**Fig. S1.** Modelled change in *Pteridium* frond density through time (1993-2013) as a result of *Pteridium-control* and sheep-grazing treatments. *Pteridium*–control treatments are coded: Untreated (Untr), Cut once/yr (Cutx1), Cut twice/yr (Cutx2), asulam applied once in 1993, retreated in 2004 and followed up annually with spot-spraying thereafter until 2012. Raw data are plotted along with the fitted GAM modelled relationship. The ranges of r2 values and % deviance explained for these fitted GAM models were 0.33-0.71 and 35%-76%.

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**Fig. S2.** Modelled change in *Pteridium* litter cover through time (1993-2013) as a result of *Pteridium-control* and sheep-grazing treatments. *Pteridium*–control treatments are coded: Untreated (Untr), Cut once/yr (Cutx1), Cut twice/yr (Cutx2), asulam applied once in 1993, retreated in 2004 and followed up annually with spot-spraying thereafter until 2012. Raw data are plotted along with the fitted GAM modelled relationship. The ranges of r2 values and % deviance explained for these fitted GAM models were 0.37-0.87 and 44%-89% for *Pteridium* litter and 0.10-0.60 and 16%-64%.



**Fig. S3.** Modelled change in graminoid cover through time (1993-2013) as a result of *Pteridium-control* and sheep-grazing treatments. *Pteridium*-treatments are coded: Untreated (Untr), Cut once/yr (Cutx1), Cut twice/yr (Cutx2), asulam applied once in 1993, retreated in 2004 and followed up annually with spot-spraying thereafter until 2012. Raw data are plotted along with the fitted GAM modelled relationship. The ranges of r2 values and % deviance explained for these fitted GAM models were 0.10-0.60 and 16%-64%.

**Table S.1.** Results of the statistical analysis testing the effects of *Pteridium-control* and grazing treatments on soil pH, soil moisture content, N mineralization rate and soil-root respiration rate; the intercept is grazed treatment with no *Pteridium* control. The parameter estimates are presented along with their lower and upper 95% confidence limits along with the Pmcmc value and its significance; - = P>0.05, \* = P<0.05, \*\* =P<0.01, \*\*\*=P<0.001.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Grazing Treatment | Bracken Treatment | Estimate | L95% | U95% | PMCMC |  |
| pH | Grazed | Intercept | 3.976 | 3.284 | 4.746 | 0.002 | \*\* |
|  |  | Asucut | 0.336 | 0.119 | 0.547 | 0.002 | \*\* |
|  |  | Asulam | 0.281 | 0.075 | 0.499 | 0.012 | \* |
|  |  | Cutasu | 0.301 | 0.093 | 0.519 | 0.007 | \*\* |
|  |  | Cut 1x | 0.319 | 0.106 | 0.527 | 0.004 | \*\* |
|  |  | Cut 2x | 0.63 | 0.417 | 0.843 | <0.001 | \*\*\* |
|  | Ungrazed | Untreated | -0.044 | -0.251 | 0.174 | 0.689 |  |
