Cairngorms Climate Conference – Net Zero with Nature

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James Hutton Institute

Woodland, climate change and the Cairngorms National Park

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*Please note – This presentation focuses on <u>theoretical examples</u> of how a woodland expansion model could be used to help identify where woodland expansion could be most beneficial to deliver identified public benefits. The maps are <u>illustrative</u> and do not represent proposed areas for woodland expansion in the Park.

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Scotland's Forestry Strategy 2019-2029 and Scottish Government's climate change commitments
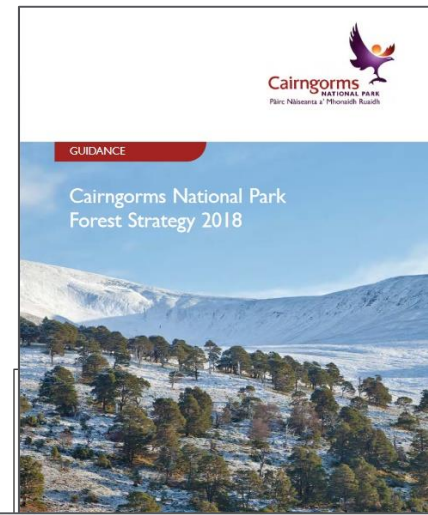
- **Vision:** *"In 2070, Scotland will have more forests and woodlands, sustainably managed and better integrated with other land uses."*

- **Key issue:** integration to maximise benefits (environmental, social, economic)

- **Expansion targets:** increase total area of forests/woodlands by 10k ha per year, rising (2020 = 12k) to 15k ha per year by 2025

- **Government's Programme for Scotland 2019-20:** *"Ensure that Scotland ends its contribution to global climate change by 2045 at the latest".* Forest/woodland expansion is a key component...

- **UK Committee on Climate Change report Jan 2020:** considering faster expansion options (also peatland restoration; low-carbon farming, etc)...
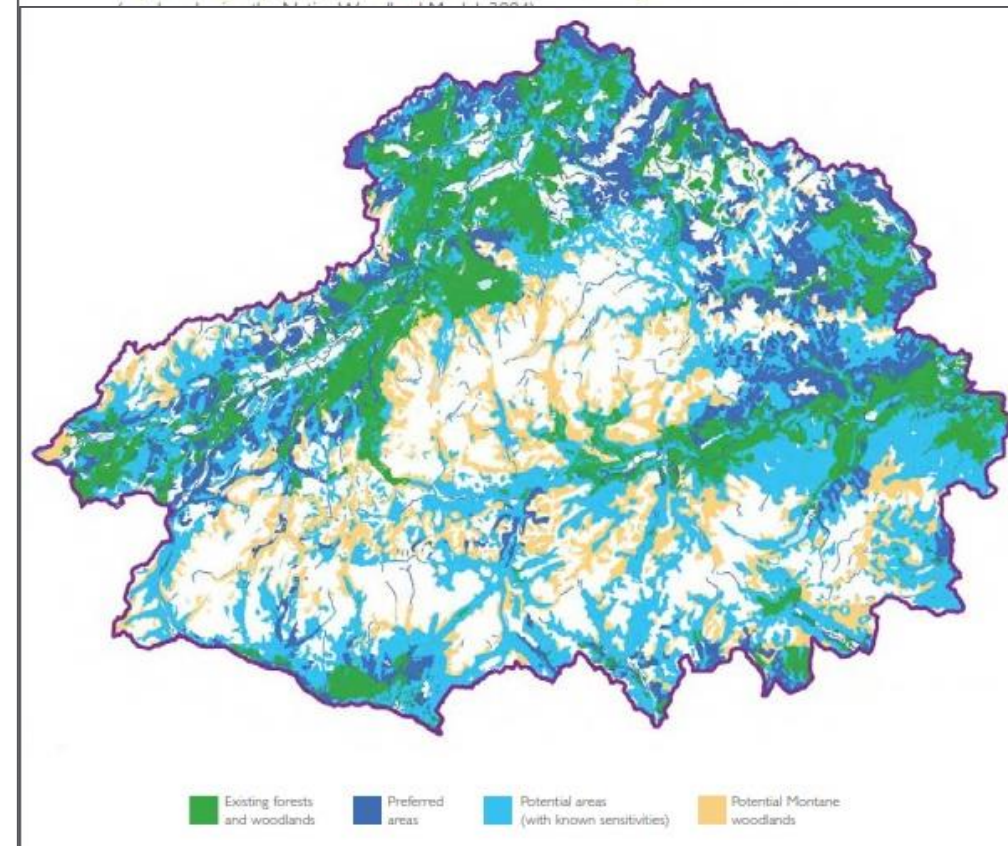
Setting this in the context of the CNP

