Bracken (*Pteridium aquilinum*) is able to rapidly colonise and dominate large areas, outcompeting other species.
- Until 2024, chemical control of bracken through the use of the herbicide Asulam was one option available to land managers.
- Many previous studies have taken place investigating the efficacy on non-chemical means of controlling bracken through repeatedly cutting and bruising the plant.
- Through the Moor Water project, a non-herbicide control trial was set up at Jagger's Clough in the Peak District. Results are presented in the report 'Non-herbicide Bracken Control Trial Report: Jagger's Clough'.
- An additional monitoring site was set up at Two Thorne Fields Farm and two plots were cut once or twice per year between 2022 and 2024.
- Change was monitored using fixed-point photography.
- Clear reductions in bracken canopy cover and frond height were seen in the images after two years of cutting using both regimes.
- No clear changes were seen at a control site which was left untreated.

## **2. Introduction**

In addition to the non-herbicide control trial carried out at Jagger's Clough (see report 'Moor Water Non-herbicide Bracken Control Trial Report: Jagger's Clough' for details) bracken cutting took place at the nearby Two Thorne Fields Farm, and was monitored through fixed-point photography only. This report shows photo pairs over the period of the trial showing 'before' images from year 0 (2022) and 'after' images from year 2 (after 2 seasons of cutting), along with any interpretation possible from anecdotal observations on the ground at the time of monitoring.

### **2.1. Location**

Two Thorne Fields Farm in the Peak District National Park is situated in a steep-sided valley to the west of Ladybower Reservoir, and the north of the A57 'Snake' road, Derbyshire. Like the site at nearby Jagger's clough, the trial area has an approximately SW aspect. It is situated at around 220 m in altitude.

The fields in the trial area are used as pasture for sheep, and large sections of these fields are dominated by bracken, as can be seen in Figure 1 below. These areas are the focus of this trial and were repeatedly cut using a small and relatively light self-driven flail.



Figure 1. Aerial imagery of two fields used for trial. Bracken coverage is clearly visible here due to the brown ‘winter’ colouration of the dead vegetation. Location of trial site can be seen on overview map (inset).

## 2.2. Treatment regimes

### 2.2.1. Cutting

Two treatment plots (TTFF1 and TTFF2) were identified at locations suitable for cutting, as shown below in Table 1. A third location was selected with a view over an untreated area to act as a control.

Table 1: Monitoring at Two Thorne Fields Farm, interventions and their plot sizes and centres

Plot ID	Intervention type	Plot size (m)	Established	Easting	Northing
TTFF1	Two cuts (July and August)	25 x 35	2022	417086	387178
TTFF2	Single cut in August	45 x 35	2022	417030	387214
TTFF3	None (control)	30 x 50	2022	416983	387232

Cutting took place in a two-week window in mid-late July (15<sup>th</sup> – 31<sup>st</sup>) and mid-late August (15<sup>th</sup> – 31<sup>st</sup>) beginning in 2022, and has been repeated annually to date (2024). The treatment used a remotely driven flail, as pictured below in Figure 2 to cut and mulch the above ground parts of the plant. Mulch was left in place. The cut areas are visible in aerial imagery taken post-cut, see Figure 3.



Figure 2. Remotely driven flail cutting plot I (TTFFI) for the first time in July 2022.



Figure 3. Post-cutting, the plots TFFF1 (right) and TFFF2 (left) are clearly visible in aerial imagery.

### 2.2.2. Grazing

Sheep grazing was present on the site, presenting an additional experimental variable which, within the parameters of this trial, could not be controlled for, as it was impractical to remove stock or fence the plots. However, this did make the trial site representative of the conditions likely to be present on many other sites where bracken may be cut.

## 3. Methodology

Vegetation was monitored using fixed-point photography annually in mid-July before treatments at both trial plots, including a control area where no treatment took place.

The trial plots were located in an area estimated to be representative of high-density bracken which was easily accessible from the road. Each of the four corners was marked out with yellow plastic ground-level marker, anchored with metal pins. These were chosen as stakes were likely to be damaged by sheep and/or cutting machinery. During installation of the markers, it was noted that the soil was very shallow, and the 36 cm standard metal marker stakes could only be driven about half way into the ground. For this reason, they were substituted with 4 galvanised petal U-pins (around 15cm long).