|  |  | Asucut | -0.159 | -0.456 | 0.149 | 0.297 |  |
|  |  | Asulam | 0.093 | -0.224 | 0.383 | 0.544 |  |
|  |  | Cutasu | 0.071 | -0.241 | 0.361 | 0.634 |  |
|  |  | Cut 1x | -0.066 | -0.362 | 0.233 | 0.663 |  |
|  |  | Cut 2x | -0.286 | -0.593 | 0.012 | 0.063 |  |
| Soil Moisture Content | Grazed | Intercept | 43.021 | 36.88 | 49.638 | <0.001 | \*\*\* |
|  | Asucut | -7.508 | -16.184 | 0.738 | 0.084 |  |
|  | Asulam | -7.573 | -16.004 | 0.927 | 0.083 |  |
|  |  | Cutasu | -4.718 | -13.417 | 3.707 | 0.272 |  |
|  |  | Cut 1x | -9.134 | -17.357 | -0.664 | 0.034 | \* |
|  |  | Cut 2x | -11.29 | -19.65 | -2.796 | 0.01 | \* |
|  | Ungrazed | Control | -3.745 | -12.594 | 4.532 | 0.384 |  |
|  |  | Asucut | 6.633 | -5.532 | 18.455 | 0.274 |  |
|  |  | Asulam | 4.159 | -7.468 | 16.264 | 0.496 |  |
|  |  | Cutasu | 9.123 | -2.825 | 21.477 | 0.136 |  |
|  |  | Cut 1x | 11.986 | -0.101 | 23.685 | 0.05 |  |
|  |  | Cut 2x | 12.178 | 0.06 | 24.024 | 0.046 | \* |
| N Mineralisation Rate | Grazed | Intercept | 57.16 | 37.42 | 77.25 | 0.002 | \*\* |
|  | Asulam | -42.17 | -65.68 | -17.68 | 0.001 | \*\* |
|  | Cut 2x | -36.78 | -61.45 | -13.14 | 0.004 | \*\* |
| Ungrazed | Control | -19.79 | -43.51 | 3.9 | 0.101 |  |
|  |  | Asulam | 24.37 | -10.19 | 57.52 | 0.149 |  |
|  |  | Cut 2x | 25.23 | -7.81 | 60.16 | 0.138 |  |
| Soil-root Respiration rate | Grazed | Intercept | 5401 | -851 | 11395 | 0.076 |  |
|  | Asulam | 25160 | 16672 | 33530 | <0.001 | \*\*\* |
|  | Cut 2x | 27998 | 19651 | 36418 | <0.001 | \*\*\* |
|  | Ungrazed | Control | 2212 | -5974 | 10714 | 0.572 |  |
|  |  | Asulam | -9657 | -21396 | 2147 | 0.103 |  |
|  |  | Cut 2x | -3150 | -15298 | 8584 | 0.563 |  |

**Table S.2**. Results of the statistical analysis testing the effects of *Pteridium-control* and grazing treatments on total soil N and C , soil extractable P (Extr. P) and soil extractable N(NH4-N, NO3-N); the intercept is the grazed treatment with no *Pteridium* control. The parameter estimates are presented along with their lower and upper 95% confidence limits along with the Pmcmc value and its significance; - = P>0.05, \* = P<0.05, \*\* =P<0.01, \*\*\*=P<0.001.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bracken Treatment | Grazing Treatment | Variable | Estimate | L95% | U95% | PMCMC |  | Variable | Estimate | L95% | U95% | PMCMC |  |
| Intercept | G | Total N | 0.58 | 0.45 | 0.71 | <0.001 | \*\*\* | NH4-N | 9.24 | 2.05 | 16.48 | 0.024 | \* |
| Asucut |  |  | -0.25 | -0.4 | -0.11 | <0.001 | \*\*\* |  | -5.95 | -13.45 | 1.05 | 0.108 | - |
| Asulam |  |  | -0.18 | -0.33 | -0.04 | 0.013 | \* |  | 4.43 | -2.66 | 11.88 | 0.229 | - |
| **Cutasu** |  |  | -0.23 | -0.38 | -0.09 | 0.003 | \*\* |  | -7.36 | -14.67 | -0.02 | 0.049 | \* |