Considering national woodland expansion targets in the context of the CNP - 3 main steps:

1. **Apportioning national expansion targets** - total land area v 'available' land area...

2. **Locations of new woodland** - maximising benefits and minimising disbenefits (e.g. carbon storage, natural flood management, food production...)

3. **Mapping different woodland expansion scenarios** to aid decision-making.

- **Starting point - CNP Forest Strategy 2018**
  - High ecological potential for woodland and scrub
  - BUT many other important land-uses to balance!

Map 2: Ecological potential for woodland and scrub in the Cairngorms National Park

Existing forests and woodlands | Preferred areas | Potential areas (with known sensitivities) | Potential Montane woodlands

Step 1: Woodland expansion targets for Scotland – 'apportioning' these to the CNP

Aim: calculate whole Scotland woodland expansion targets as proportion of total area of land 'available' for woodland expansion:

1. **Remove the following as 'non-available' land** *(='hard constraints')*:

   ➤ **Biophysical:** (a) high exposure 'unsuitable' for tree growth (DAMS 'windiness' score >24); (b) built-up areas, water, etc; (c) existing woodland

   ➤ **Policy-related:** (a) Peatland (SNH 2016 dataset); (b) Prime agricultural land (LCA Classes 1, 2, 3.1)

2. **Consider remaining land as 'available' for woodland expansion**

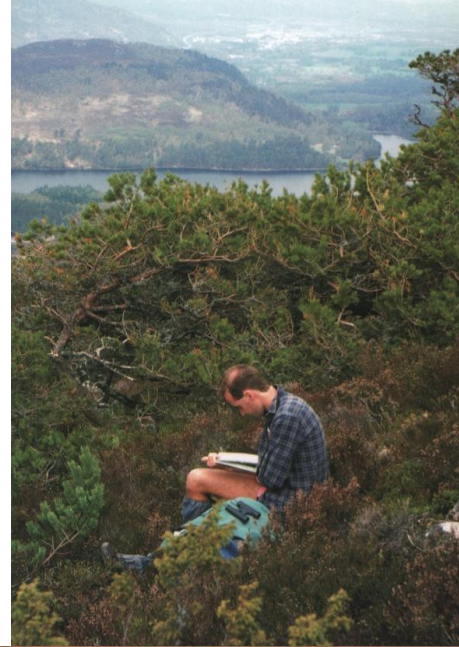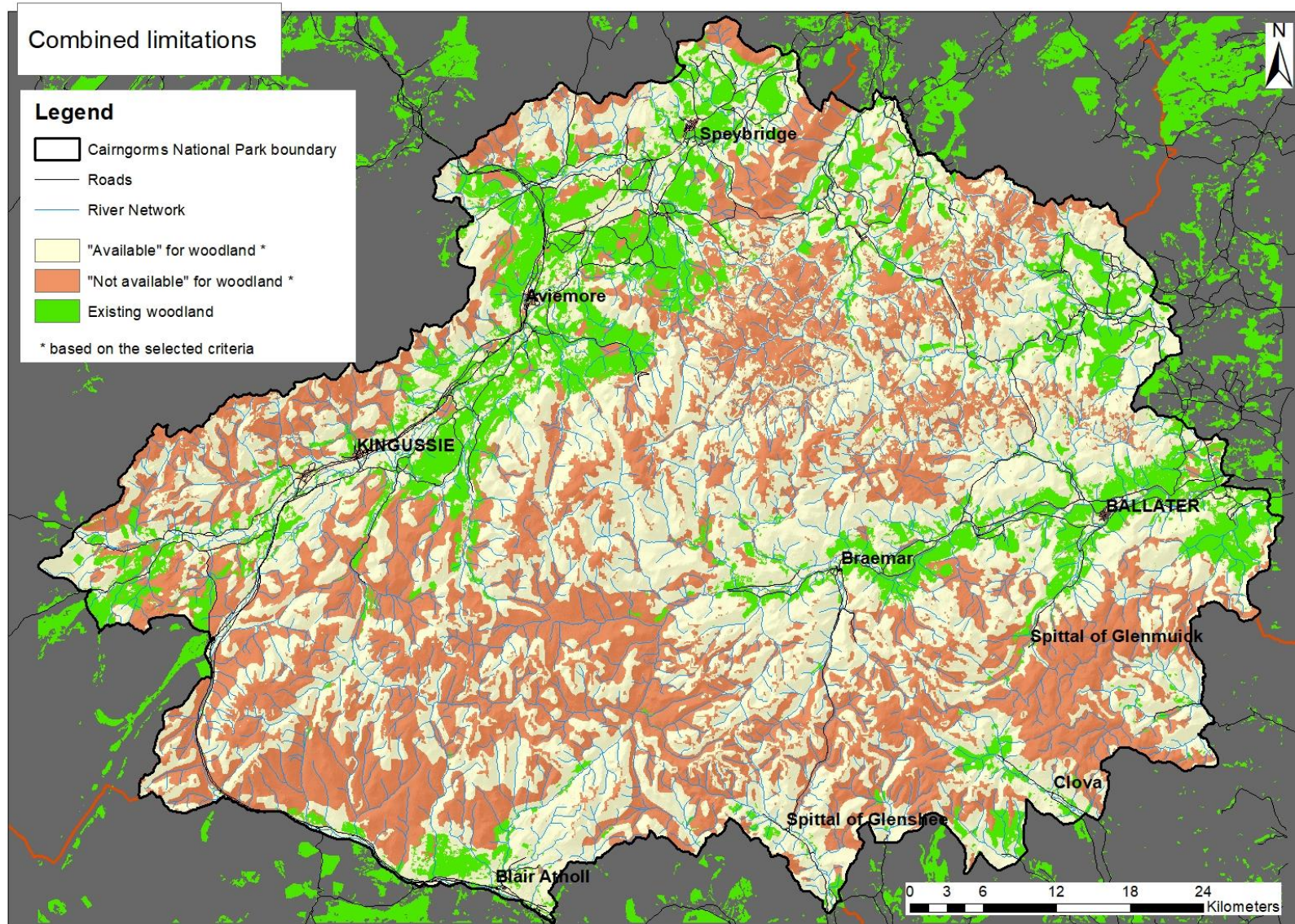3. **Do the same for the CNP** – *next slide…*

Illustration – total land area 'available'/'not available' for woodland expansion in CNP (using defined criteria)

Combined limitations

Legend

- ⬚ Cairngorms National Park boundary
- — Roads
- — River Network
- "Available" for woodland *
- "Not available" for woodland *
- Existing woodland

* based on the selected criteria

Speybridge

Aviemore

KINGUSSIE

BALLATER

Braemar

Spittal of Glenmuick

Clova

Spittal of Glenshee

Blair Atholl

0 3 6 12 18 24 Kilometers

Step 1: Woodland expansion targets for Scotland – 'scaling' these to the CNP

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CONT'D: Aim: calculate whole Scotland woodland expansion targets as proportion of total area of land 'available' for woodland expansion:

- We now have: total area of 'available' land for woodland expansion for whole-Scotland, and the same for CNP.

4. Scotland level woodland expansion targets - translate each expansion target (ha) into % of the 'available' land area of Scotland.

5. Use those national level %'s to calculate corresponding woodland expansion targets for CNP – *numbers in next slide…*

Calculations – five different woodland expansion targets, scaled to CNP by % 'available' land