Baseline monitoring was carried out in July 2022, before the first treatment – during the period when bracken cover and height was around its annual peak. Subsequent monitoring was carried out annually, each July within the same two-week window; before the treatment took place in July and/or August. Three fixed points were chosen at each treatment plot and

one at the control plot, making a total of seven fixed-point views available for comparison over time as detailed in Table 2 below.

**Table 2. Fixed-point photography locations and approximate directions photos taken in.**

<b>Plot ID</b>	<b>Intervention</b>	<b>Fixed point code</b>	<b>Direction</b>	<b>Grid Ref</b>
TTFF1	Treatment	A	NNE	SK1708487152
TTFF1	Treatment	B	NNE	SK1707187164
TTFF1	Treatment	C	SE	SK1707887190
TTFF2	Treatment	A	NWW	SK1707887196
TTFF2	Treatment	B	W	SK1704687202
TTFF2	Treatment	C	NE	SK1701787201
TTFF3	Control	A	E	SK1695987250

## 4. Results

Pairs of plot overview photographs are presented below for each of the treatment and the control areas, along with any additional photographs taken to support anecdotal observations.

### 4.1. Treatment: Cutting twice per year (plot TTFFI)

Plot I (TTFFI) received two annual cuts in mid-to-late July and mid-to-late August in 2022 and 2023, before the second photographs were taken in July 2024 prior to cutting. The bracken was noted to appear much shorter and sparser, and possibly paler/yellowish green in 2024 than 2022. There appeared to be more growth of other vegetation including the thistles visible in views A, B and C below (Figure 5, Figure 6, Figure 7). Figure 4 below shows a close-up example of some of the bracken in this plot appearing stunted – having grown to an estimated 40 cm only by July 2024, and showing a yellowish colouration on the leaf tips.



Figure 4. Close-up of bracken in plot TTFFI 2024, appearing very stunted compared to bracken in the control area.

#### 4.1.1. Plot I View A



Figure 5. Plot I view A Before (2022) and after (2024) two years of treatment

#### 4.1.2. Plot I View B



Figure 6. Plot 1 view B Before (2022) and after (2024) two years of treatment

### 4.1.3. Plot I View C



Figure 7. Plot I view C Before (2022) and after (2024) two years of treatment. The bracken in the foreground is clearly shorter and sparser in 2024 compared to 2022.

#### 4.2. Treatment: Cutting once per year (plot TTFF2)

Plot 2 (TTFF2) received one annual cut in mid-to-late July 2022 and 2023, before the second photographs were taken in July 2024 prior to cutting. Similarly to plot 1, the bracken was noted to appear shorter and sparser here than the adjacent control area, and possibly paler/yellowish green in 2024 than 2022. Figure 8 below shows a visible increase in bracken height in the background of the photograph along the line where the treatment in the foreground ceases.

