Cyfoeth Naturiol Cymru
Natural Resources Wales

Town Tree Cover in Powys

Understanding canopy cover to better plan and manage our urban trees

Foreword

Emyr Roberts

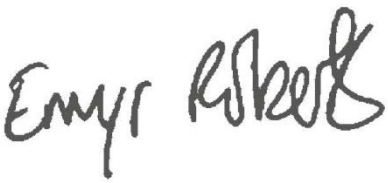
Diane McCrea

Introducing a world-first for Wales is a great pleasure, particularly as it relates to greater knowledge about the hugely valuable woodland and tree resource in our towns and cities.

We are the first country in the world to have undertaken a country-wide urban canopy cover survey. The resulting evidence base set out in this supplementary county specific study for Powys will help all of us - from community tree interest groups to urban planners and decision-makers in local authorities and our national government - to understand what we need to do to safeguard this powerful and versatile natural asset.

Trees are an essential component of our urban ecosystems, delivering a range of services to help sustain life, promote well-being, and support economic benefits. They make our towns and cities more attractive to live in - encouraging inward investment, improving the energy efficiency of buildings – as well as removing air borne pollutants and connecting people with nature. They can also mitigate the extremes of climate change, helping to reduce storm water run-off and the urban heat island.

Natural Resources Wales is committed to working with colleagues in the Welsh Government and in public, third and private sector organisations throughout Wales, to build on this work and promote a strategic approach to managing our existing urban trees, and to planting more where they will deliver the greatest benefits.



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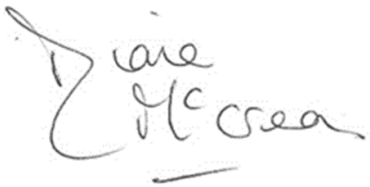

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Gorsedd Park, Ystradgynlais

Acknowledgements

Fryer, Dafydd CMLI (NRW) Urban Forest Architect – Main Author
Natural Resources Wales (NRW) would especially like to thank the following people:

Anglezarke, Barbara, (NRW) Communities and Regeneration Team Leader
GIS & Spatial Services Team (NRW)
Hume, David, AECOM (TCWTC Phase 3 Consultants)
Jaluzot, Anne, Green Infrastructure Planning Consultant
Lush, Claire, Exegesis SDM (TCWTC Phase 1 Consultants)
Negi, Poonam, RMSI (TCWTC Phase 2 Consultants)
Special thanks go to the Welsh Government for funding Phase 3 and Richard Morgan from the Welsh Government's Forestry Policy Team, Land, Nature and Forestry Division.
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Published by: Natural Resources Wales, Welsh Government Offices, Rhodfa Padarn, Llanbadarn Fawr, Aberystwyth, Ceredigion, SY23 3UR

The updated national 'Tree Cover in Wales' Towns and Cities' report and associated summary are available online at the Natural Resources Wales website.
For further information:
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1. Introduction – Wales' canopy cover study

The 'Tree Cover in Wales' Towns and Cities' study is the first nationwide study of a whole country's urban area to be undertaken anywhere in the world. To compliment this 22 county reports provide specific local focus to the canopy cover findings. For Powys this offers details for its 13 towns. Start here to understand the context, objectives, audience, and future prospects of this work:

1.1 The economic, social and environmental value of trees in our towns
1.2 Why a 'Tree Cover in Wales' Towns and Cities' (TCWTC) Study?
1.3 Who is this study for?
1.4 How was the study developed? An overview
1.5 A portrait of Wales' and Powys' urban tree canopy
1.6 The way ahead. What we can all do

The '*Tree Cover in Wales' Towns and Cities'* study – providing the context for Powys' canopy cover findings

1.1 The economic, social and environmental value of trees in our towns

It is now widely accepted that trees and woodlands in and around towns and cities have a vital role to play in promoting sustainable communities. In the last few years a growing body of research has demonstrated that trees bring a wide range of benefits both to individual people and to society as a whole.

As the most important single component of green infrastructure, trees can contribute to improved health and wellbeing, increased recreational opportunities, and an enriched and balanced environment that ultimately boosts a town's image and prosperity.

Figure 1: Trees are powerful and versatile natural assets

1.2 Why a 'Tree Cover in Wales' Towns and Cities' (TCWTC) Study?

Trees are a shared resource and are amongst the most versatile natural assets planners, policy makers, businesses and communities can use to cost effectively raise the quality of Welsh towns and cities.

In spite of this potential, very little is known about Wales' urban tree resource. Nobody knows how much there is, where it falls, and whether current provisions are adequate to effectively support the sustainable growth, health and wellbeing of Welsh urban communities. Despite their multi-purpose benefits to society the urban environment places considerable pressure on trees, with the reasons for their potential removal and loss of cover varied.

1.3 Who is this study for?

The Tree Cover in Wales' Towns and Cities (TCWTC) study was designed to help address this knowledge gap and **provide decision-makers around the country, including Powys County Council, with the baseline information they need to strategically plan and manage Wales' urban tree resource.**

The TCWTC study makes a significant contribution to building understanding and capacity for effective national coordination of urban green infrastructure delivery. Its findings will be of interest to both policy makers and practitioners, particularly those in the Welsh Government, Natural Resources Wales and their Public Service Board representatives, local authorities such as Powys County Council, Registered Social Landlords, e.g. Mid-Wales Housing Association and other significant land owners in urban areas, e.g. Dŵr Cymru / Welsh Water, University campuses and non-governmental bodies.

This supplementary county report provides detailed findings in the form of maps, tables and charts and are presented in a similar format as to what is presented in the national TCWTC study sections. To gain a greater understanding behind the county results this report should be read in conjunction with the more detailed analysis found in the national study. Further analysis is needed to tease out the particular characteristics and trends of canopy cover within each county.

1.4 How was the study developed? An overview

Because it is mostly through their crown spread that trees deliver benefits, the TCWTC study focuses on tree canopy cover (rather than counting individual number of trees). This was mapped through a desk-based analysis of 2006, 2009 and 2013 aerial photographs for Wales' 220 urban areas as defined by the Office of National Statistics' settlement based approach.

Wales is the first country in the world to undertake a complete canopy cover study of all its urban areas.

The findings of non-woodland 'amenity' trees were complemented by existing datasets on urban woodland (>0.5 hectares), using National Forest Inventory data. The analysis conducted at multiple scales (county, town and ward level) also considered the relation between canopy cover and local levels of deprivation.

1.5 A portrait of Wales' and Powys' urban tree canopy

Urban canopy coverage

Wales' mean urban tree cover was estimated to be 16.3% for 2013, down from 17.0% in 2009. Powys' urban cover was estimated to be 14.5% in 2013, down from 15.3% in 2009.

High differences from town to town

Behind national figures, landscape character influences the noticeable differences that exist - often low in coastal towns (e.g. Rhyl and Porthcawl – 6%) and high in the South Wales Valleys (e.g. 30% in Treharris). Two towns exceed the national average – Llandrindod Wells (21.4%) and the Valleys town – Ystradgynlais (18.4%). All other towns (11) have similar cover of between 11% and 16% except for Machynlleth that displays the low level of canopy of 7.7%.

Nationally one third urban woodland, two thirds amenity trees

Urban woodlands represent 35% of Wales' urban canopy cover, with Powys on 30%. The rest is made up of so-called 'amenity' non-woodland trees, those individual and groups of trees growing along streets, gardens, car parks and other urban public and private open spaces.

Distribution of canopy amongst land uses tells a great deal about urban tree stewardship

Public open space hosts 53% of all tree cover in our Welsh communities despite making up only 22% of urban land. This is 45% in Powys, where public open space accounts for 20% of urban land.

Private residential gardens make up 35% of Wales' urban areas and provide 20% of all our town's tree cover. This is 37% in Powys with gardens providing a significant 24% of all canopy.
This underlines the responsibility of homeowners, and the importance of the good use and management of tree preservation orders to the upkeep of the Welsh urban forest. It also highlights the responsibility of developers and planners as part of the development process to ensure our housing areas are all adequately canopied.

Transport routes - including verges and pavements - make up 16% of Wales' urban land but they only provide 9% of cover, similar to Powys. Motorised traffic causes much of the urban air and surface water pollution, which trees have the ability to remove.

Tree canopy loss

Overall towns in Powys lost 21hectares between 2009 and 2013 with all towns recording a loss of canopy. Similarly 159 of Wales' 220 urban areas showed a decline in canopy. When comparing loss and gain of trees between 2006 and 2013, 7,000 large trees appear to have been lost across Wales – with 127 in Powys. This suggests a steady erosion of Wales' Victorian and Edwardian tree legacy.

Tree cover in deprived areas tends to be lower and relatively less rich in amenity trees

Whilst variation exists across Wales, 63% of more affluent wards have cover greater than 15% compared to 23% for less well-off wards. There is however great variation in tree cover within Wales' top 10 most deprived wards (2014), from as little as 2% in Rhyl West 2 to 19% in Merthyr Vale 2, Aberfan. The 'Western Valleys' (Neath Port Talbot) Communities First cluster area includes part of Ystradgynalais. Both wards (LSOAs) display 17% and 18% cover. Deprived communities with low cover include St John 2, Brecon (7.6%), Machynlleth (7.7%), Newtown Central 1 (8.4%) and South (8.8%), Welshpool Gungrog 1(8%) and Aber-craf, Ystradgynlais (6.2%). Where high tree cover and high level of deprivation coexist, this seems to be associated with local urban woodland being present rather than amenity trees. Woods of this nature can sometimes be unmanaged and inaccessible.

Potential for tree cover

'Green land' sites (soil, grass and shrub areas) were assessed for potential planting, piloting one major town in each local and national park authority, e.g. Newtown and Brecon.
If all 'green land' sites identified were planted, with the right trees in the right places, cover in towns could potentially increase by 42% and 48% respectively.

Knowing where trees might be planted enables planners to set realistic canopy cover targets. Many North American and Australian cities have comprehensive tree strategies with tree canopy cover goals. Portland in Oregon, with a similar climate to Wales, intends to increase its cover by 7% from its current level of 26%. Bristol City Council has set an aspirational goal of increasing canopy cover from 14% to 30%.
If Welsh towns with lower cover aimed for 20% (the UK Forest Standard woodland definition) in the medium term – we could have a nation of woodland towns!

1.6 The way ahead. What we can all do

Share and build the evidence

What gets measured gets managed. The study has addressed a significant information gap. It's crucial that we continue to share findings and continue the research.

Adopting a strategic approach to managing our urban trees

The study has identified significant discrepancies in canopy cover levels between and within individual towns. International best practice shows that the best way to ensure all urban communities achieve adequate canopy cover is to adopt local tree strategies and set canopy cover targets.

Supporting sustainable urban tree management

Significant rates of tree loss have been identified. It's crucial that we all review the effectiveness and use of existing tools and legislation for tree care and preservation and ensure that the potential of grant programmes is maximised to support Wales' urban treescape.

Crickhowell: © Crown Copyright: RCAHMW

2. Powys - County and town canopy cover findings

This section presents headline findings on canopy cover extent.