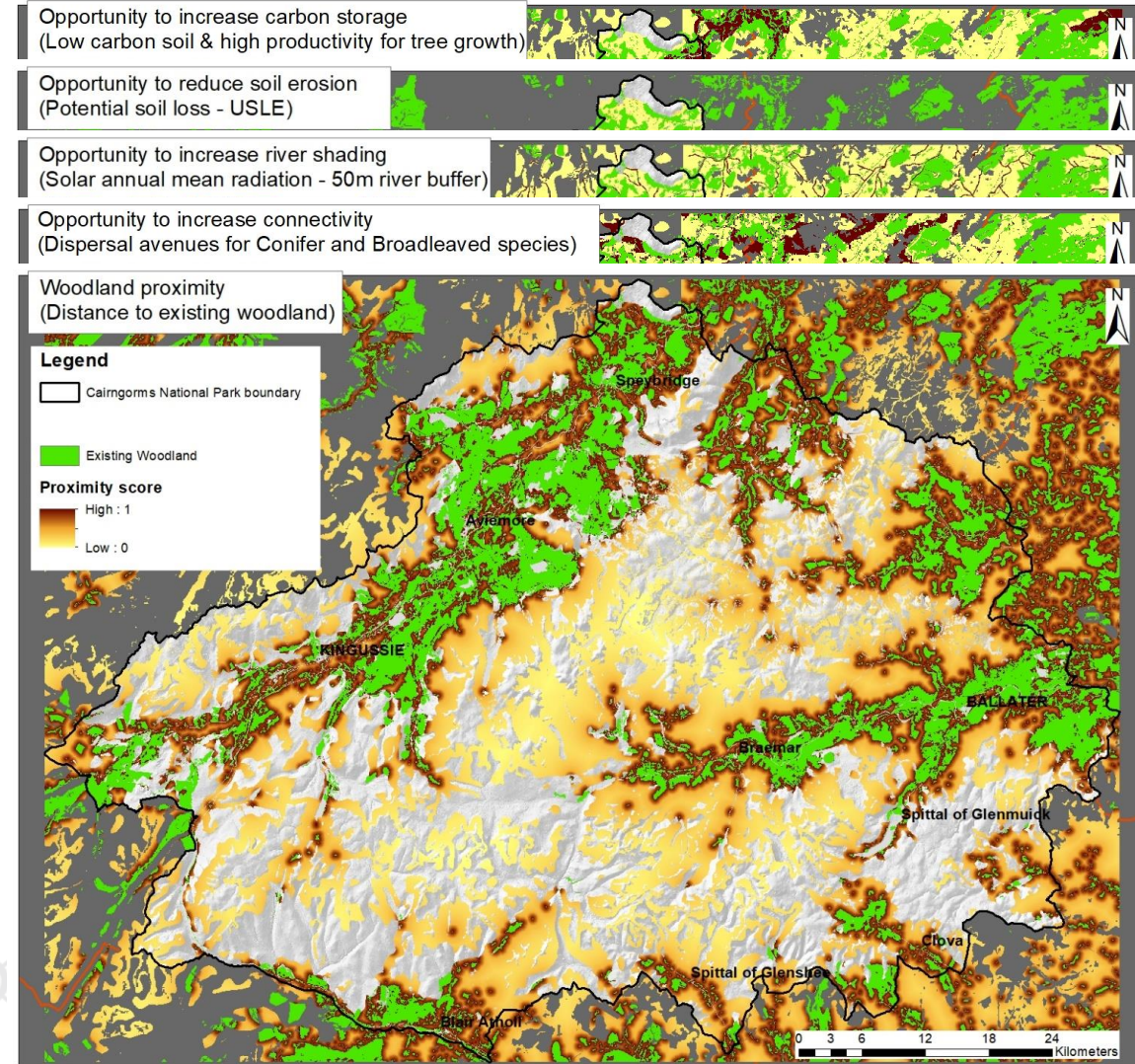| Scotland annual target (ha)	CNP annual target (ha)	CNP woodland expansion by 2045 (ha)	CNP woodland expansion by 2045 (% CNP)	CNP total woodland cover by 2045 (ha)	CNP total woodland cover by 2045 (% CNP)
10000	801*	20018	4.4	84381	18.6
15000	1201*	30027	6.6	94390	20.8
20000	1601	40037	8.8	104400	23.1
25000	2002	50046	11.0	114409	25.1
30000	2402	60055	13.2	124418	27.3