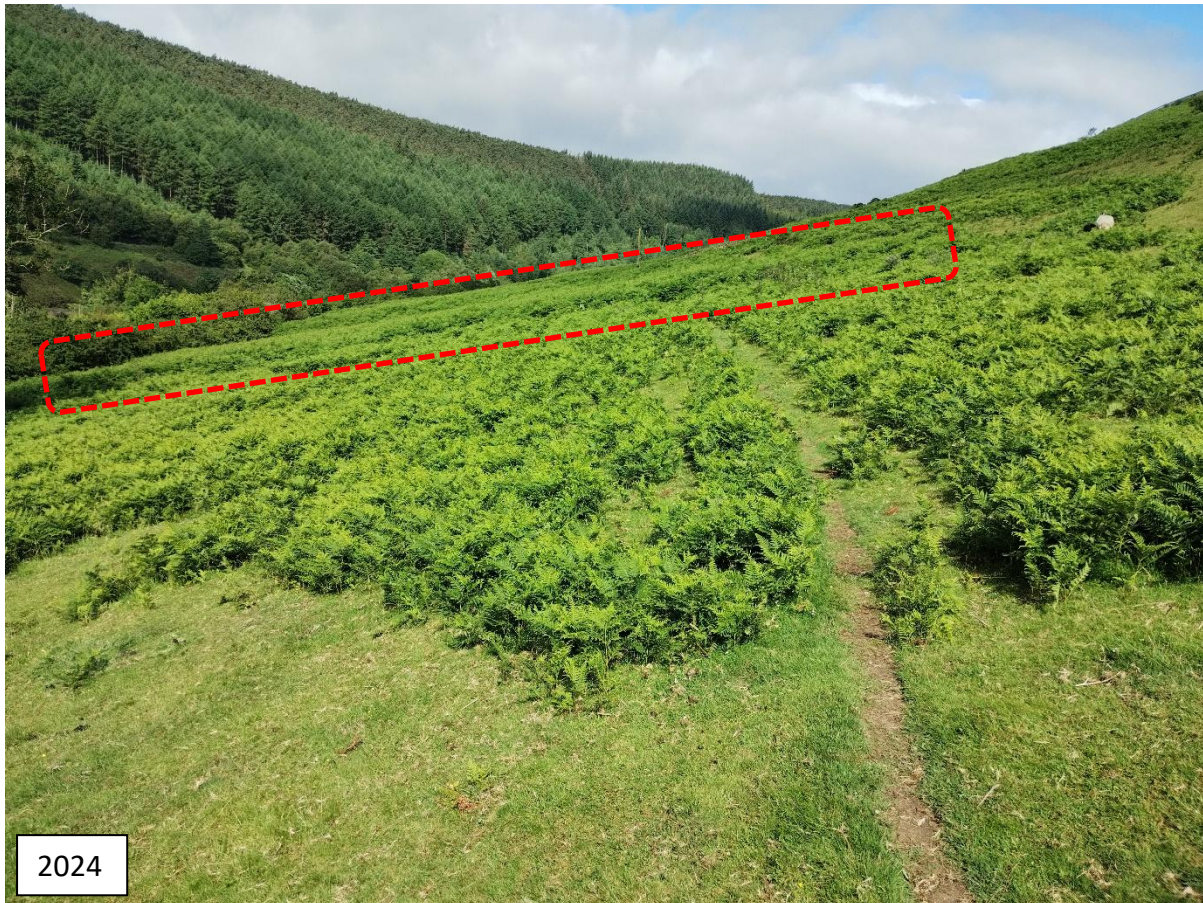


Figure 8. View of plot 2 in July 2024, prior to treatment. The control plot (3) is visible in the background, and the increase in bracken height where no treatment has occurred is clearly visible as the line highlighted by the red dashed box.

#### 4.2.1. Plot 2 View A



Figure 9. Plot 2 view A Before (2022) and after (2024) two years of treatment. Note that the bracken in the foreground (the area in shadow) is not part of the treatment plot, so was not cut.