| Cut 1x |  |  | -0.23 | -0.37 | -0.08 | 0.002 | \*\* |  | -7.83 | -15.16 | -0.62 | 0.034 | \* |
| Cut 2x |  |  | -0.21 | -0.35 | -0.06 | 0.005 | \*\* |  | -7.88 | -15.26 | -0.79 | 0.035 | \* |
| Control | U |  | -0.16 | -0.3 | -0.01 | 0.033 | \* |  | 6.74 | -0.59 | 13.96 | 0.07 | - |
| Asucut |  |  | 0.21 | 0.01 | 0.42 | 0.043 | \* |  | -4.03 | -14.08 | 6.48 | 0.442 | - |
| Asulam |  |  | 0.1 | -0.1 | 0.3 | 0.336 | - |  | -13.47 | -23.59 | -3.12 | 0.011 | \* |
| Cutasu |  |  | 0.22 | 0.02 | 0.43 | 0.037 | \* |  | -3.06 | -13.2 | 7.17 | 0.563 | - |
| Cut 1x |  |  | 0.19 | -0.01 | 0.4 | 0.063 | - |  | -5.46 | -15.49 | 4.92 | 0.291 | - |
| Cut 2x |  |  | 0.12 | -0.08 | 0.33 | 0.254 | - |  | -5.52 | -16.09 | 4.64 | 0.292 | - |
| Intercept | G | Total C | 10.67 | 7.62 | 13.57 | 0.003 | \*\* | NO3-N | 6.09 | 3.42 | 8.78 | 0.008 | \*\* |
| Asucut |  |  | -5.32 | -8.36 | -2.3 | 0.001 | \*\* |  | -5.48 | -7.72 | -3.31 | <0.001 | \*\*\* |
| Asulam |  |  | -4.13 | -7.11 | -1.01 | 0.009 | \*\* |  | -5.39 | -7.64 | -3.25 | <0.001 | \*\*\* |
| Cutasu |  |  | -4.92 | -8.02 | -1.87 | 0.001 | \*\* |  | -5.59 | -7.81 | -3.36 | <0.001 | \*\*\* |
| Cut 1x |  |  | -4.95 | -7.94 | -1.87 | 0.002 | \*\* |  | -5.6 | -7.81 | -3.4 | <0.001 | \*\*\* |
| Cut 2x |  |  | -4.35 | -7.38 | -1.35 | 0.005 | \*\* |  | -5.96 | -8.08 | -3.68 | <0.001 | \*\*\* |
| Control | U |  | -3.02 | -6.15 | -0.07 | 0.05 | - |  | 2.86 | 0.68 | 5.09 | 0.012 | \* |
| Asucut |  |  | 4.36 | 0.1 | 8.69 | 0.046 | \* |  | -0.63 | -3.69 | 2.54 | 0.686 | - |
| Asulam |  |  | 2.01 | -2.32 | 6.29 | 0.364 | - |  | -1.67 | -4.77 | 1.48 | 0.294 | - |
| Cutasu |  |  | 4.2 | -0.03 | 8.56 | 0.056 | - |  | -1.33 | -4.43 | 1.84 | 0.399 | - |
| Cut 1x |  |  | 3.71 | -0.66 | 8.01 | 0.095 | - |  | -1.83 | -5.03 | 1.25 | 0.252 | - |
| Cut 2x |  |  | 2 | -2.32 | 6.23 | 0.366 | - |  | -2.53 | -5.6 | 0.63 | 0.112 | - |
| Intercept | G | Extr. P | 1.19 | -0.32 | 2.76 | 0.081 | - |  |  |  |  |  |  |
| Asucut |  |  | -0.64 | -1.3 | 0.03 | 0.059 | - |  |  |  |  |  |  |
| Asulam |  |  | -0.66 | -1.31 | 0.01 | 0.05 | \* |  |  |  |  |  |  |
| Cutasu |  |  | -0.45 | -1.14 | 0.21 | 0.181 | - |  |  |  |  |  |  |
| Cut 1x |  |  | -0.85 | -1.53 | -0.2 | 0.014 | \* |  |  |  |  |  |  |
| Cut 2x |  |  | -1.01 | -1.66 | -0.34 | 0.004 | \*\* |  |  |  |  |  |  |
| Control | U |  | 0.43 | -0.23 | 1.1 | 0.202 | - |  |  |  |  |  |  |
| Asucut |  |  | 0.99 | 0.05 | 1.92 | 0.04 | \* |  |  |  |  |  |  |
| Asulam |  |  | -0.12 | -1.05 | 0.81 | 0.8 | - |  |  |  |  |  |  |
| Cutasu |  |  | 0.4 | -0.54 | 1.34 | 0.412 | - |  |  |  |  |  |  |
| Cut 1x |  |  | -0.03 | -0.96 | 0.93 | 0.963 | - |  |  |  |  |  |  |
| Cut 2x |  |  | 0.25 | -0.67 | 1.21 | 0.597 | - |  |  |  |  |  |  |