



**JNCC Report  
No. 701**

**Brecon Beacons Fire Risk Modelling Tool**  
Appendix 2: Example questionnaire

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## Land management opportunities for fire risk reduction at Mynydd Du: a decision support tool

### Land Management Scoring Sheet

JNCC are collaborating with Natural Resources Wales and Brecon Beacons National Park to create a proof-of-concept decision support tool which aims to explore the potential management opportunities to reduce fire risk at Mynydd Du. Moorland fires can have a significant ecological impact (loss of habitat in particular), cost a large amount of money to tackle and result in significant release of carbon to the atmosphere. This project will look for ways to estimate fuel load and the impact of different management decisions on fire risk through the power of modelling.

The risk that an area of land will burn in an out of control fire is a combination of physical elements (which define how flammable the area is) and social elements (which define how likely an ignition event will happen). To inform impact land management can have on fire risk in our risk model and how these measures are scored against key factors, we require your knowledge and expertise of the local area.

Please complete this survey below to help inform our approach. The survey has been split out into five sections, please attempt to answer all the questions, and provide as much detail as possible for the free text questions.

#### Section 1: About you

1. Which stakeholder group do you belong to? Tick all that apply.
  - Active graziers
  - Brecon Beacons National Park Authority staff
  - Natural Resources Wales staff
  - Wales Fire & Rescue
  - Other: .....

#### Section 2: Grazing practices

If you have no knowledge of grazing practices in the Mynydd Du please tick the box below and skip to section 3. Otherwise please answer the questions in this section.

I have no knowledge of grazing practices (skip to section 3)

- To your knowledge, what proportion of these habitat types in Mynydd Du are regularly used for grazing? Tick one box per row and tick not applicable if the habitat is not used for grazing.

| Habitat type  | Percentage cover of habitat used for grazing |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 1-20%  | 20-40%                   | 40-60%                   | 60-80%                   | 80-100%                  | Not applicable           |
| Heath ( <i>Calluna</i> )  | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mire ( <i>Eriophorum Angustifolium</i> )                          | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Rush ( <i>Juncus Effusus</i> )                                    | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Limestone Grassland   | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grassland ( <i>Nardus</i> )                                       | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heath ( <i>Vaccinium</i> )  | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wet Heath   | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grassland ( <i>Molinia</i> )                                      | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

- How does grazing change the likelihood of wildfire?

To inform how grazed habitats compare to non-grazed habitats, please complete the tables below. For this we are assuming a moderate level of grazing on a habitat. In future iterations we could consider differences between high, moderate and low levels of grazing and the type of grazing, but this level of complexity will not be included at this stage.

Scores are given with 1 being where the grazed habitat is equally as likely to spread wildfire than the non-grazed habitat, whereas scores of 2 to 4 is where you think the habitat is more likely (2 = twice as likely, 4 = four times more likely) and 1/2 to 1/4 being less likely to spreading wildfire (1/2 = half as likely, 1/4 = four times less likely).

| Less Likely to burn    |                         |                | Equally likely   | More likely to burn |                       |                      |
|------------------------|-------------------------|----------------|------------------|---------------------|-----------------------|----------------------|
| 1/4                    | 1/3                     | 1/2            | 1                | 2                   | 3                     | 4                    |
| Four times less likely | Three times less likely | Half as likely | Equal likelihood | Twice as likely     | Three times as likely | Four times as likely |

For example, grazed *Molinia* Grassland may result in drier vegetation and so if I thought this generally is twice as likely to burn compared with the same habitat which was not grazed on, I would give this a score of 2.

Please complete the table below ticking one box per row, selecting the not applicable option if a habitat is not used for grazing.

| Grazed habitat   | Non-grazed habitat  | Less likely              |                          |                          | Equally likely           | More likely              |                          |                          | Not applicable           |
|--|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  |   | 1/4                      | 1/3                      | 1/2                      | 1                        | 2                        | 3                        | 4                        |                          |
| Grazed Heath ( <i>Calluna</i> )  | Heath ( <i>Calluna</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Mire ( <i>Eriophorum Angustifolium</i> )                          | Mire ( <i>Eriophorum Angustifolium</i> )                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Rush ( <i>Juncus Effusus</i> )                                    | Rush ( <i>Juncus Effusus</i> )                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Limestone Grassland   | Limestone Grassland   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Grassland ( <i>Nardus</i> )                                       | Grassland ( <i>Nardus</i> )                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Heath ( <i>Vaccinium</i> )  | Heath ( <i>Vaccinium</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Wet Heath   | Wet Heath   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Grassland ( <i>Molinia</i> )                                      | Grassland ( <i>Molinia</i> )                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. Please indicate your level of confidence in the above answers.

|  | High                     | Moderate                 | Low                      | Not applicable           |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Grazed Heath ( <i>Calluna</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Mire ( <i>Eriophorum Angustifolium</i> )                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Rush ( <i>Juncus Effusus</i> )                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Limestone Grassland   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Grassland ( <i>Nardus</i> )                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Heath ( <i>Vaccinium</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Wet Heath   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grazed Grassland ( <i>Molinia</i> )                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4. Besides the level of grazing intensity (high, moderate, and low) and the type of grazing livestock, are there any other key aspects of grazing which you think should be considered in explaining where wildfires occur. Please provide a short explanation.

### Section 3: Prescribed burns

If you have no knowledge of prescribed burns in the Mynydd Du please tick the box below and skip to section 4. Otherwise please answer the questions in this section.

