

Quantifying the risk posed to peatland conservation by invasive seeding of non-native conifers

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Introduction

Invasive seeding of non-native coniferous trees¹ in the UK involves mainly Sitka Spruce² and Lodgepole Pine. It is a growing conservation problem³ for the condition of designated sites (SSSI, SAC, SPA); on restored peatlands and forestry adjacent areas of open priority habitat.

The main seed dispersal vector in conifers is wind (Fig. 1 & 2). Individual mature trees can produce ~15,000 to 300,000 seeds each in a good year⁴.

Tackling this is costly. Invasive seeding is a problem that should be addressed by the forestry industry under the 'polluter pays' principle⁵. Objective evidence of the extent of invasive seeding is lacking. Here we begin to address this by measuring the area of peatland restoration and peatland in general exposed to invasive seeding.

Figure 1 – Sitka Spruce seeds



Figure 2 – Lodgepole pine seed

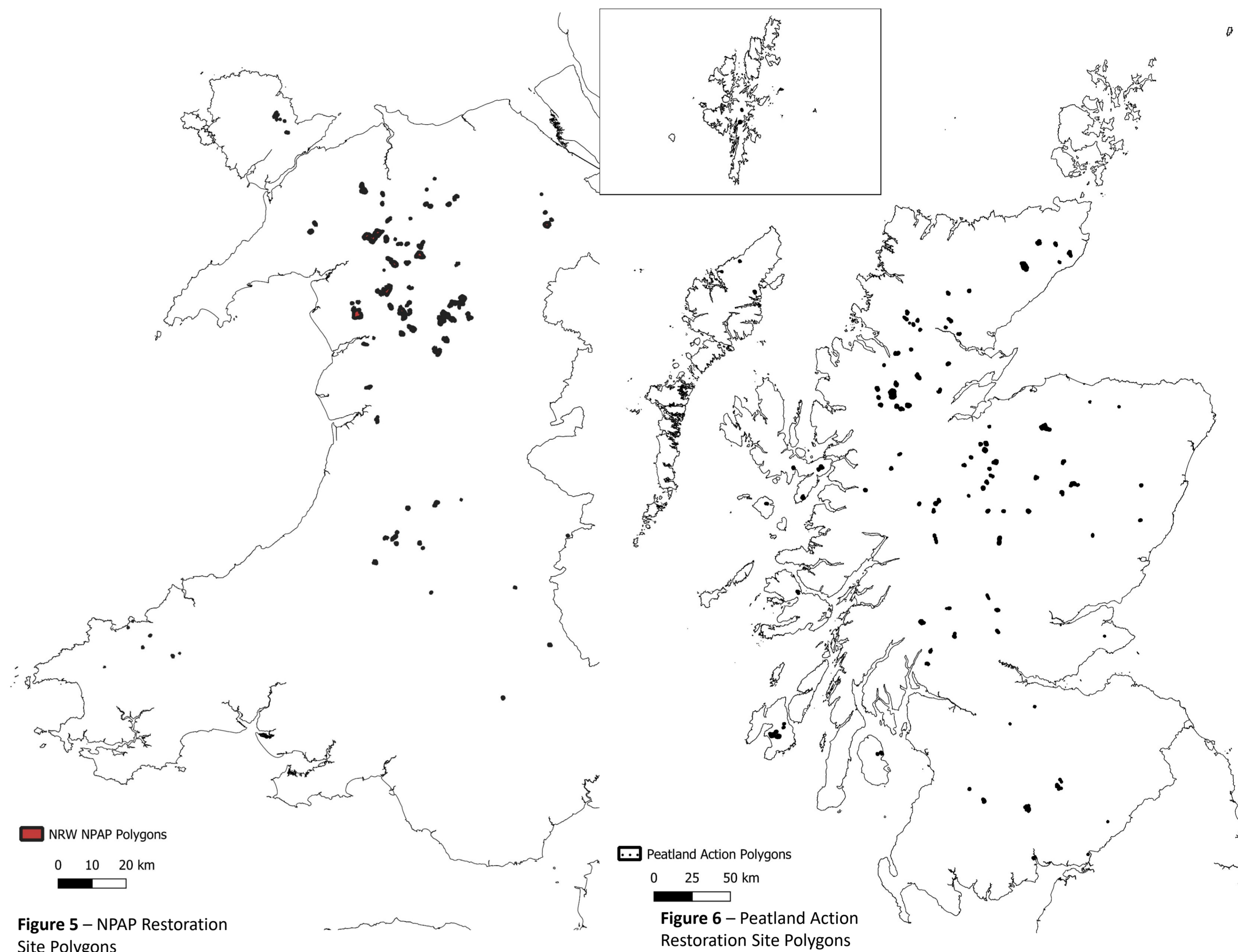


Figure 5 – NPAP Restoration Site Polygons

Figure 6 – Peatland Action Restoration Site Polygons

Results

- **Sitka spruce (*Picea Stitchensis*) - SS.** Seed dispersal = 60m (80% of seed)¹⁰ 150m (99% of seed)⁹. Seedling establishment - 200m (93% of individuals)⁸, max recorded 996m⁸.
- **Lodgepole pine (*Pinus contorta*) - LP.** Seed dispersal distances = 70m (80% of seed)⁴ - 150m (99% of seed)⁹. Seedling establishment mean - 500m¹², max recorded 1200m¹¹.
- Establishment distances > seed dispersal distances. Long distance dispersal events¹³ important in establishment. Risk zones defined based on establishment distances.
- **1,260 ha (9%) to 4,425 ha (45%)** of Peatland Action (Scotland) restoration polygons within establishment distances for **SS** and **LP**.
- **1,171 ha (22%) to 2,433 ha (46%)** of NPAP (Wales) restoration polygons within establishment distances for **SS** and **LP**.
- **200,144 ha to 970,661 ha** of UK 'deep peat' within establishment distances for **SS** and **LP**.