Facts, figures and conclusions are provided in the following sequence:

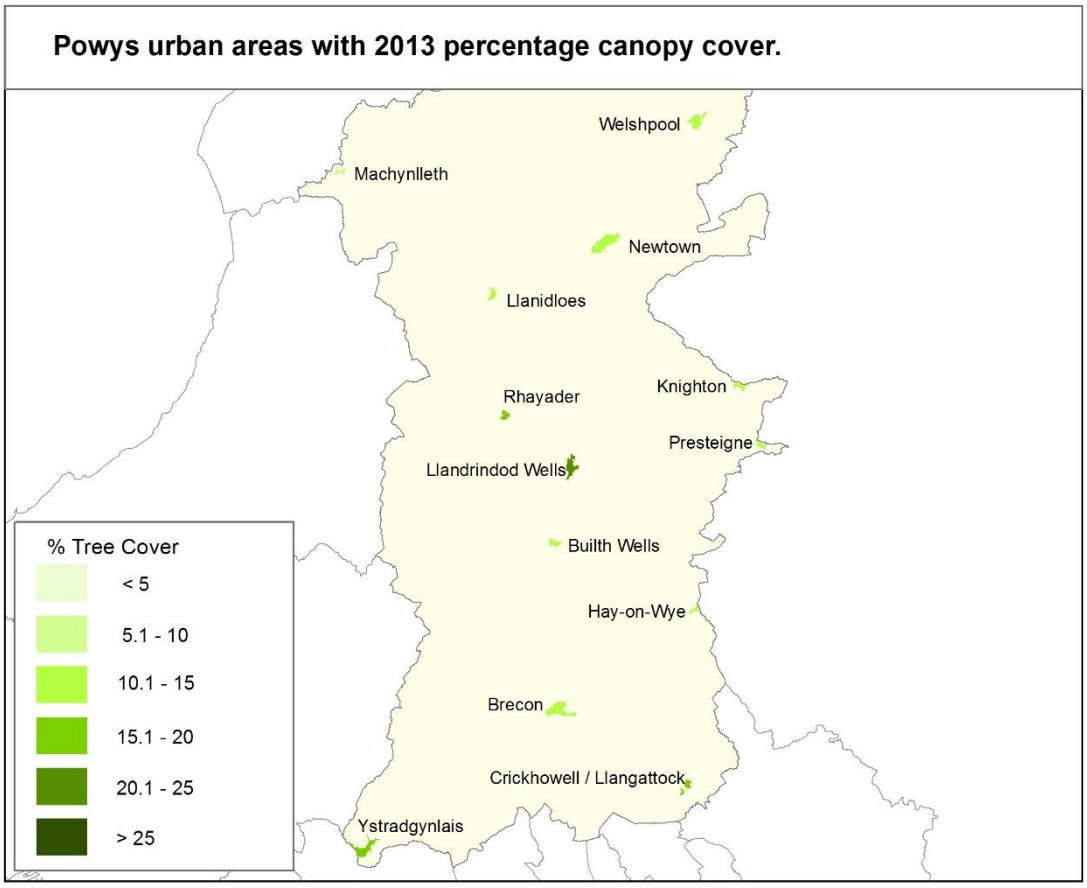


Figure 2: Powys' urban areas with their 2013 canopy cover percentage

Machynlleth: © Crown Copyright: RCAHMW

2.2 Town canopy cover comparisons

Urban Area Size (ha) Category:

0 - 250	251-500	501-1000	1001-5000	>5000

Canopy Cover Size Classes:

0 - 5%	5.1 – 10%	10.1 -15%	15.1 -20%	20.1-25%	>25.1%

National Area Size Rank	Urban Area	Landscape Character Zone	Population ONS 2011 Census	Urban Area (ha)	Total Cover '13 (ha)	Total Cover '13 (%)
40	Newtown	Hinterland	11,357	475	66	13.8%
47	Brecon	Hinterland	8,250	407	53	12.9%
72	Ystradgynlais	W. Valleys	10,248	294	54	18.4%
78	Llandrindod Wells	Hinterland	5,309	268	57	21.4%
82	Welshpool	Hinterland	5,948	251	30	11.8%
137	Crickhowell / Llangattock	Hinterland	2,725	114	18	15.6%
141	Knighton	Hinterland	3,007	109	13	12.2%
147	Builth Wells	Hinterland	2,829	105	14	13.5%
148	Rhayader	Hinterland	1,824	105	16	15.4%
149	Llanidloes	Hinterland	2,929	104	12	11.8%
172	Presteigne	Hinterland	2,056	84	9	11.2%
174	Machynlleth	Hinterland	2,235	84	6	7.7%
195	Hay-on-Wye	Hinterland	1,954	61	7	11.8%

Table 1: Town size and canopy cover

Llanidloes: © Crown Copyright: RCAHMW

2.3 Summary: actionable findings

Setting canopy cover targets

The review of experiences on the international stage demonstrates that adopting canopy cover targets helps to drive urban tree management. The national findings on mean canopy cover provide a useful benchmark for local planning authorities across the country to use in support of their local planning efforts.
Under the UK Forest Standard 20%, tree cover constitutes woodland. This could be applied to urban areas as to whether they attain 'woodland town' status.

Priority towns for adoption of a strategic approach to canopy cover increase

Apart from the number of people affected by low tree canopy provision, other factors to consider when identifying canopy cover needs include deprivation, air quality and flood issues.

- The modest level of tree cover in most towns, especially Machynlleth, merits a planned approach to improve canopy provision for the future socio-economic well-being of those communities.

The ward-level analysis provides further insight where targeted tree planting might be needed. This is addressed in Section 4.

Optimising funding tools facilitating delivery

The strategic delivery of the canopy cover objectives set for a local area will be greatly facilitated if existing funding streams supporting the delivery of a high quality environment and infrastructure across urban Wales integrate tree-related measures as an eligible expenditure. For example: Vibrant and Viable Places, Coastal Communities Fund, Business Improvement District Fund Wales, Regional Transport Consortia Grant, Safe Routes in Communities, etc.
In line with this, NRW will ensure that its own grant schemes are open to urban tree and woodland proposals as far as possible.

Rhayader: © Crown Copyright: RCAHMW

3. Distribution, composition and change to canopy cover

This section focuses on the distribution, composition and changes to Powys' urban forest. It considers:

3.1 Urban canopy cover distribution across land-uses
3.2 Balance between urban woodland and amenity trees
3.3 Monitoring the extent of urban tree canopy over time - losses and gains
3.4 Summary – actionable findings

3.1 Urban canopy cover distribution across land-uses

Land Use Category	Total Land-use: hectares	TCWTC 2013 Canopy Cover : hectares
Commercial Areas (COM)	302.69	42.85
Education (EDU)	123.48	14.55
Hospitals (HOS)	12.53	1.83
Burial (BUR)	28.26	5.40
Remnant Countryside (FLD)	27.59	3.70
Formal Open Space (OSF)	329.30	56.36
Informal Open Space (OSI)	138.55	77.05
Woodland (WOD)	25.46	25.46
High Density Residential (RHD)	110.08	2.94
Low Density Residential (RLD)	801.54	82.74
Transport Corridors (TRN)	398.57	35.19
Un-Classified Land-Use (UNC)	164.62	8.00
TOTAL	2462.68	356.06

Table 2: Canopy cover within each land-use for the 13 towns

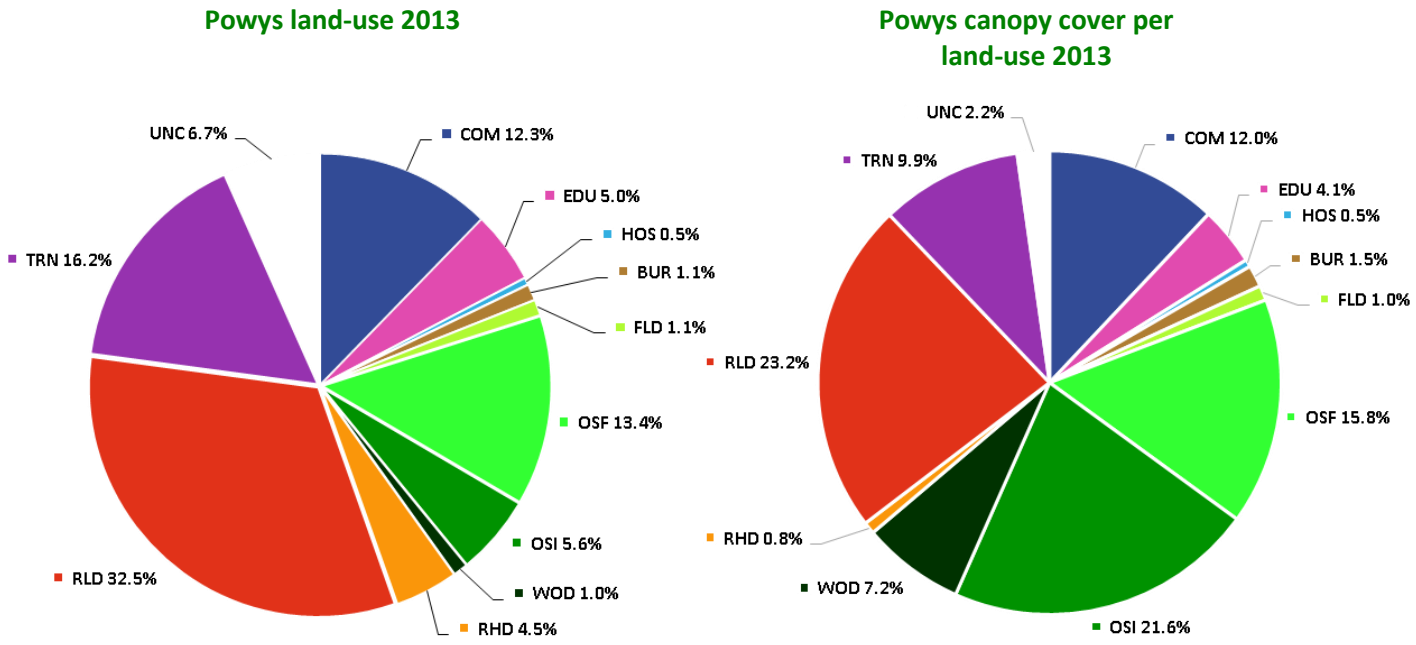


Figure 3: Distribution of the 12 land-use categories (2013) across Powys' urban areas