- I have no knowledge of prescribed burns (skip to section 4)

1. To your knowledge, what proportion of these habitat types in Mynydd Du are regularly used for prescribed burning? Tick one box per row and tick not applicable if the habitat is not used for burning.

| Habitat type  | Percentage cover of habitat used for burning |                          |                          |                          |                          |                          |
|---|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 1-20%  | 20-40%                   | 40-60%                   | 60-80%                   | 80-100%                  | Not applicable           |
| Heath ( <i>Calluna</i> )  | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Mire ( <i>Eriophorum Angustifolium</i> )                          | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Rush ( <i>Juncus Effusus</i> )                                    | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Limestone Grassland   | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grassland ( <i>Nardus</i> )                                       | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heath ( <i>Vaccinium</i> )  | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Wet Heath   | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Grassland ( <i>Molinia</i> )                                      | <input type="checkbox"/>                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. How do prescribed burns change the likelihood of wildfire?

To inform how habitats which have been burnt compare to non-burnt habitats, please complete the tables below. In future iterations we could consider the timing of burns during the year, however this level of complexity will not be included at this stage.

Scores are given with 1 being where the burned habitat is equally as likely to spread wildfire than the non-grazed habitat, whereas scores of 2 to 4 is where you think the

habitat is more likely (2 = twice as likely, 4 = four times more likely) and 1/2 to 1/4 being less likely to spreading wildfire (1/2 = half as likely, 1/4 = four times less likely).

| Less Likely to burn    |                         |                | Equally likely   | More likely to burn |                       |                      |
|------------------------|-------------------------|----------------|------------------|---------------------|-----------------------|----------------------|
| 1/4                    | 1/3                     | 1/2            | 1                | 2                   | 3                     | 4                    |
| Four times less likely | Three times less likely | Half as likely | Equal likelihood | Twice as likely     | Three times as likely | Four times as likely |

For example, burnt *Molinia* Grassland may result in drier vegetation and so if I thought this generally is twice as likely to burn compared with the same habitat which has not undergone a prescribed burn, I would give this a score of 2.

Please complete the table below ticking one box per row, selecting the not applicable option if a habitat is not used for burning.

| Burned habitat   | Non-burned habitat  | Less likely              |                          |                          | Equally likely           | More likely              |                          |                          | Not applicable           |
|--|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  |   | 1/4                      | 1/3                      | 1/2                      | 1                        | 2                        | 3                        | 4                        |                          |
| Burned Heath ( <i>Calluna</i> )  | Heath ( <i>Calluna</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Mire ( <i>Eriophorum Angustifolium</i> )                          | Mire ( <i>Eriophorum Angustifolium</i> )                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> )             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Rush ( <i>Juncus Effusus</i> )                                    | Rush ( <i>Juncus Effusus</i> )                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Limestone Grassland   | Limestone Grassland   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Grassland ( <i>Nardus</i> )                                       | Grassland ( <i>Nardus</i> )                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Heath ( <i>Vaccinium</i> )  | Heath ( <i>Vaccinium</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Wet Heath   | Wet Heath   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Grassland ( <i>Molinia</i> )                                      | Grassland ( <i>Molinia</i> )                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

3. Please indicate your level of confidence in the above answers.

|  | High                     | Moderate                 | Low                      | Not applicable           |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Burned Heath ( <i>Calluna</i> )                              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Mire ( <i>Eriophorum Angustifolium</i> )              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> ) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

|  |                          |                          |                          |                          |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| Burned Rush ( <i>Juncus Effusus</i> )                                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Limestone Grassland   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Grassland ( <i>Nardus</i> )                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Heath ( <i>Vaccinium</i> )  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Wet Heath   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Burned Grassland ( <i>Molinia</i> )                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4. Besides the timing of when prescribed burns are undergone, are there any other key aspects of burning practices which you think should be considered in explaining where wildfires happen. Please provide a short explanation.

#### Section 4: Peatland restoration

If you have no knowledge of peatland restoration in the Mynydd Du please tick the box below and skip to section 5. Otherwise please answer the questions in this section.

- I have no knowledge of prescribed burns (skip to section 5)

1. To your knowledge, which of these habitat types in Mynydd Du are peatland restoration actions looking to restore habitats to? Tick all which apply.

- |  |  |
|--|--|
| <input type="checkbox"/> Heath ( <i>Calluna</i> )                              | <input type="checkbox"/> Heath ( <i>Vaccinium</i> )  |
| <input type="checkbox"/> Mire ( <i>Eriophorum Angustifolium</i> )              | <input type="checkbox"/> Heath and Grassland mosaic ( <i>Nardus</i> and <i>Vaccinium</i> ) |
| <input type="checkbox"/> Grassland mosaic ( <i>Festuca</i> and <i>Nardus</i> ) | <input type="checkbox"/> Wet Heath   |
| <input type="checkbox"/> Rush ( <i>Juncus Effusus</i> )                        | <input type="checkbox"/> Grassland ( <i>Molinia</i> )                                      |
| <input type="checkbox"/> Limestone Grassland                                   | <input type="checkbox"/> Other: .....  |
| <input type="checkbox"/> Grassland ( <i>Nardus</i> )                           |  |

## Section 5: Further questions

Our fire risk model considers key factors influencing where wildfires occur including:

- **Climatic factors:** temperature, rainfall, wind speed
- **Topographic factors:** slope, aspect, elevation
- **Human factors:** proximity to roads, footpaths, populated areas
- **Land cover factors:** habitat type, vegetation cover

1. Do you think any additional key factors influencing wildfires are missing from this list?

2. Any further comments or key considerations you would like to highlight?

Thank you very much for your participation and taking the time to complete this survey.