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# Commission of Inquiry on Peatlands Update: Biodiversity monitoring

## Summary

This technical report update assesses the extent of biodiversity monitoring at peatland restoration projects in the UK, review the existing evidence base of biodiversity responses to peatland restoration, provide a critical review of whether current UK monitoring is sufficient to enable responses to be robustly measured and provide guidance for future biodiversity monitoring of peatland restoration.

- Responses to a questionnaire survey sent to 55+ contacts who were either attached to known restoration projects, or otherwise involved in UK peatland restoration, enabled us to summarise biodiversity monitoring at 12 UK restoration projects, 11 of which undertake monitoring. This is known to be only a small sample (max. 6%) of the c200+ UK peatland restoration projects. It is unknown whether the respondents comprise the majority of projects undertaking biodiversity monitoring.
- Vegetation was reported to be monitored in some form at all 11 sites, invertebrates and birds at 9 sites, reptiles, amphibians and mammals at 4 sites and microbes at 2. The extent of monitoring of key taxa that may provide measurable targets for assessing restoration, such as Sphagnum mosses and craneflies, was unclear across sites. The popularity of monitoring some other taxa may relate to project or organisational priorities rather than selection based on their being the optimum taxa to use for assessing peatland recovery.
- Use of formal study designs was limited. Only four instances of Before-After-Control-Impact (BACI) designs were reported, all relating to vegetation. Other study designs that should enable robust testing of biodiversity responses were also limited, with four instances of Control-Impact (CI) designs; vegetation (1), invertebrates (1), birds (1) and mammals (1) and six instances of Before-After (BA) designs; vegetation (2), invertebrates (1), reptiles (1) and birds (2).
- Monitoring timescales and the extent of taxon-specific monitoring also differed between sites, which may limit the inferences that can be made in terms of restoration trajectories across sites. The variation in monitoring between sites may relate to the absence of any overarching co-ordination of peatland monitoring in the UK.

Material adapted from the technical report by Douglas *et al.*, (2019) Commission of Inquiry on Peatlands Update: Biodiversity monitoring

This review was commissioned by the IUCN UK Peatland Programme's Commission of Inquiry on Peatlands. The IUCN UK Peatland Programme is not responsible for the content of this review and does not necessarily endorse the views contained within.

- Reported spend on biodiversity monitoring varied widely across sites and the median was 1.1% (range 0.3 to 37.7%) of total project budget. If two nature reserves with the highest spend are excluded, the mean spend across the remaining three sites providing figures was just 0.7% of overall budget. Based on questionnaire responses, most monitoring resources are spent on in-house staff costs rather than outsourced monitoring.
- Across temperate peatlands globally, translation of biodiversity monitoring into peer-reviewed papers and grey literature varies between taxa. Some taxa are clearly under-represented globally; for example, in a sample of 179 papers or reports identified as suitable for review, birds feature in just 3.4% (n=6) of these, amphibians 0.6% (n=1), mammals 1.1% (n=2) and we found no published studies addressing responses of reptiles to peatland restoration. Vegetation was better represented, with 80.4% (n=144) of papers addressing vegetation responses to restoration, and invertebrates were also reasonably well represented (18.4% of papers, n=33).
- The reported evidence does suggest that, for some taxa such as birds, responses to restoration can be rapid and in expected directions. A lack of robust evidence of biodiversity responses to restoration, particularly over the required timescales (multiple decades), could have implications for the ability of governments to accurately assess their contribution to achieving targets for biodiversity restoration, notably the Aichi biodiversity targets of the Convention on Biological Diversity (CBD). It is worth noting that some biodiversity indicators such as vegetation could also act as potential proxies of likely carbon/greenhouse gas responses to restoration, adding to the value of monitoring biodiversity at restoration sites. A weak evidence base across different taxa also means that the most effective restoration techniques may not be adequately known and information on them is not being used to guide future restoration.

## Recommendations

- Large sums of government funding are being used for peatland restoration and it is important that this is deployed effectively to achieve value for money. We strongly encourage the formal analysis and publication of further biodiversity monitoring. This could be achieved for example through making a percentage of restoration money available for analysis and publication of monitoring data.
- In terms of UK monitoring, we recommend a more robust approach to biodiversity monitoring of peatland restoration. A key recommendation is that a network of exemplar sites, deploying consistent approaches, should be developed and supported by appropriate funding. Formal study designs that enable robust testing of responses (in particular BACI but also CI or BA) should be utilised:
  - Monitoring that lacks both a baseline and controls is unlikely to yield useful data and will not be cost-effective.
  - Taxa monitored should enable measurable biodiversity restoration targets to be assessed. As a minimum, this should include Sphagnum mosses, ideally to species level, plus additional keystone taxa such as craneflies, which can be indicators themselves of peatland condition such as moisture levels, and are also important in peatland food webs.
  - Consistent methods should be used for individual taxa, both within a site over time and across different sites. Monitoring should continue over a sufficient (long-term) timescale to assess responses (for example 2, 5, 10, 20 and 30+ years post-restoration).
  - Progress towards recovery outcomes should be assessed periodically, using on-site monitoring data. This will enable remedial works to be deployed if restoration is not progressing as expected, using an adaptive management approach.
- Sufficient funding (for example 5% of overall restoration costs) should be made available for biodiversity monitoring. There is scope for more co-ordinated use of citizen science and volunteers and potential for greater use of remote sensing vegetation change. Data should be shared to enable collaborative meta-analyses of biodiversity responses to be undertaken.
- Finally, biodiversity monitoring at UK peatland restoration sites should be standardised by an agreed national common outcomes approach to ensure consistency in data collection and allow national assessments to be made.