Ecosystem Services in a Protected Landscape

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Aims

• Evaluate whether the network of hedgerows within the Blackdown Hills AONB could provide an economic driver for their long term management through provision of sustainable wood fuel.

• Desk base study using GIS and field survey of hedgerows to calculate wood fuel potential.

• Provide baseline account of hedgerow structure within the AONB.
Background

- Blackdowns Natural Area – most important country for ancient & species-rich hedgerows\(^1\), Devon has more hedges than any other county\(^2\).
- Up to 50% of hedgerows lost since 1945\(^3\).
- Hedgerows require active management\(^4\).
- Ecosystem services “benefits people obtain from ecosystems”\(^5\) (MEA, 2005).
- Active management of hedgerows can provide multiple ecosystem services.
Hedgerow Ecosystem Services

Provisional
- Food
- Fibre
- Fuel

Regulating
- Hydrological processes
- Pesticide drift
- Pest predation
- Field microclimate
- Soil erosion

Supporting
- Biodiversity
- Soil formation
- Primary production
- Protected species

Cultural
- Hedge laying
- Landscape
- Religion
- History
Methods

- Wood fuel calculations based on Dr Rob Wolton series of Cordial reports\textsuperscript{6}.
- ‘Detailed’ and ‘remote’ survey to understand hedgerows of each landscape character type (LCT) of the Blackdown hills AONB.
- X2 1km\textsuperscript{2} survey squares of each suitable LCT.
- X18 hedgerows surveyed in detail for each LCT.
- GIS calculations of hedgerow length.
GIS
LCT1E: Wooded ridges and hilltops

• Smallest LCT area – 2.2km².
• Devon distinctive hedge types, including x4 beech (*Fagus sylvatica*) and x1 elm (*Ulmus sp.*).
• 11.38km hedgerow per 1km² = 56.9MW potential environmental energy or enough to heat 1.90 ‘typical’ farmhouses (TFH).
• Following assumptions (per 1km²): (species) = 1.79 TFH or (landscape) = 1.42 TFH.
• LCT THF = 3.94 (species) or 3.12 (landscape).
Devon distinctive hedgerows

Elm dominated hedgerow

Beech dominated hedgerows
LCT3B: Lower rolling farmed and settled slopes

- Only LCT where invasive species Himalayan balsam (*Impatiens glandulifera*) recorded.
- Hedgerows generally short in character.
- All considered suitable for wood fuel (species/landscape).
- 10.95km hedgerow per 1km².
- 1km² = 1.82 TFH / LCT = 77.71 TFH.
Low hedgerows
Himalayan balsam
LCT1A: Open inland planned plateaux

• Covers large area – 129.9km².
• Devon distinctive hedge types, including x4 beech and x1 willow (Salix sp.).
• X1 hedge dominated by hawthorn (Crataegus monogyna) / blackthorn (Prunus spinosa).
• 11.34 km hedgerow per 1km².
• 1km² = 1.89 TFH / LCT = 245.51 TFH.
• 1km² = 1.78 TFH / LCT = 231.22 TFH (species).
LCT3A: Upper farmed and wooded slopes

- Largest LCT of Blackdown Hills AONB - 137km².
- Highest density of hedgerows - 13.07km per 1km².
- 1km² = 2.18 TFH / LCT = 298.66 THF.
- 83% considered suitable for wood fuel (landscape).
- 1km² = 1.81 TFH / LCT = 247.89 TFH (landscape).
Hedgerows

- Total average 6.34 woody species per 30m.
- Max 12 / Min 3 woody species per 30m (LCT1A).
- Management type - mostly A ‘*trimmed and dense*’.
- Blackdown Hills AONB 11.68km hedgerow per 1km² total average.
- Potentially heating for 625 TFH; or
- 559 TFH (species/landscape).
Conclusions

• Potentially heated TFH relates to hedgerow density > relates to law shaping the landscape\textsuperscript{7}.
• High presence of distinctive hedgerows may indicate other ecosystem services best utilised e.g. biodiversity provision, eco tourism.
• Defining hedgerows using quantifiable criteria, e.g. Hedgerow Regs (1997) fails to recognise intrinsic or cultural values.
• Wood fuel calculations based on assumptions that can change results, e.g. Biomass boiler costs, energy efficiency of farmhouses etc.
Any Questions?
Thank you
References

2 – Devon County Council (2012a) Devon Hedges; http://www.devon.gov.uk/index/environment/natural_environment/biodiversity/devon_hedges/the_devon_hedge.htm
9 - Natural England (2012b) Blackdowns Natural Area profile ; http://www.naturalareas.naturalengland.org.uk/Science/natural/profiles%5CnaProfile89.pdf
11 (Devon County Council, 2011b)