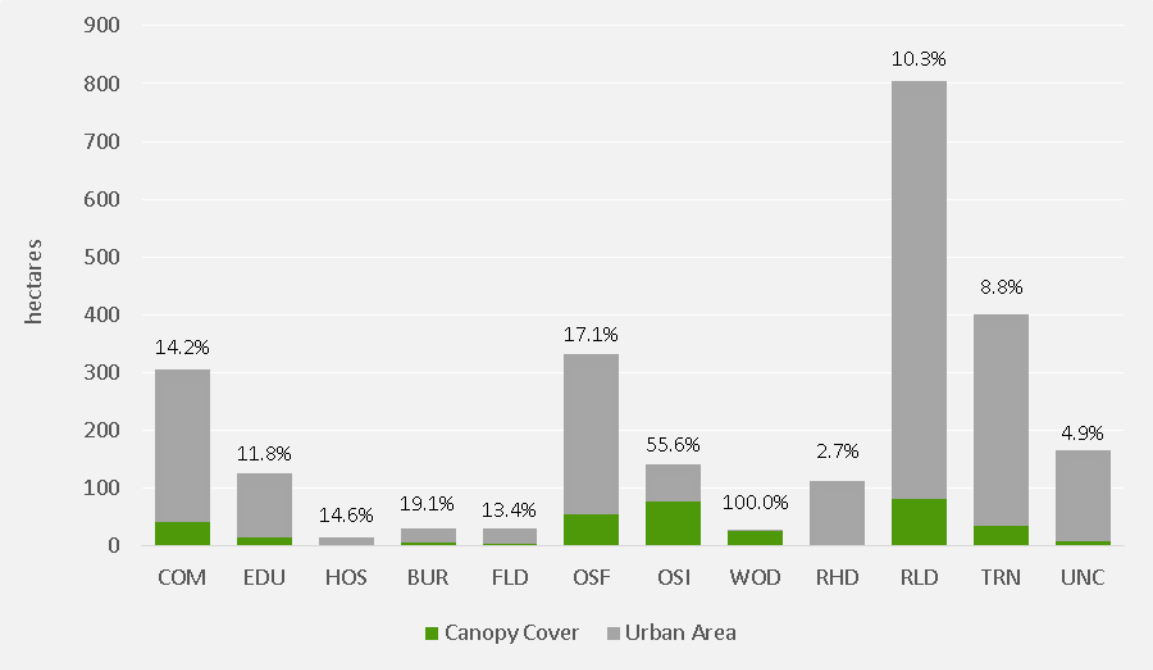


Figure 4: The Percentage Contribution of Canopy Cover within each Land-Use

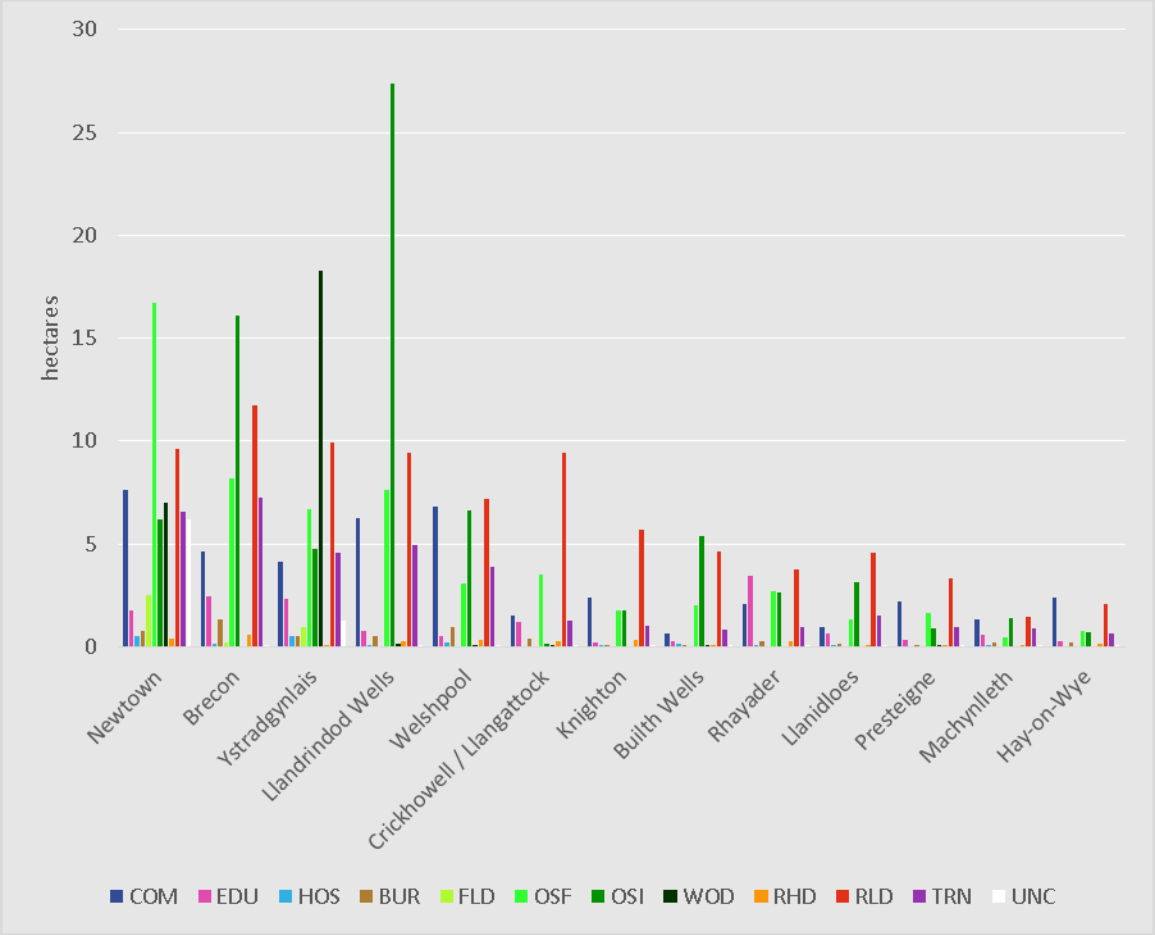


Figure 5: Land-Use Canopy Cover Distribution within Powys' Towns

Land-use distribution of canopy cover within wards (LSOAs)

Ward (LSOA) with WIMD (Cluster Area Ward highlighted)	Total Ward Area (ha)	Town Area in ward (ha)	COM (ha)	EDU (ha)	HOS (ha)	BUR (ha)	FLD (ha)	OSF (ha)	OSI (ha)	WOD (ha)	RHD (ha)	RLD (ha)	TRN (ha)	UNC (ha)	Total Cover TCWTC 3 (ha)
Brecon															
Felin-fâch	9468.93	2.97	0.00	0.00	0.00	0.00	0.00	0.00	1.27	0.00	0.00	0.06	0.08	0.00	1.41
St. David Within	322.67	126.45	2.73	0.94	0.02	0.10	0.20	4.53	3.03	0.00	0.13	0.85	2.56	0.04	15.12
St. John 1	84.87	59.43	0.00	0.36	0.00	1.04	0.00	0.35	6.79	0.00	0.10	1.81	0.57	0.01	11.03
St. John 2	144.70	36.11	0.00	0.01	0.00	0.14	0.00	0.59	0.24	0.00	0.19	1.03	0.52	0.00	2.72
St. Mary 1	76.29	64.72	0.74	0.44	0.00	0.04	0.00	0.61	0.69	0.00	0.07	1.39	0.81	0.04	4.81
St. Mary 2	480.95	116.36	1.18	0.69	0.14	0.00	0.00	2.10	4.09	0.00	0.06	6.52	2.67	0.02	17.44
Talybont-on-Usk	20510.10	1.26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.01	0.00	0.06
Builth Wells															
Builth 1	100.16	31.69	0.37	0.05	0.00	0.00	0.00	0.09	0.79	0.00	0.07	1.21	0.09	0.02	2.71
Builth 2	202.94	62.71	0.25	0.21	0.16	0.10	0.00	1.87	3.68	0.00	0.03	2.60	0.53	0.02	9.45
Llanafanfawr	22358.27	10.36	0.00	0.00	0.00	0.00	0.00	0.08	0.92	0.00	0.00	0.79	0.21	0.00	2.00
Crickhowell / Llangattock															
Crickhowell 1	567.00	63.88	0.75	1.19	0.00	0.31	0.00	1.90	0.13	0.00	0.10	4.20	0.65	0.02	9.26
Crickhowell 2	7111.70	17.03	0.20	0.00	0.00	0.00	0.00	0.32	0.00	0.00	0.12	1.80	0.24	0.00	2.68
Llangattock	3140.52	32.73	0.53	0.00	0.00	0.08	0.00	1.29	0.03	0.00	0.04	3.41	0.39	0.01	5.78
Hay-on-Wye															
Gwernyfed	7001.95	3.02	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.06	0.00	0.44
Hay	149.78	57.92	2.11	0.26	0.00	0.20	0.00	0.75	0.69	0.00	0.16	1.94	0.56	0.02	6.70
Knighton															
Knighton 1	1438.90	42.33	0.19	0.00	0.02	0.00	0.00	0.12	1.44	0.00	0.07	2.83	0.60	0.01	5.28

Ward (LSOA) with WIMD (Cluster Area Ward highlighted)	Total Ward Area (ha)	Town Area in ward (ha)	COM (ha)	EDU (ha)	HOS (ha)	BUR (ha)	FLD (ha)	OSF (ha)	OSI (ha)	WOD (ha)	RHD (ha)	RLD (ha)	TRN (ha)	UNC (ha)	Total Cover TCWTC 3 (ha)
Knighton 2	1183.40	66.89	2.19	0.18	0.04	0.07	0.00	1.61	0.34	0.00	0.25	2.88	0.43	0.02	8.01
Llandrindod Wells															
Llandrindod East/Llandrindod West	101.51	65.21	0.69	0.43	0.02	0.00	0.00	1.57	3.77	0.02	0.03	2.02	0.88	0.02	9.46
Llandrindod North	353.08	82.78	4.43	0.24	0.00	0.52	0.00	0.84	2.13	0.00	0.16	1.51	1.84	0.03	11.69
Llandrindod South	813.86	119.56	1.13	0.09	0.00	0.00	0.00	5.19	21.45	0.12	0.08	5.88	2.21	0.02	36.16
Llanidloes															
Llanidloes 1	174.72	52.19	0.44	0.61	0.01	0.00	0.00	0.16	1.37	0.00	0.04	1.85	0.94	0.04	5.47
Llanidloes 2	364.90	52.26	0.48	0.00	0.05	0.12	0.00	1.16	1.77	0.00	0.01	2.69	0.55	0.01	6.84
Machynlleth															
Machynlleth	506.03	83.50	1.32	0.55	0.10	0.21	0.00	0.43	1.37	0.00	0.07	1.47	0.92	0.02	6.46
Newtown															
Newtown Central 1	38.72	27.79	0.00	0.00	0.00	0.00	0.00	0.54	0.18	0.02	0.14	0.45	0.79	0.24	2.35
Newtown Central 2	51.63	51.31	0.01	0.00	0.08	0.00	1.35	3.36	0.37	1.19	0.06	0.45	0.59	0.58	8.03
Newtown East	799.12	145.50	2.68	0.42	0.00	0.44	0.32	6.75	2.20	1.27	0.08	1.47	1.97	2.61	20.19
Newtown Llanllwchaiarn North	704.46	64.64	0.00	0.00	0.00	0.30	0.44	2.13	1.73	0.06	0.02	2.40	0.60	1.10	8.76
Newtown Llanllwchaiarn West	814.92	72.21	0.00	0.67	0.46	0.00	0.00	2.76	1.51	4.20	0.03	4.36	0.80	1.27	16.06
Newtown South	299.71	113.55	4.95	0.66	0.00	0.00	0.42	1.17	0.19	0.28	0.08	0.37	1.58	0.39	10.09
Presteigne															
Presteigne 1	2081.95	34.44	0.65	0.27	0.00	0.00	0.00	0.32	0.62	0.00	0.04	1.18	0.31	0.01	3.41
Presteigne 2	412.72	49.60	1.55	0.02	0.00	0.02	0.00	1.33	0.24	0.00	0.06	2.09	0.65	0.01	5.98
Rhayader															
Nantmel	18883.92	1.28	0.02	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.03	0.00	0.27
Rhayader	13941.28	103.38	2.07	3.42	0.01	0.26	0.00	2.68	2.64	0.00	0.23	3.58	0.92	0.04	15.85
Welshpool															
Welshpool Castle	1795.07	61.56	1.77	0.06	0.00	0.35	0.00	1.57	1.27	0.01	0.09	1.00	0.71	0.04	6.86