CNP Forest Strategy 2018 - current 5-year woodland expansion target is 5k ha
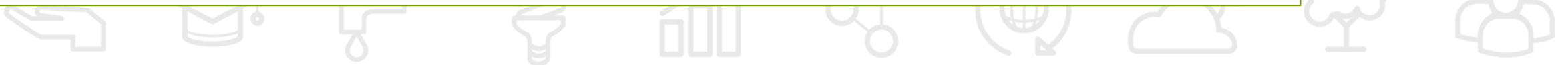
Step 2. Locations of new woodland - maximising benefits and minimising disbenefits
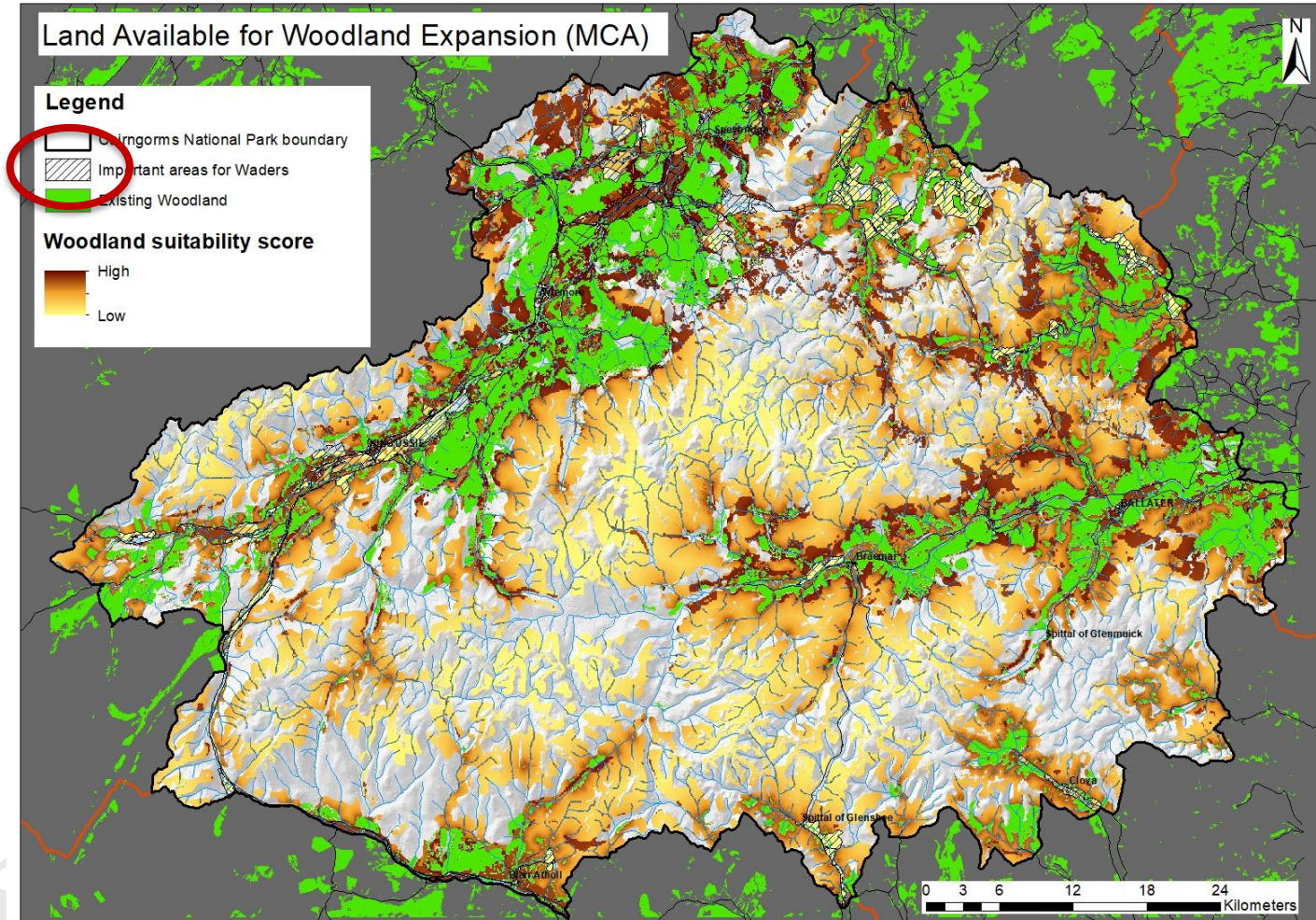
Select criteria ('opportunities' / 'constraints') to aid location-prioritisation for new woodlands

