Triage and investment optimisation for peatland restoration

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Narrative brief

Scottish Woodlands manages a portfolio of peatland restoration projects, from initial scoping through to design and funding. For a peatland manager, this means assessing site suitability, designing works to prevent or slow erosion, preparing funding applications (e.g., Peatland ACTION), navigating carbon unit/credit pathways under the Peatland Code, and exploring alternative restoration techniques where appropriate. The landscapes are complex: we predominantly deal with upland blanket bog systems characterised by variable peat depths and a range of erosive features, including artificial drainage, hags, gullies, and bare peat pans. Hydrological connectivity is heterogeneous; woodland and peatland habitats interact at margins. Decisions must balance ecological benefits, carbon outcomes, safety, logistics, and financial considerations.

Typical estate-scale problems include identifying suitable areas and potential workflow for restoration phases – estates may be several thousand hectares in size, with sometimes hundreds of hectares suitable for project development.

What managers aim to do better, at speed, is the initial appraisal/triage of large estates into priority areas for intervention. Managers need a defensible way to (i) map hydrological units and erosion features using existing datasets, (ii) quantify a cost and risk of doing nothing (in monetary, biodiversity and hydrological terms), and (iii) compare this with costs and expected benefits of feasible actions (e.g., drain blocking, re-wetting, gully stabilisation) to recommend a safe, cost-effective programme of work. This also includes determining the stability limits of peat, given the continuity/fragmentation of the peat body, and optimising a portfolio under budget and access constraints.

Scottish Woodlands is interested in developing a prototype decision-support pipeline that ingests partner-supplied data (including high-resolution imagery from NatureScot) for a reference site (e.g., Glen Dye Moor, Aberdeenshire) and produces: (a) maps of hydrological units and probable erosion features; (b) triage scores combining risk and opportunity; and (c) a budget-aware recommendation of where and how to act first. Emphasis is on

transparency, uncertainty quantification, and operational feasibility rather than black-box performance alone.

Data and assets available

Scottish Woodlands will provide access to existing NatureScot imagery and other layers used in current practice. Indicative layers include high-resolution imagery; soils/peat depth or proxies; land cover/vegetation; drains/gullies (mapped or to be detected); hydrology and boundaries; restoration feasibility notes. Where gaps exist, we may create clearly labelled synthetic or proxy inputs for method testing.

What success looks like:

- Map products for the site: hydrological units, candidate intervention polygons, and a triage score (with uncertainty bands).
- A small optimisation study: select a subset of units to treat under a notional budget to maximise expected net benefit (carbon/biodiversity proxies minus costs), plus a sensitivity analysis.
- A concise roadmap listing data gaps, calibration needs, and steps required to create a product that will support Scottish Woodlands' peatland management processes.