Ward (LSOA) with WIMD (Cluster Area Ward highlighted)	Total Ward Area (ha)	Town Area in ward (ha)	COM (ha)	EDU (ha)	HOS (ha)	BUR (ha)	FLD (ha)	OSF (ha)	OSI (ha)	WOD (ha)	RHD (ha)	RLD (ha)	TRN (ha)	UNC (ha)	Total Cover TCWTC 3 (ha)
Welshpool Gungrog 1	184.48	70.37	1.36	0.08	0.05	0.00	0.00	0.59	0.85	0.00	0.08	1.30	1.25	0.03	5.60
Welshpool Gungrog 2	1223.56	60.51	3.24	0.18	0.00	0.00	0.00	0.35	2.69	0.01	0.04	2.26	1.36	0.01	10.14
Welshpool Llanerchyddol	696.53	58.47	0.40	0.18	0.14	0.59	0.00	0.58	1.82	0.00	0.09	2.64	0.53	0.01	6.98
Ystradgynlais															
Aber-craf	959.96	16.43	0.02	0.20	0.00	0.00	0.03	0.17	0.04	0.07	0.00	0.28	0.05	0.13	0.99
Cwm-twrch	1297.43	67.15	0.37	0.39	0.02	0.29	0.34	1.81	0.76	6.37	0.02	3.91	1.90	0.33	16.52
Ynyscedwyn	379.95	128.02	3.47	1.64	0.51	0.22	0.59	3.22	2.01	4.82	0.03	2.74	1.66	0.42	21.32
Ystalyfera 1	613.40	7.81	0.16	0.00	0.00	0.00	0.00	0.02	0.36	0.87	0.00	0.39	0.04	0.05	1.89
Ystradgynlais 1	38.27	26.94	0.00	0.00	0.00	0.00	0.00	0.26	0.52	3.60	0.02	0.34	0.09	0.11	4.93
Ystradgynlais 2	2819.54	47.94	0.12	0.07	0.00	0.02	0.00	1.02	0.97	2.55	0.03	2.23	0.81	0.17	7.99

Table 3: Land-use distribution of canopy cover within wards (LSOAs)