- **'Illustrative' criteria that we have used here are**:

  - ➢ *'Net' carbon impact - **soil carbon** (current) & **potential carbon storage by trees** (Land Capability for Forestry)*

  - ➢ *Soil erosion risk - InVEST model*

  - ➢ *River shading – 50m buffer + solar radiation estimates*

  - ➢ *Connectivity potential – dispersal avenues for woodland species*

  - ➢ *Proximity to existing woodland.*

Opportunity to increase carbon storage
(Low carbon soil & high productivity for tree growth)

Opportunity to reduce soil erosion
(Potential soil loss - USLE)

Opportunity to increase river shading
(Solar annual mean radiation - 50m river buffer)

Opportunity to increase connectivity
(Dispersal avenues for Conifer and Broadleaved species)

Woodland proximity
(Distance to existing woodland)

Legend

☐ Cairngorms National Park boundary

▇ Existing Woodland
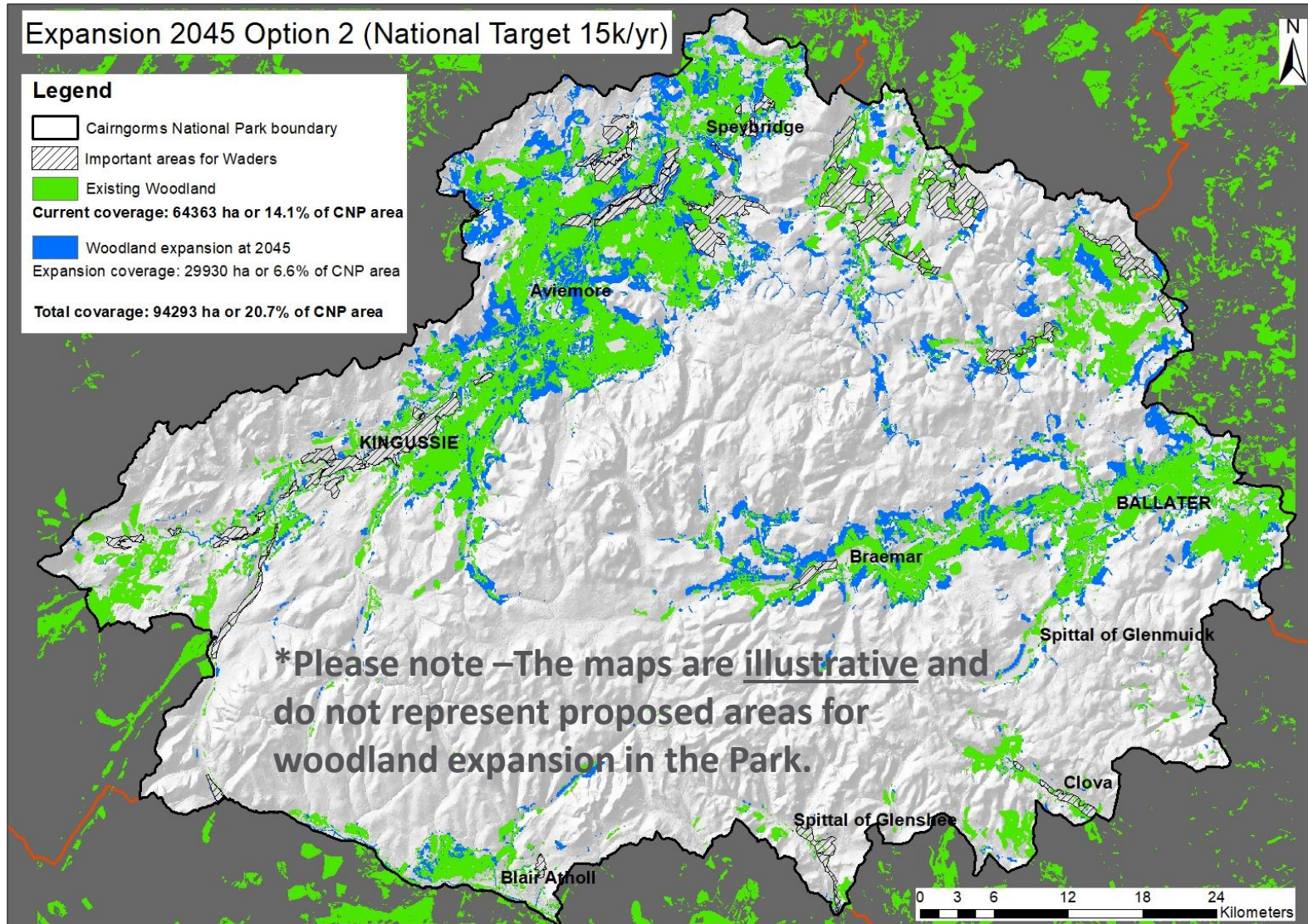
Proximity score
High : 1
Low : 0