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Methods

- Seed dispersal and establishment distances were collated from the literature^{4 6 7 8 9} and used to define exposure buffers.
- Exposure buffers were applied to National Forest Inventory¹⁰ conifer polygons (Fig 3 & 4) to define risk zones.
- Risk zones overlapped with peatland restoration polygons^{13 14} and 'deep peat' (Fig 5 & 6) to identify areas at risk.

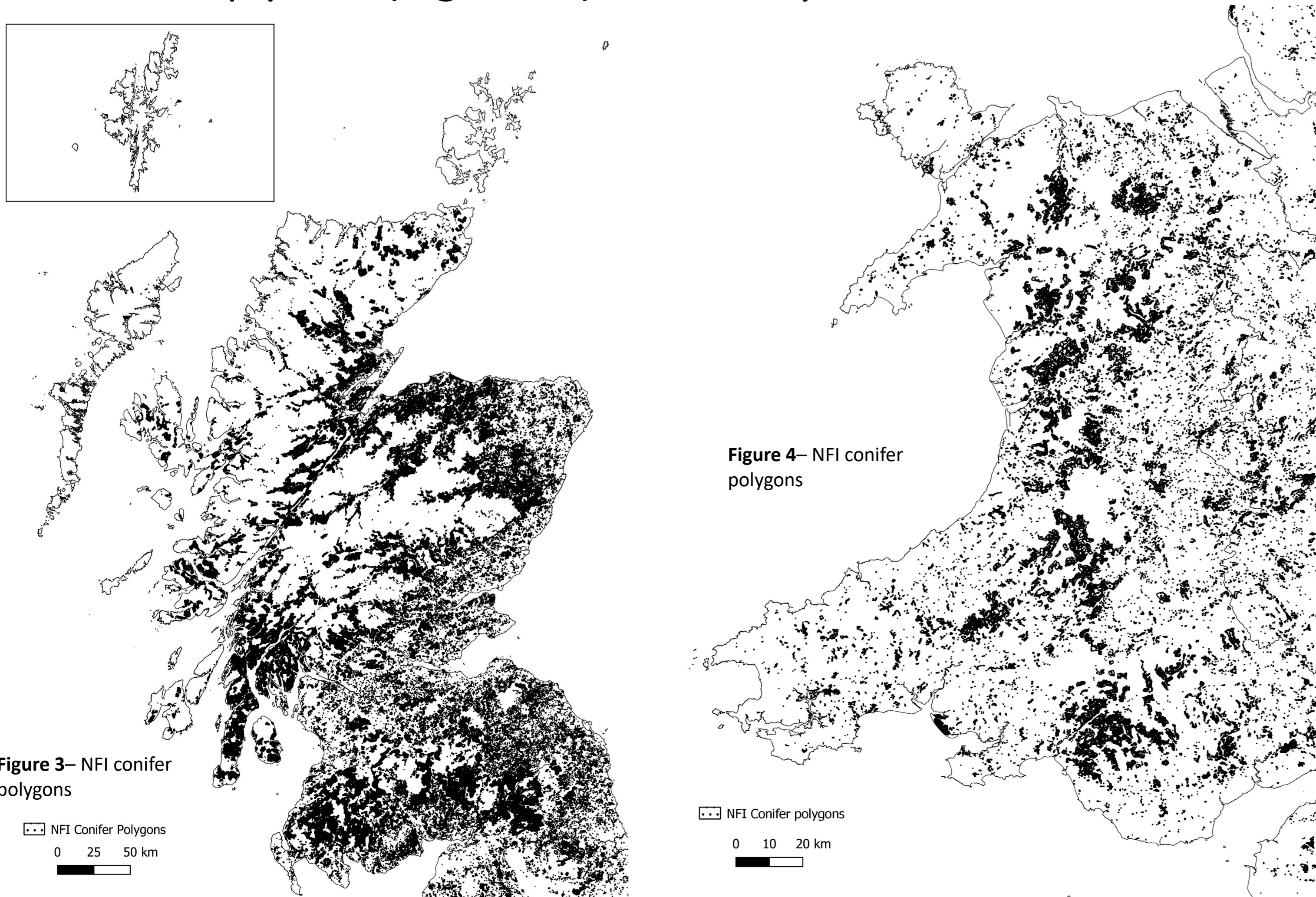


Figure 4 – NFI conifer polygons

NFI Conifer polygons

Figure 3 – NFI conifer polygons

NFI Conifer Polygons