Presteigne: © Crown Copyright: RCAHMW

Hay on Wye: © Crown Copyright: RCAHMW

3.2 Balance between urban woodland and amenity trees

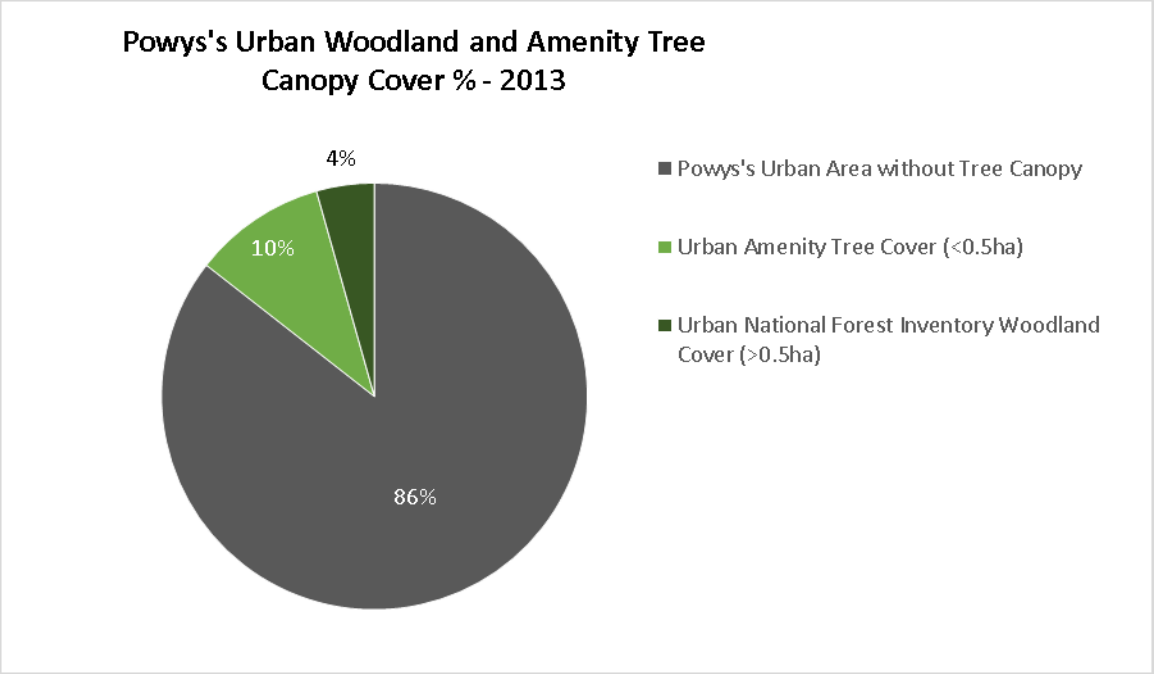


Figure 6: Powys' Urban Woodland and Amenity Tree Canopy Cover % - 2013

Llandrindod Wells: © Crown Copyright: RCAHMW

Spatial distribution of woodland and amenity trees within towns

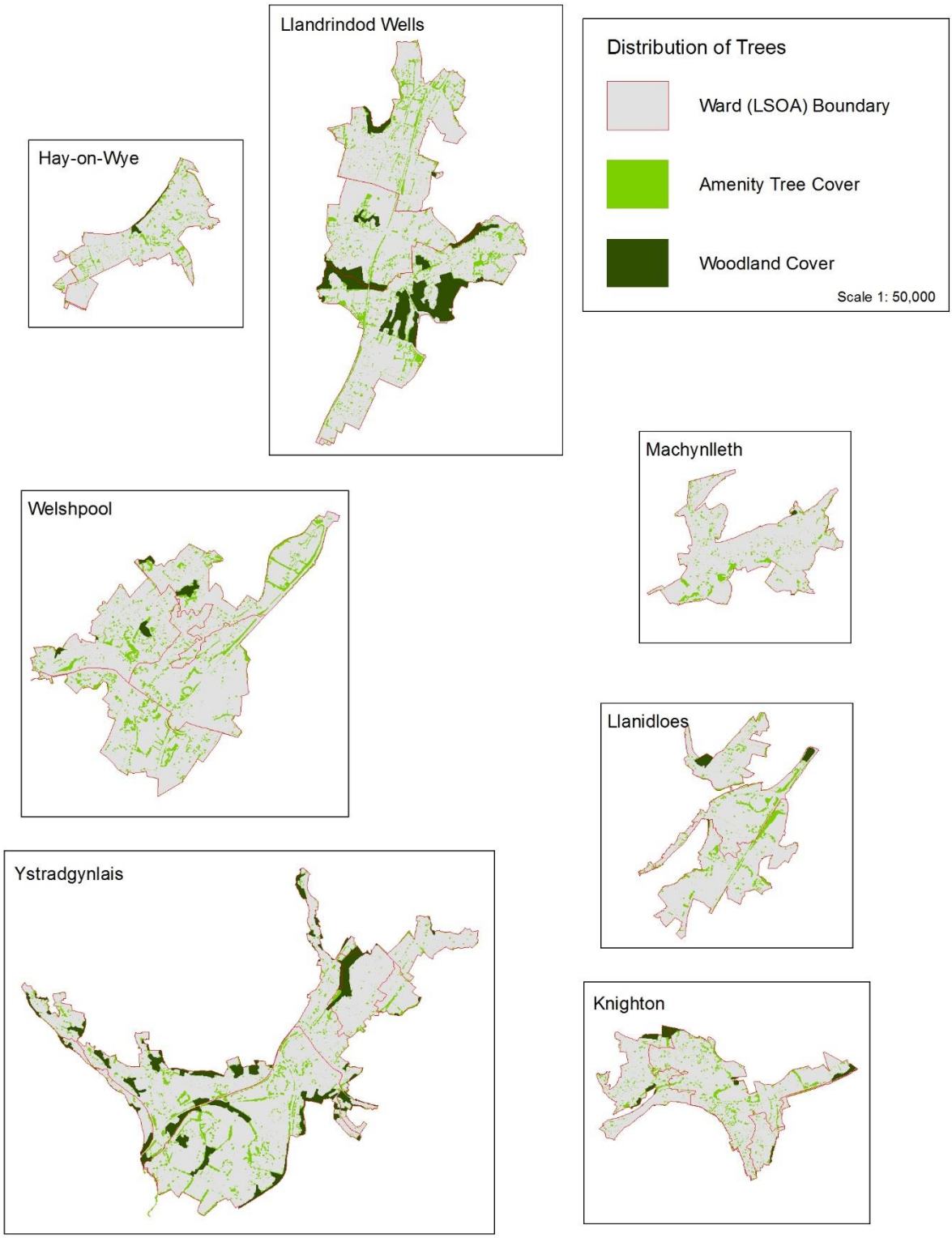


Figure 7: Spatial Distribution of Woodland and Amenity Trees within Towns

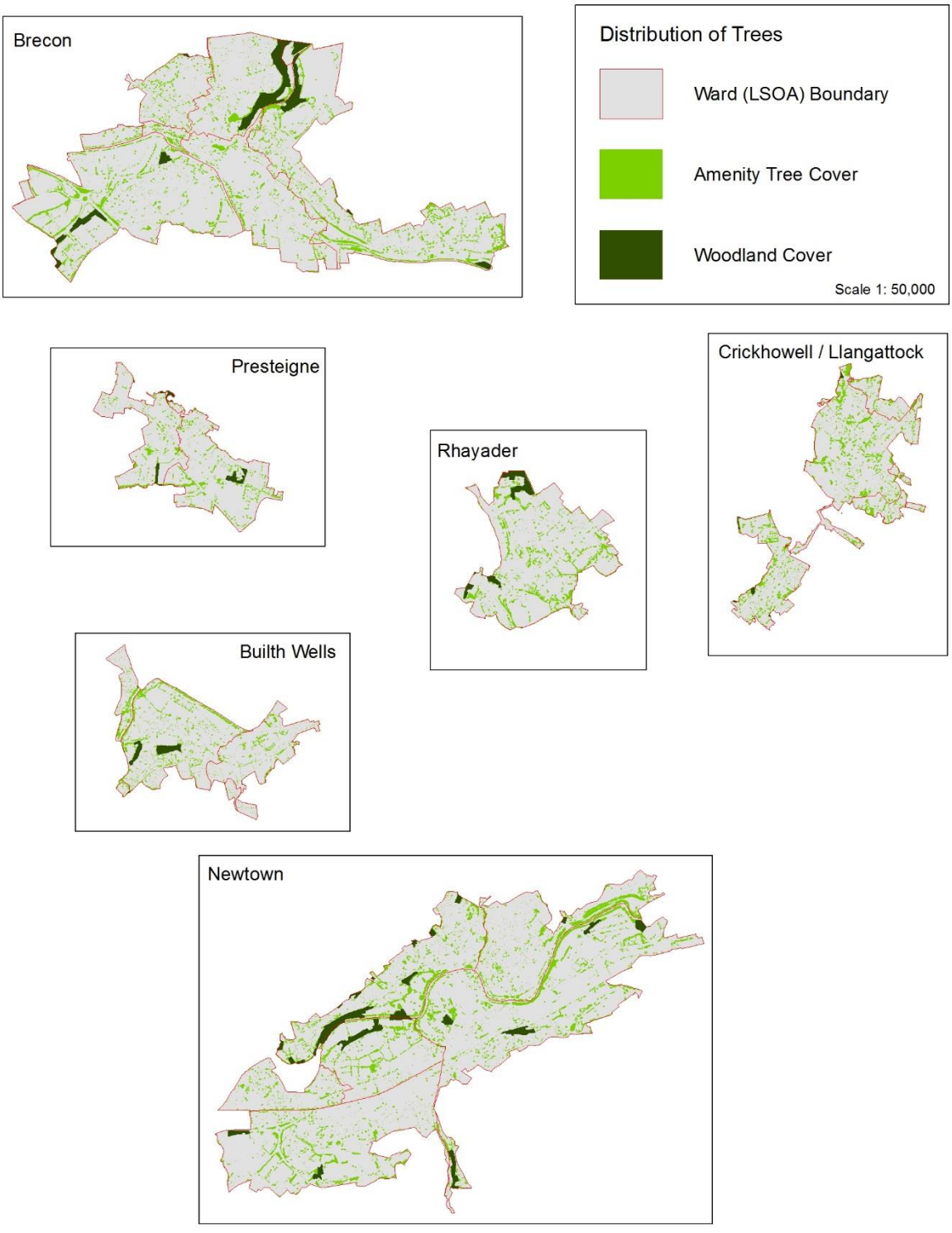


Figure 8: Spatial Distribution of Woodland and Amenity Trees within Towns

Extent of woodland and amenity tree coverage across Powys' towns

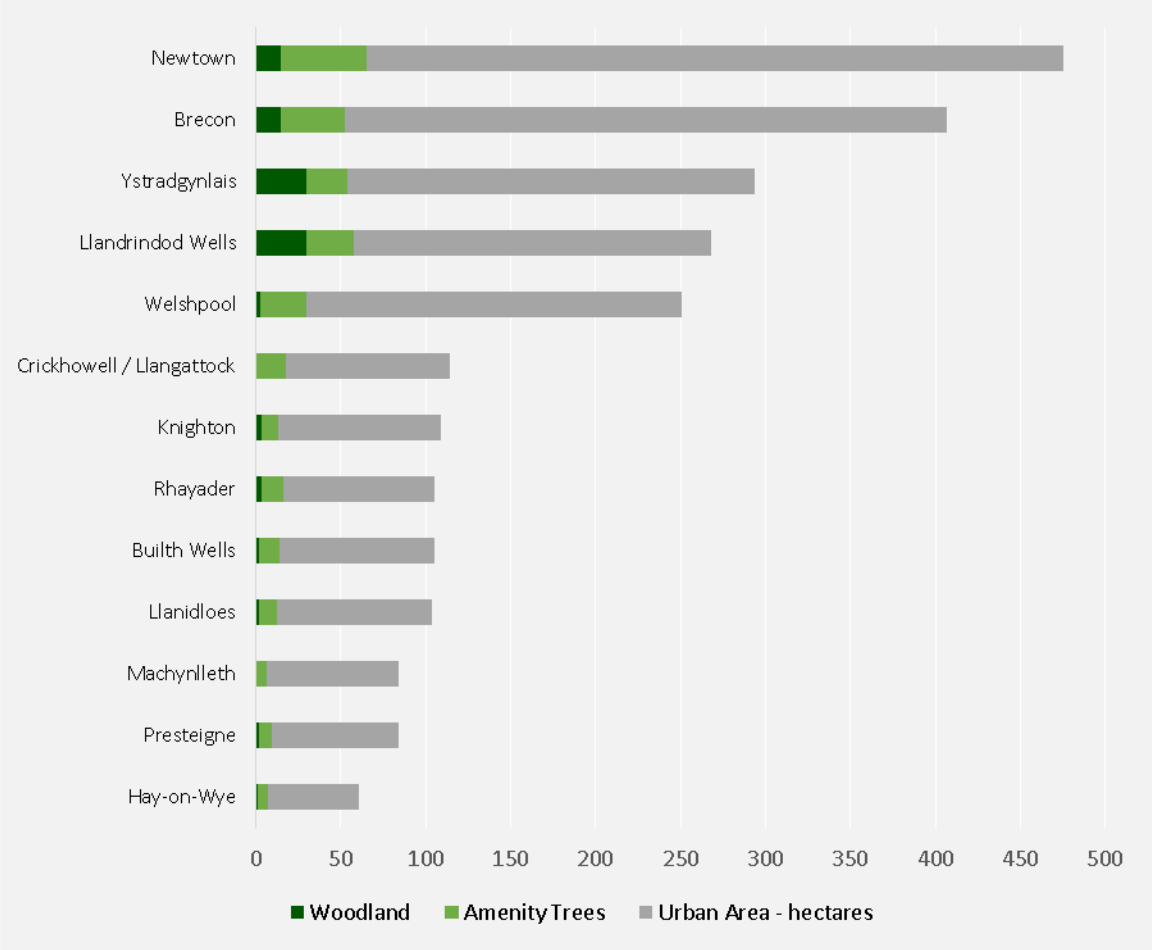


Figure 9: Extent of Woodland and Amenity Tree Coverage (ha) across Powys' Towns

Land-use distribution of woodland vs. amenity canopy

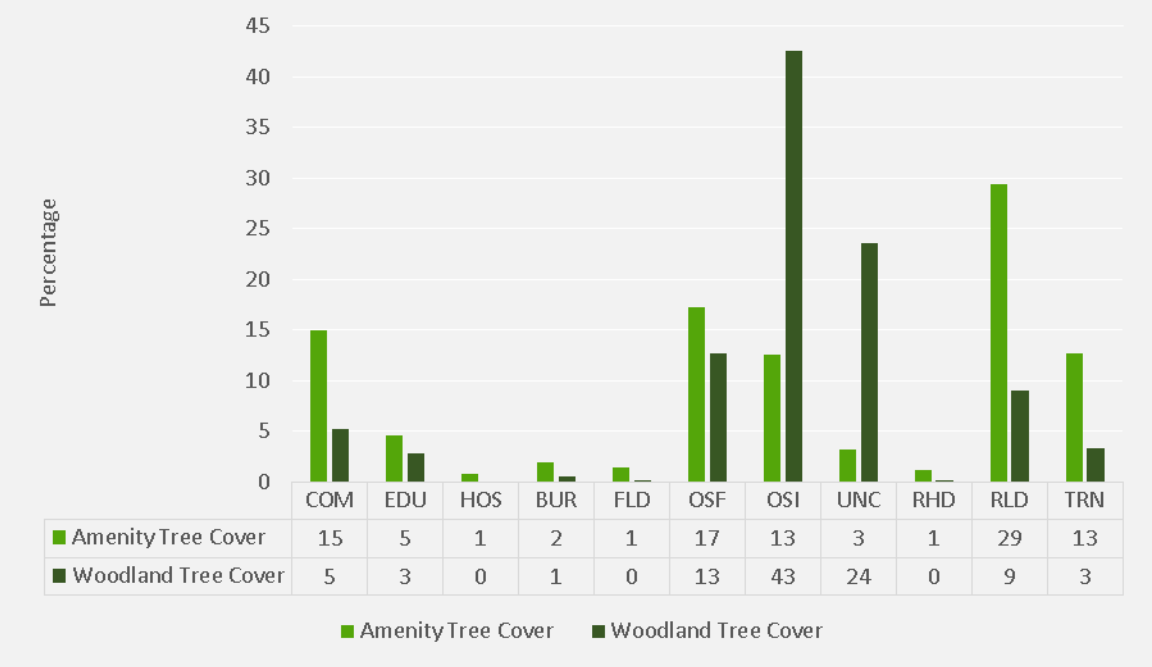


Figure 10: Percentage Distribution of Amenity Tree and Woodland Cover across the Land-Uses

Wards with high and low woodland (NFI) cover – making the distinction between 'wooded' and 'amenity' tree cover

Cluster Area Wards (LSOA)	Urban Area	'Wooded' %	'Amenity' Tree %	Total Canopy %
High 'Wooded' Wards				
Ystradgynlais 1	Ystradgynlais	81%	19%	18.3%
Ystradgynlais 2	Ystradgynlais	57%	43%	16.7%
Low 'Wooded' Wards				
N/A				

Table 4: The highest and lowest 'woodland' cover within Powys' Communities First Cluster Area wards (LSOAs)

3.3 Monitoring the extent of urban tree canopy over time - losses and gains

Town	Amenity Tree Loss & Gain between 2006, 2009 & 2013						Change in Tree Count 2006 - 2009	Change in Tree Count 2009 - 2013	Change in Tree Count 2006 - 2013
	Large Trees 12m+ 2006 - 2009	Large Trees 12m+ 2009 - 2013	Medium Trees 6 - 12m 2006 - 2009	Medium Trees 6 - 12m 2009 - 2013	Small Trees 3 - 6m 2006 - 2009	Small Trees 3 - 6m 2009 - 2013			
Newtown	40	**-15**	679	**-468**	**-1288**	**-1584**	**-569**	**-2067**	**-2636**
Brecon	**-277**	5	1167	58	**-2117**	**-707**	**-1227**	**-644**	**-1871**
Ystradgynlais	**-203**	6	515	199	29	**-113**	341	92	433
Llandrindod Wells	**-59**	6	**-288**	34	8379	**-1495**	8032	**-1455**	6577
Welshpool	269	**-40**	1328	**-76**	**-3053**	**-225**	**-1456**	**-341**	**-1797**
Crickhowell / Llangattock	**-65**	7	1280	**-314**	2330	**-462**	3545	**-769**	2776
Knighton	**-26**	7	**-787**	27	4316	**-426**	3503	**-392**	3111
Builth Wells	81	5	**-261**	**-30**	1713	**-407**	1533	**-432**	1101
Rhayader	10	0	1485	319	**-3119**	**-195**	**-1624**	124	**-1500**
Llanidloes	89	**-11**	429	12	104	**-360**	622	**-359**	263
Presteigne	**-8**	9	264	**-132**	**-564**	**-303**	**-308**	**-426**	**-734**
Machynlleth	22	1	536	**-81**	855	**-582**	1413	**-662**	751
Hay-on-Wye	23	**-3**	**-48**	**-18**	892	**-112**	867	**-133**	734
Change in Tree Numbers	**-104**	**-23**	6299	**-470**	8477	**-6971**	14672	**-7464**	7208