Spatial Multi-Criteria Analysis (sMCA) – combining scores for all selected criteria

- This produces a map that scores each ('available') location according to how well it meets the combined criteria (*current analysis: all weighted the same*)

- *NB outcome is dependent on choice of criteria!*

- On top of this we can add additional 'soft' constraints for consideration:

  ➢ e.g. **important areas for waders (RSPB data)**, Designated land, recreation, other farmland (i.e. not already in 'hard constraints'), etc…

Land Available for Woodland Expansion (MCA)

Legend
- Cairngorms National Park boundary
- Important areas for Waders
- Existing Woodland

Woodland suitability score
- High
- Low

Step 3. Mapping different woodland expansion targets – using sMCA to prioritise multifunctional 'best-score' areas

Expansion 2045 Option 2 (National Target 15k/yr)

Legend

- ▭ Cairngorms National Park boundary
- ▨ Important areas for Waders
- 🟩 Existing Woodland
  Current coverage: 64363 ha or 14.1% of CNP area

- 🟦 Woodland expansion at 2045
  Expansion coverage: 29930 ha or 6.6% of CNP area

  Total coverage: 94293 ha or 20.7% of CNP area

Speybridge
Aviemore
KINGUSSIE
BALLATER
Braemar
Spittal of Glenmuick
Clova
Spittal of Glenshee
Blair Atholl

*Please note –The maps are illustrative and do not represent proposed areas for woodland expansion in the Park.