#### 4.2.2. Plot 2 View B

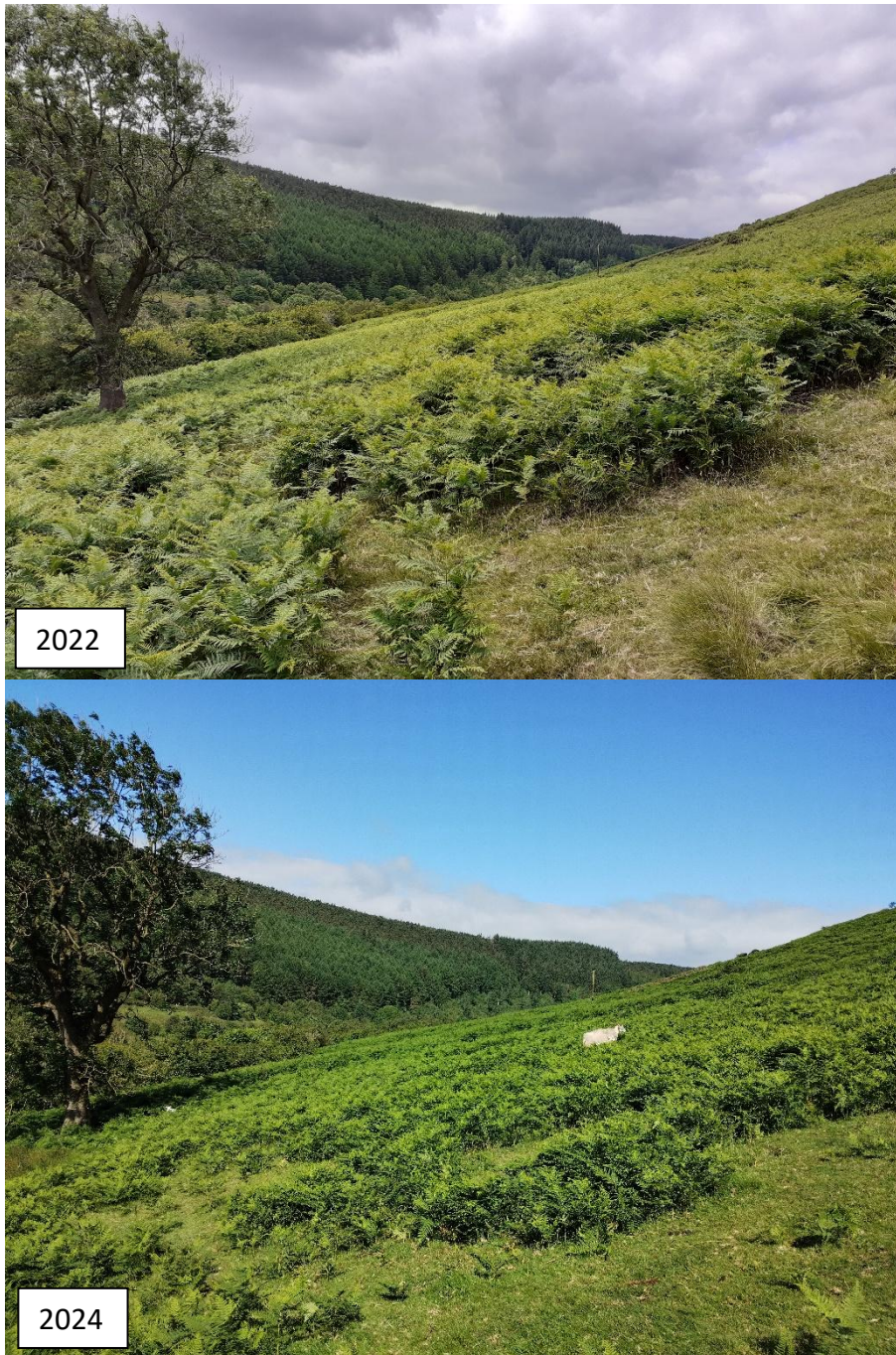


Figure 10. Plot 2 view B Before (2022) and after (2024) two years of treatment.