Table 5: Town amenity tree loss and gain between 2006, 2009 & 2013

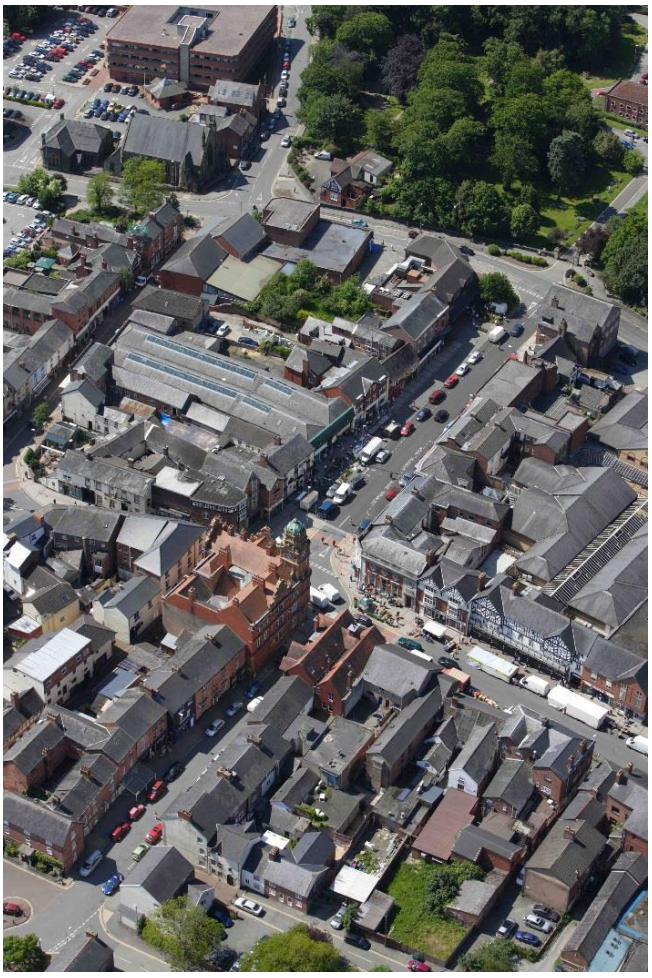
Town	Area of NFI 2011 (ha)	Area of NFI 2014 (ha)	Change (ha)
Brecon	15.01	15.01	0.00
Builth Wells	2.19	2.19	0.00
Crickhowell / Llangattock	0.56	0.56	0.00
Hay-on-Wye	0.94	0.94	0.00
Knighton	2.99	3.54	+0.55
Llandrindod Wells	29.92	29.84	**-0.08**
Llanidloes	1.96	1.96	0.00
Machynlleth	0.20	0.20	0.00
Newtown	14.90	14.90	0.00
Presteigne	1.35	1.80	+0.45
Rhayader	3.76	3.76	0.00
Welshpool	3.10	3.08	**-0.01**
Ystradgynlais	30.13	30.13	0.00
Powys	**107.0**	**107.9**	**+0.91**

Table 6: Town woodland loss and gain between 2011 and 2014

URBAN NAME	Area Size Rank	Survey Year	Urban Area (ha)	Woodland (ha)	Amenity Trees (ha)	Woodland %	Amenity Trees %	Woodland + Amenity Trees (ha)	Total Cover %
Brecon	47	2006	407.3	15.0	39.6	3.7%	9.7%	54.6	13.4%
		2009	407.3	15.0	38.7	3.7%	9.5%	53.7	13.2%
		2013	407.3	15.0	37.6	3.7%	9.2%	52.6	12.9%
Builth Wells	147	2006	104.8	2.2	10.2	2.1%	9.7%	12.4	11.8%
		2009	104.8	2.2	12.8	2.1%	12.2%	15.0	14.3%
		2013	104.8	2.2	12.0	2.1%	11.4%	14.2	13.5%
Crickhowell / Llangattock	137	2006	113.6	0.6	9.0	0.5%	7.9%	9.5	8.4%
		2009	113.6	0.6	20.0	0.5%	17.6%	20.6	18.1%
		2013	113.6	0.6	17.2	0.5%	15.1%	17.7	15.6%
Hay-on-Wye	195	2006	61.0	0.9	4.9	1.5%	8.0%	5.8	9.5%
		2009	61.0	0.9	6.6	1.5%	10.8%	7.6	12.4%
		2013	61.0	0.9	6.2	1.5%	10.2%	7.2	11.8%
Knighton	141	2006	109.2	3.0	9.5	2.7%	8.7%	12.5	11.4%
		2009	109.2	3.0	10.9	2.7%	10.0%	13.9	12.7%
		2013	109.2	3.5	9.8	3.2%	8.9%	13.3	12.2%
Llandrindod Wells	78	2006	268.0	29.9	20.4	11.2%	7.6%	50.3	18.8%
		2009	268.0	29.9	30.9	11.2%	11.5%	60.9	22.7%
		2013	268.0	29.8	27.6	11.1%	10.3%	57.4	21.4%
Llanidloes	149	2006	104.5	2.0	6.8	1.9%	6.5%	8.8	8.4%
		2009	104.5	2.0	11.0	1.9%	10.6%	13.0	12.4%
		2013	104.5	2.0	10.4	1.9%	9.9%	12.3	11.8%
Machynlleth	174	2006	83.5	0.2	2.6	0.2%	3.1%	2.8	3.3%
		2009	83.5	0.2	7.7	0.2%	9.3%	7.9	9.5%
		2013	83.5	0.2	6.3	0.2%	7.5%	6.5	7.7%
Newtown	40	2006	475.0	14.9	54.3	3.1%	11.4%	69.2	14.6%

		2009	475.0	14.9	56.9	3.1%	12.0%	71.9	15.1%
		2013	475.0	14.9	50.6	3.1%	10.7%	65.5	13.8%
Presteigne	172	2006	84.1	1.3	8.6	1.6%	10.2%	9.9	11.8%
		2009	84.1	1.3	9.3	1.6%	11.1%	10.7	12.7%
		2013	84.1	1.8	7.6	2.1%	9.1%	9.4	11.2%
Rhayader	148	2006	104.7	3.8	8.8	3.6%	8.4%	12.5	12.0%
		2009	104.7	3.8	13.4	3.6%	12.8%	17.2	16.4%
		2013	104.7	3.8	12.4	3.6%	11.8%	16.1	15.4%
Welshpool	82	2006	250.9	3.1	19.8	1.2%	7.9%	22.9	9.1%
		2009	250.9	3.1	28.4	1.2%	11.3%	31.5	12.6%
		2013	250.9	3.1	26.5	1.2%	10.6%	29.6	11.8%
Ystradgynlais	72	2006	294.5	30.1	23.2	10.2%	7.9%	53.3	18.1%
		2009	294.5	30.1	23.2	10.2%	7.9%	53.4	18.1%
		2013	294.5	30.2	23.9	10.2%	8.1%	54.0	18.4%
POWYS TOTAL		**2006**	**2461.0**	**107.0**	**217.5**	**4.3%**	**8.8%**	**324.5**	**13.2%**
		2009	**2461.0**	**107.0**	**270.1**	**4.3%**	**11.0%**	**377.1**	**15.3%**
		2013	**2461.0**	**107.9**	**247.9**	**4.4%**	**10.1%**	**355.8**	**14.5%**

Table 7: Summary breakdown of town amenity tree and woodland cover in 2006, 2009 and 2013



Newtown: © Crown Copyright: RCAHMW

3.5 Summary: actionable findings

Identifying landowners to promote better care and planting of trees

The distribution of Powys' urban tree resource amongst 12 land uses has demonstrated the wide range of public and private stakeholders that have a decisive impact on the county's existing and future urban canopy cover. The strategic delivery of increasing canopy cover will be greatly facilitated if existing funding streams of respective landowners' budgets can be tapped into in order to support the delivery of a high quality environment and infrastructure across urban Powys. In doing so, this would recognise the huge contribution that trees make to ecosystem services.

Identifying quantity and quality of tree cover to improve the provision and management of trees where best aligned to communities needs

The case for distinguishing between woodland and amenity canopy cover is useful where:

- Quantity; where woodland cover increases a town's canopy but, in terms of benefits to neighbourhoods, they are often not realising their potential due to lack of management or accessibility.
- Quality; where regular tree management in parks, gardens and streets provide a cared-for appearance. These are the trees that, whilst not extensive in terms of canopy, tend to be 'on the doorstep' of where people live and work.

The presence, or not, of woodland is clearly a factor in accounting for the highs and lows of the South Wales Valley and coastal towns. The Valleys town of Ystradgynlais and spa town of Llandrindod Wells both display high levels of woodland, especially when compared with Machynlleth. The open-space land-use categories host the majority of woodland cover, with private gardens being the major provider of towns' amenity trees. Examining woodland vs. amenity cover at a ward level helps to understand that the make-up of the local landscape plays a major role in determining high and low cover. Despite the broad high and low cover distinctions between the Valleys and coasts, affluent versus deprived areas, there are numerous specific examples where woodland significantly raises canopy levels in both localities.

Further detailed analysis and ground-truthing would usefully reveal:

- Evidence as to the exact spatial balance between 'wooded' and 'amenity tree' areas within communities.
- To what degree quantity and quality of tree cover align with the needs of where people live, work and play and where targeted tree planting is required.

Identifying amenity tree and woodland loss, aligning with decline in canopy cover and highlighting specific town and county concerns for further investigation

The loss of large long-lived trees is concerning. This maturing Victorian and Edwardian legacy, whilst at some point in need of replacement, does offer urban society the greatest benefits. The danger is that these trees are not being replaced and where they are, small, short-lived trees offering fewer overall benefits take their place. A consistent, resourced and planned approach is needed to:

- Protect and care for the Victorian and Edwardian legacy of large trees
- Promote planting of large canopy specimens.

Initial analysis combining tree count and canopy cover loss across counties highlights specific towns where a diminishing tree resource is apparent. The next steps for local authorities and NRW would be to:

- Undertake detailed interrogation of the survey data, ascertaining both the validity of the highlighted concerns and identifying in detail where specific loss is occurring.
- Undertake complimentary ground-truthing across towns to further understand and explain the reasons behind tree removal and their rate of loss.

Identifying legislation to protect and funding to increase tree planting opportunities

Optimising some of the existing legislation to reduce tree loss and current funding tools to secure planting schemes can both facilitate in addressing canopy cover concerns. Examples of practical next steps include:

- Reviewing the effectiveness and use of existing tools and legislation for tree preservation.
- Ensuring investments in enhancing the Wales urban treescape are an eligible expenditure for grant programmes such as Vibrant and Viable Places, Coastal Communities Fund, Business Improvement District Fund Wales, Regional Transport Consortia Grant, Safe Routes in Communities.