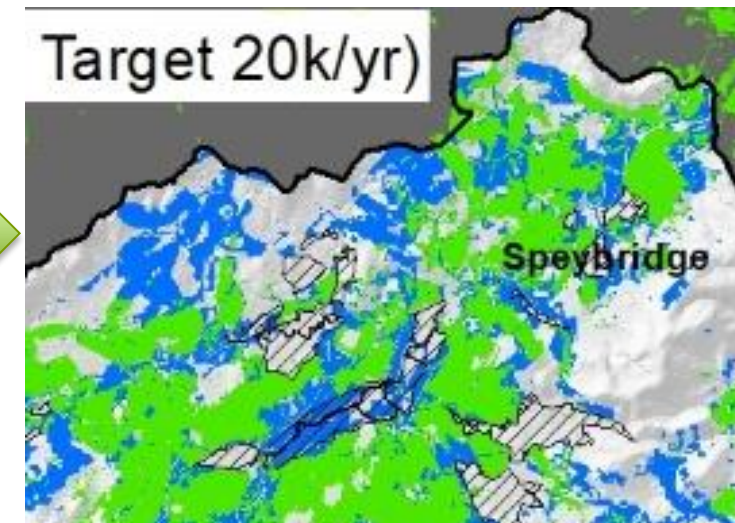# Step 3. Rolling video of the five different woodland expansion targets tested (= 10k-30k ha all-Scotland)
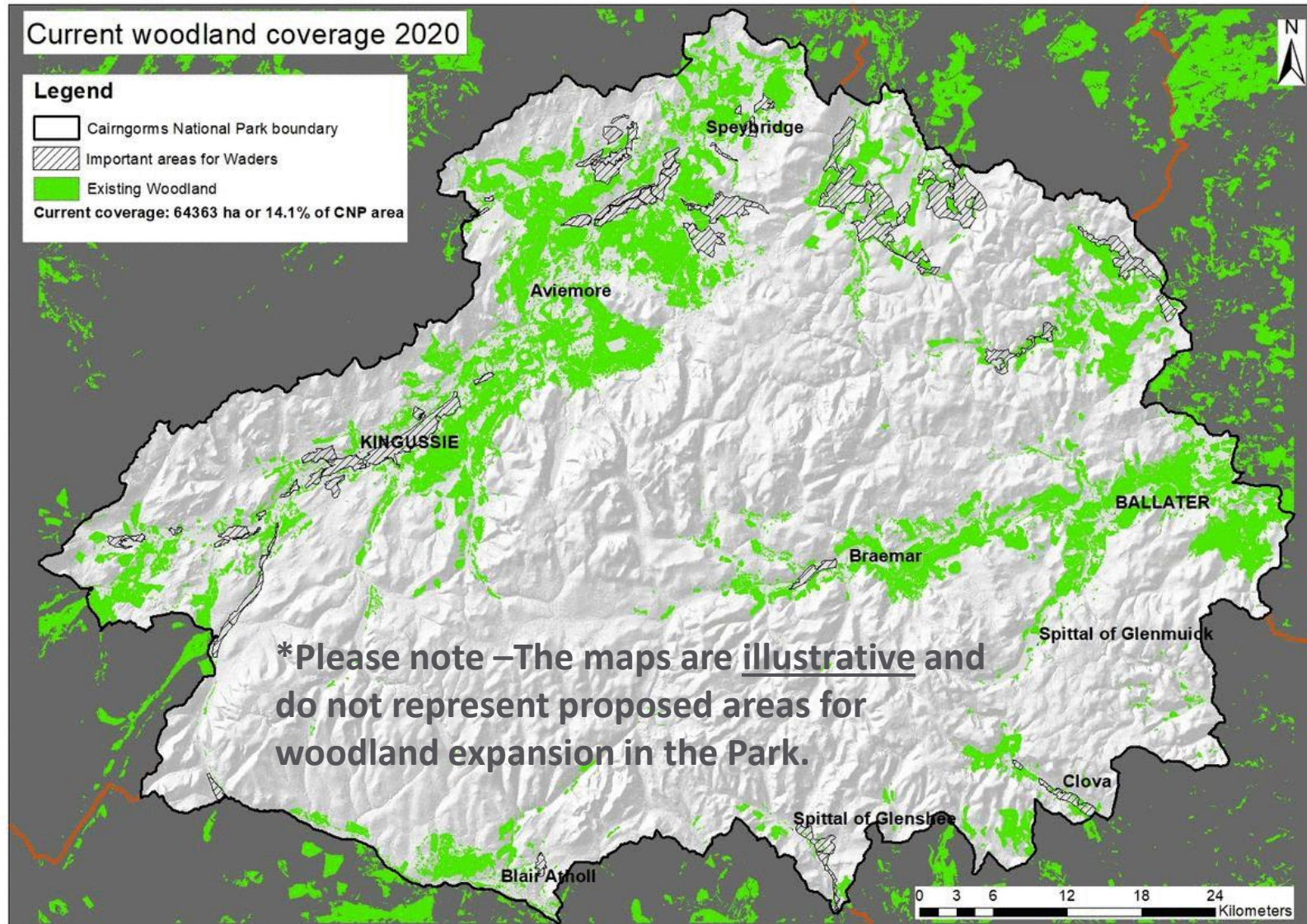
Summary main messages

- **Impacts of woodland expansion targets to CNP** – small proportion of total land area (current annual targets = 5% additional land area by 2045)

- **Lots more 'available' land for woodland expansion than 'needed' to meet targets** – lots of location choice and opportunities to integrate with / protect other land uses

- **sMCA allows assessment of relative benefits/costs of locating new woodlands in different places** – can include any criteria that have spatial data; can use weighting; can add/remove/change data and re-run to make new maps...

- **Key issue** – careful consideration of what opportunities and constraints are important, and how good the data are!

Scotland annual target (ha)	CNP annual target (ha)	CNP woodland expansion by 2045 (ha)	CNP woodland expansion by 2045 (%)	CNP total woodland cover by 2045 (ha)	CNP total woodland cover by 2045 (%)
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Target 20k/yr)

Speybridge

Thank you ☺

This work is underpinned by ongoing research in the Scottish-Govt funded RESAS Strategic Research Programme (Lead: Alessandro Gimona).

National-level analysis is also being produced, with additional criteria...

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