### 4.2.3. Plot 2 View C

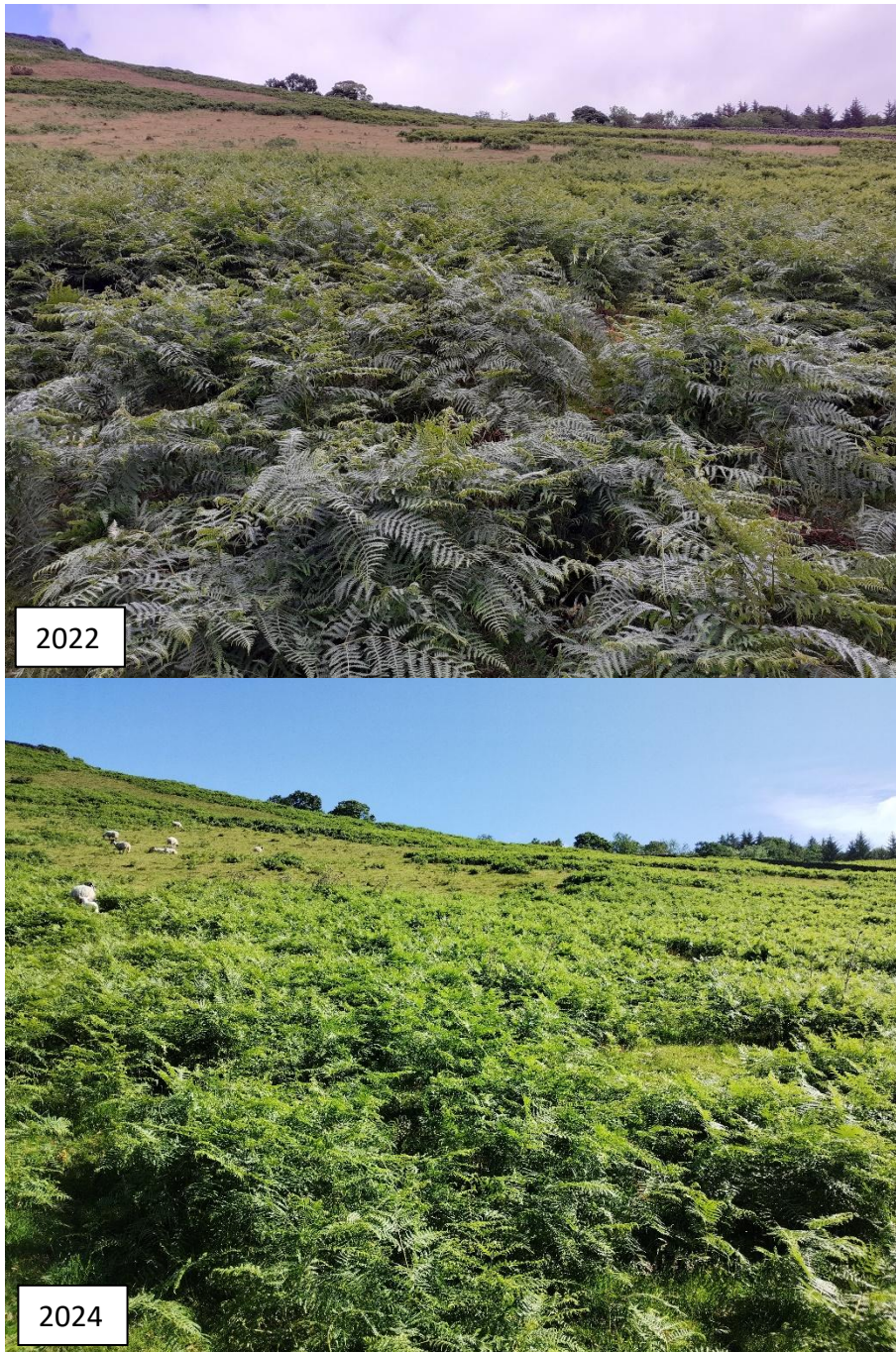


Figure 11. Plot 2 view C Before (2022) and after (2024) two years of treatment.