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4. Neighbourhood canopy cover – a focus on wards

This section focuses on contrasting ward level canopy cover, considering levels of deprivation where relevant, to identify where qualitative or quantitative improvements to tree cover might be needed.
Analysis and findings are presented as follows:

4.1 Best and worst canopied urban wards

Town ward by ward canopy cover breakdown

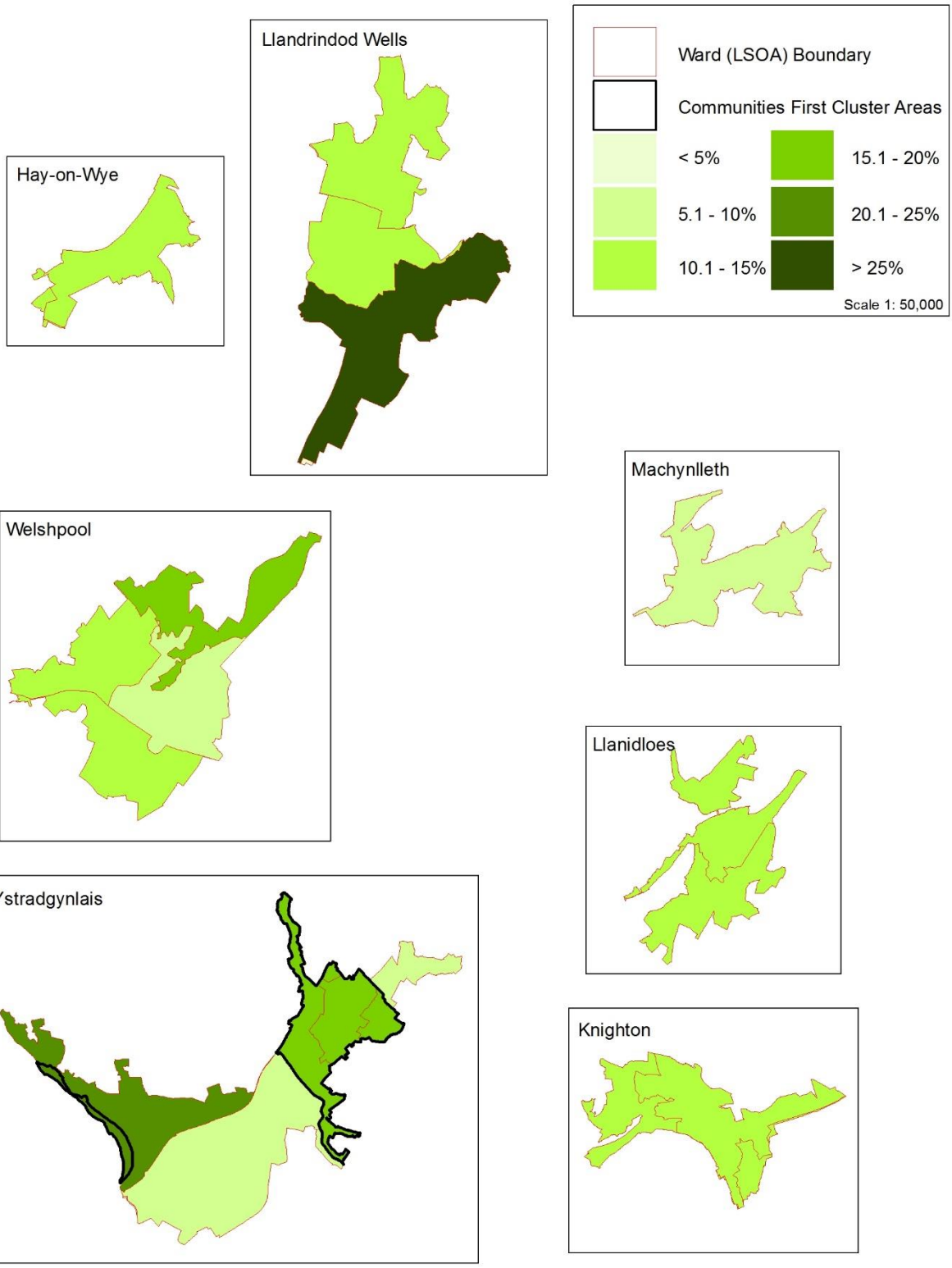

Figure 11: Town Ward by Ward Canopy Cover Breakdown

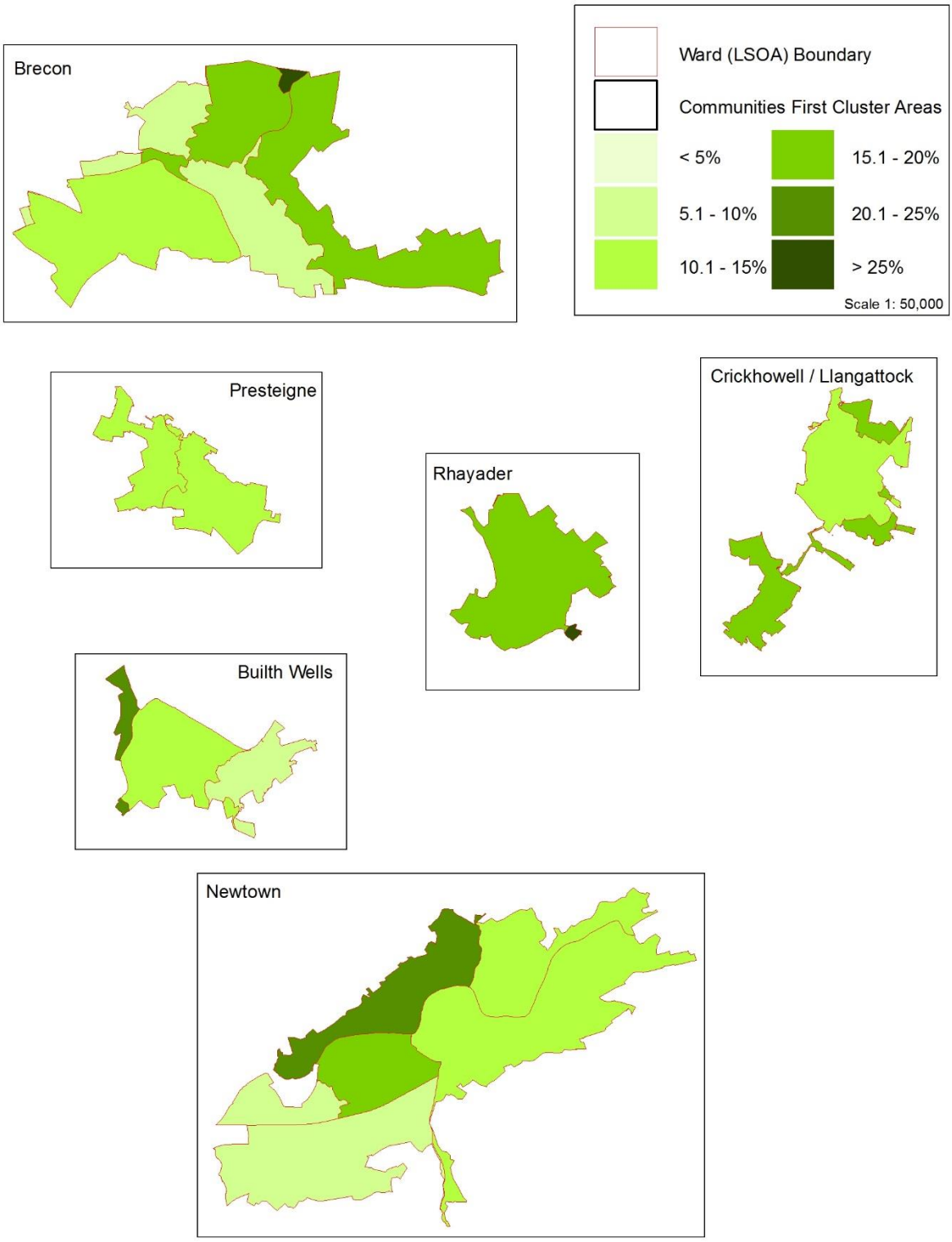

Figure 12: Town Ward by Ward Canopy Cover Breakdown

4.2 Multiple deprivation and tree canopy cover

Wales' Index of Multiple Deprivation (WIMD)

No	Key		WIMD Category	Total No. of Wards	TCWTC Urban Area (ha)
1	Most Deprived	0-10%	1 – 190	1	27
2		10-20%	191 – 380	0	0
3		20-30%	381 – 570	6	336
4		30-50%	571 - 950	8	541
5	Least Deprived	50-100%	951 - 1896	28	1555
	Total			**43**	**2459**

Table 8: Distribution of Powys' wards (LSOAs) as per the Welsh Index of Multiple Deprivation 2011

'Top 10' most canopied and 'Bottom 10' least canopied urban wards and WIMD

Canopy Rank	Urban Area	Ward / WIMD Category	Urban Area in Ward (ha)	Canopy Cover %
1	Brecon	Felin-fâch	3 of 9469	46.9%
2	Llandrindod Wells	Llandrindod South	120 of 814	30.1%
3	Rhayader	Nantmel	1 of 18884	27.1%
4	Ystradgynlais	Cwm-twrch	67 of 1297	24.7%
5	Ystradgynlais	Ystalyfera 1	8 of 613	23.7%
6	Newtown	Newtown Llanllwchaiarn West	72 of 815	22.3%
7	Builth Wells	Llanafanfawr	10 of 22358	20.0%
8	Brecon	St. John 1	59 of 85	18.7%
9	Ystradgynlais	Ystradgynlais 1	27 of 38	18.2%
10	Crickhowell / Llangattock	Llangattock	33 of 3141	17.5%

Table 9: 'Top10' most canopied wards

Canopy Rank	Urban Area	Ward / WIMD Category	Urban Area in Ward (ha)	Canopy Cover %
1	Ystradgynlais	Aber-craf	16 of 960	6.2%
2	Brecon	Talybont-on-Usk	1 of 20510	6.3%
3	Brecon	St. Mary 1	65 of 76	7.4%
4	Brecon	St. John 2	36 of 145	7.6%
5	Machynlleth	Machynlleth	84 of 506	7.7%
6	Welshpool	Welshpool Gungrog 1	70 of 184	8.0%
7	Newtown	Newtown Central 1	28 of 39	8.4%
8	Builth Wells	Builth 1	32 of 100	8.5%
9	Newtown	Newtown South	114 of 300	8.8%
10	Presteigne	Presteigne 1	34 of 2082	10.0%