### 4.3. No treatment: Control (plot TTFF3)

#### 4.3.1. Plot 3 View A

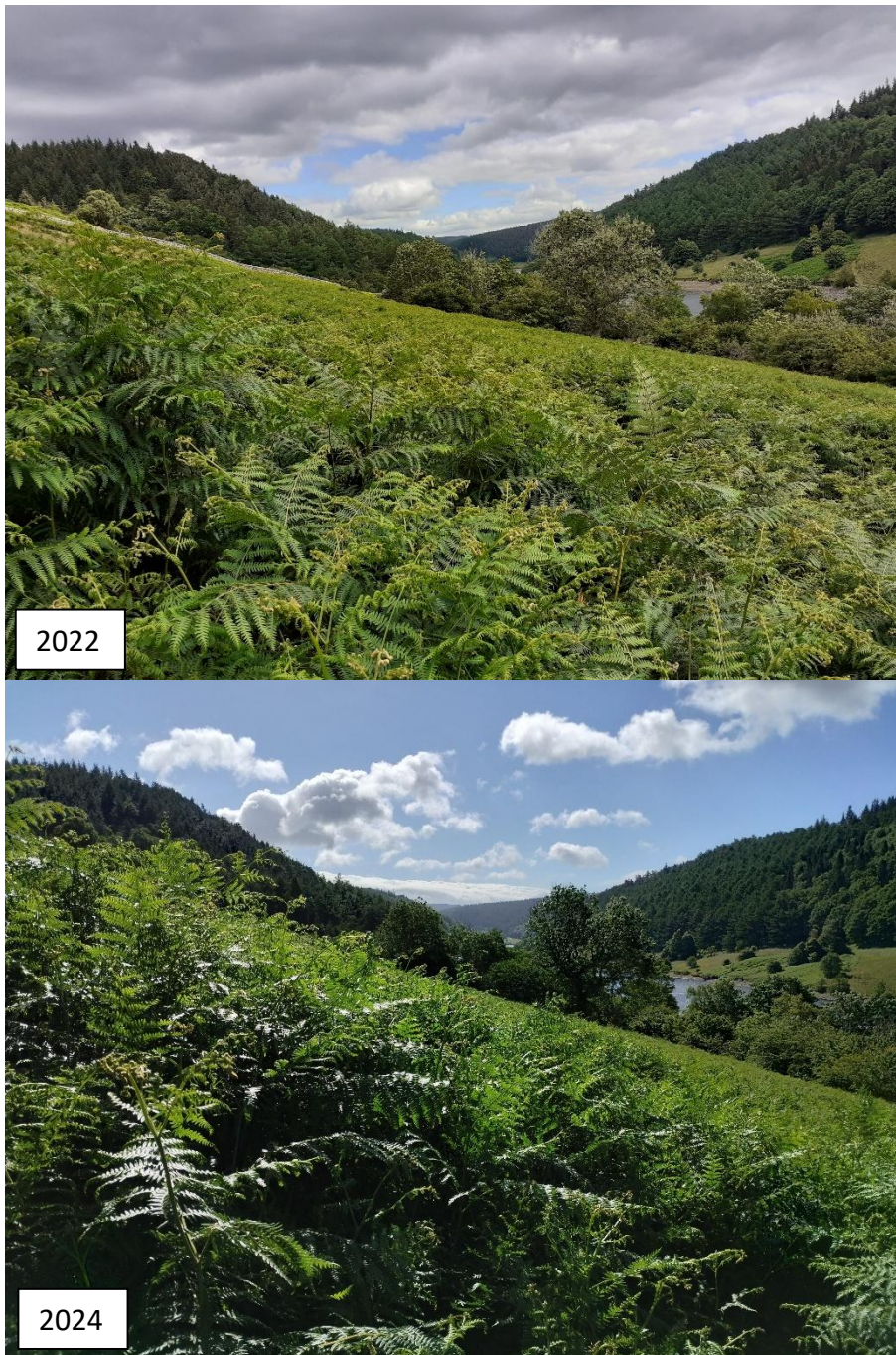


Figure 12. Plot 3 view A Before (2022) and after (2024) two years of no treatment.

## 5. Discussion and limitations

After two years of cutting (both a single July cut and a July cut followed by an August cut) there appeared to be a clear reduction in bracken canopy cover on both plots, and no change on the control plot. There also appeared to be a substantial reduction in bracken frond height on both treatment plots, but not at the control plot. The change in ground flora e.g. the appearance of thistles could be related to bracken reduction and/or ground disturbance from the cutting machinery. It is possible that the perceived yellowing leaf colouration noted in 2024 but not in other years was related to a reduction in nutrient availability or starch storage in the rhizomes as a result of the treatment.

The presence of sheep on the experimental site is a confounding factor which could not be controlled for in this study. The highly selective nature of their grazing mean that they are likely to have moved between plots grazing desired ground flora species, and may have favoured some areas more than others. It is very likely that they would spend more time in treatments plot than the control for example (as observed during monitoring in 2024), impacting the recovery of ground flora both in terms of cover and species diversity – but this was not possible to quantify. Furthermore, they may have introduced crushing of bracken via trampling any frond regrowth, which was not also not possible to quantify.

## 6. Conclusion

This fixed-point photography in this study suggests that it is possible to reduce bracken productivity and cover after two years of conducting a single cut in mid-summer or a cut in mid-summer followed up with another in late summer. Further years of treatment and monitoring could be useful to indicate any possible further reductions in bracken cover and productivity using these methods.

## 7. References

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