Table 10: 'Bottom 10' least canopied wards

Canopy Cover in Communities First Cluster Areas

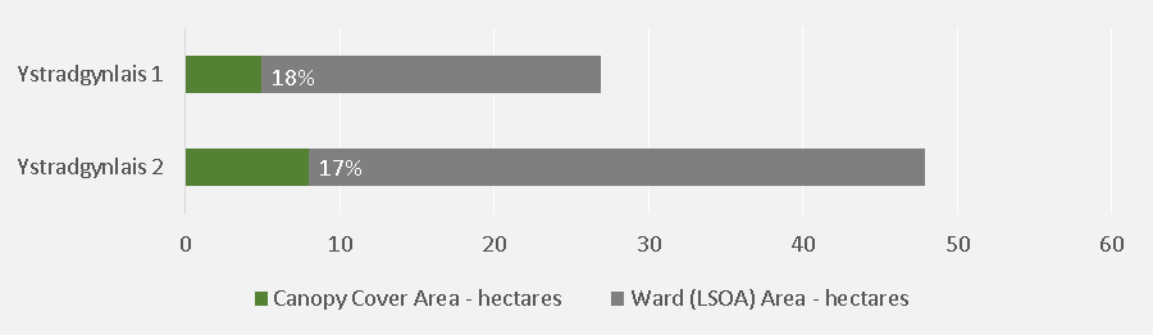

Figure 13: Canopy Cover in 'Western Valleys' Communities First Cluster Area

Ystradgynlais: © Crown Copyright: RCAHMW

Builth Wells: © Crown Copyright: RCAHMW

Ward by Ward (LSOAs) Canopy Cover

% Canopy Cover: 0 - 5 | 5 - 10 | 10 - 15 | 15 - 20 | 20 - 25 | > 25

WIMD: 1 - 190 | 190 - 380 | 380 - 570 | 570 - 950 | 950 - 1896

Ward (LSOA) with WIMD (Cluster Area Ward highlighted)	Total Ward Area (ha)	Town Area in ward (ha)	Amenity Trees 2006 (ha)	NFI Cover 2011 (ha)	Total Cover TCWTC 1 (ha)	Total % Cover TCWTC 1	Amenity Trees 2009 (ha)	NFI Cover 2011 (ha)	Total Cover TCWTC 2 (ha)	Total % Cover TCWTC 2	Amenity Trees 2013 (ha)	NFI Cover 2014 (ha)	Total Cover TCWTC 3 (ha)	Total % Cover TCWTC 3
Brecon														
Felin-fâch	9468.93	2.97	0.06	1.36	1.41	47.7%	0.06	1.36	1.42	47.8%	0.05	1.36	1.41	46.9%
St. David Within	322.67	126.45	12.44	3.22	15.66	12.4%	12.51	3.22	15.74	12.4%	11.90	3.22	15.12	12.0%
St. John 1	84.87	59.43	4.90	6.64	11.54	19.4%	4.34	6.64	10.99	18.5%	4.39	6.64	11.03	18.7%
St. John 2	144.70	36.11	3.47	0.17	3.64	10.1%	2.87	0.17	3.03	8.4%	2.56	0.17	2.72	7.6%
St. Mary 1	76.29	64.72	4.79	0.00	4.79	7.4%	4.95	0.00	4.95	7.7%	4.81	0.00	4.81	7.4%
St. Mary 2	480.95	116.36	13.75	3.62	17.37	14.9%	13.88	3.62	17.50	15.0%	13.81	3.62	17.44	15.0%
Talybont-on-Usk	20510.10	1.26	0.12	0.00	0.12	9.8%	0.08	0.00	0.08	6.1%	0.06	0.00	0.06	6.3%
Builth Wells														
Builth 1	100.16	31.69	2.25	0.01	2.26	7.1%	3.09	0.01	3.10	9.8%	2.70	0.01	2.71	8.5%
Builth 2	202.94	62.71	6.26	2.10	8.36	13.3%	7.82	2.10	9.92	15.8%	7.35	2.10	9.45	15.0%
Llanafanfawr	22358.27	10.36	1.63	0.08	1.72	16.6%	1.90	0.08	1.98	19.2%	1.92	0.08	2.00	20.0%
Crickhowell / Llangattock														
Crickhowell 1	567.00	63.88	4.91	0.17	5.08	7.9%	10.33	0.17	10.50	16.4%	9.09	0.17	9.26	14.5%
Crickhowell 2	7111.70	17.03	1.50	0.00	1.50	8.8%	3.18	0.00	3.18	18.7%	2.68	0.00	2.68	15.8%
Llangattock	3140.52	32.73	2.57	0.39	2.96	9.0%	6.47	0.39	6.86	21.0%	5.39	0.39	5.78	17.5%
Hay-on-Wye														
Gwernyfed	7001.95	3.02	0.24	0.00	0.24	8.0%	0.43	0.00	0.43	14.3%	0.44	0.00	0.44	14.6%
Hay	149.78	57.92	4.59	0.94	5.53	9.6%	6.14	0.94	7.08	12.2%	5.75	0.94	6.70	11.5%
Knighton														
Knighton 1	1438.90	42.33	2.88	1.50	4.38	10.3%	3.73	1.50	5.23	12.3%	3.22	2.06	5.28	12.6%

Ward (LSOA) with WIMD (Cluster Area Ward highlighted)	Total Ward Area (ha)	Town Area in ward (ha)	Amenity Trees 2006 (ha)	NFI Cover 2011 (ha)	Total Cover TCWTC 1 (ha)	Total % Cover TCWTC 1	Amenity Trees 2009 (ha)	NFI Cover 2011 (ha)	Total Cover TCWTC 2 (ha)	Total % Cover TCWTC 2	Amenity Trees 2013 (ha)	NFI Cover 2014 (ha)	Total Cover TCWTC 3 (ha)	Total % Cover TCWTC 3
Knighton 2	1183.40	66.89	6.62	1.49	8.10	12.1%	7.20	1.49	8.69	13.0%	6.52	1.49	8.01	12.0%
Llandrindod Wells														
Llandrindod East/Llandrindod West	101.51	65.21	4.59	4.30	8.89	13.6%	6.28	4.30	10.58	16.2%	5.17	4.29	9.46	14.6%
Llandrindod North	353.08	82.78	6.94	2.43	9.37	11.3%	10.41	2.43	12.83	15.5%	9.35	2.35	11.69	14.1%
Llandrindod South	813.86	119.56	8.80	23.18	31.98	26.7%	14.17	23.18	37.35	31.2%	12.98	23.18	36.16	30.1%
Llanidloes														
Llanidloes 1	174.72	52.19	3.18	0.08	3.26	6.2%	5.43	0.08	5.51	10.6%	5.39	0.08	5.47	10.5%
Llanidloes 2	364.90	52.26	3.61	1.88	5.49	10.5%	5.60	1.88	7.49	14.3%	4.96	1.88	6.84	13.2%
Machynlleth														
Machynlleth	506.03	83.50	2.57	0.20	2.77	3.3%	7.74	0.20	7.94	9.5%	6.26	0.20	6.46	7.7%
Newtown														
Newtown Central 1	38.72	27.79	2.42	0.02	2.44	8.8%	2.68	0.02	2.70	9.7%	2.33	0.02	2.35	8.4%
Newtown Central 2	51.63	51.31	5.67	2.89	8.56	16.7%	5.26	2.89	8.15	15.9%	5.15	2.89	8.03	15.8%
Newtown East	799.12	145.50	18.03	4.36	22.39	15.4%	17.24	4.36	21.60	14.8%	15.83	4.36	20.19	13.9%
Newtown Llanllwchaiarn North	704.46	64.64	8.15	0.23	8.37	13.0%	9.74	0.23	9.97	15.4%	8.54	0.23	8.76	13.5%
Newtown Llanllwchaiarn West	814.92	72.21	9.31	6.16	15.48	21.4%	12.10	6.16	18.27	25.3%	9.89	6.16	16.06	22.3%
Newtown South	299.71	113.55	10.72	1.24	11.96	10.5%	9.89	1.24	11.13	9.8%	8.85	1.24	10.09	8.8%
Presteigne														
Presteigne 1	2081.95	34.44	3.39	0.10	3.49	10.1%	3.83	0.10	3.92	11.4%	2.86	0.55	3.41	10.0%
Presteigne 2	412.72	49.60	5.16	1.25	6.41	12.9%	5.44	1.25	6.69	13.5%	4.73	1.25	5.98	12.0%
Rhayader														
Nantmel	18883.92	1.28	0.10	0.02	0.13	9.9%	0.25	0.02	0.27	21.4%	0.25	0.02	0.27	21.4%
Rhayader	13941.28	103.38	8.68	3.73	12.41	12.0%	13.17	3.73	16.90	16.3%	12.11	3.73	15.85	15.4%
Welshpool														
Welshpool Castle	1795.07	61.56	5.33	0.02	5.35	8.7%	7.40	0.02	7.42	12.1%	6.85	0.01	6.86	11.1%

Ward (LSOA) with WIMD (Cluster Area Ward highlighted)	Total Ward Area (ha)	Town Area in ward (ha)	Amenity Trees 2006 (ha)	NFI Cover 2011 (ha)	Total Cover TCWTC 1 (ha)	Total % Cover TCWTC 1	Amenity Trees 2009 (ha)	NFI Cover 2011 (ha)	Total Cover TCWTC 2 (ha)	Total % Cover TCWTC 2	Amenity Trees 2013 (ha)	NFI Cover 2014 (ha)	Total Cover TCWTC 3 (ha)	Total % Cover TCWTC 3
Welshpool Gungrog 1	184.48	70.37	4.52	0.00	4.52	6.4%	6.25	0.00	6.25	8.9%	5.60	0.00	5.60	8.0%
Welshpool Gungrog 2	1223.56	60.51	5.72	1.78	7.50	12.4%	8.27	1.78	10.06	16.6%	8.36	1.78	10.14	16.6%
Welshpool Llanerchyddol	696.53	58.47	4.24	1.29	5.54	9.5%	6.47	1.29	7.76	13.3%	5.69	1.29	6.98	12.0%
Ystradgynlais														
Aber-craf	959.96	16.43	0.86	0.15	1.01	6.1%	0.89	0.15	1.04	6.3%	0.84	0.15	0.99	6.2%
Cwm-twrch	1297.43	67.15	5.29	10.66	15.94	23.7%	5.84	10.66	16.49	24.6%	5.87	10.66	16.52	24.7%
Ynyscedwyn	379.95	128.02	12.31	9.25	21.56	16.8%	12.06	9.25	21.31	16.6%	12.07	9.25	21.32	16.7%
Ystalyfera 1	613.40	7.81	0.44	1.53	1.96	25.1%	0.48	1.53	2.01	25.7%	0.37	1.53	1.89	23.7%
Ystradgynlais 1	38.27	26.94	0.69	3.99	4.68	17.4%	0.65	3.99	4.64	17.2%	0.94	3.99	4.93	18.3%
Ystradgynlais 2	2819.54	47.94	3.34	4.57	7.91	16.5%	3.07	4.57	7.63	15.9%	3.42	4.57	7.99	16.7%

Table 11: Ward by Ward (LSOAs) Canopy Cover

Brecon: © Crown Copyright: RCAHMW

Welshpool: © Crown Copyright: RCAHMW

4.4 Summary: actionable findings

Adopting a ward-level focus to identify priority communities for action

Powys's ward-level data (LSOAs) provides a useful insight into those areas most deficient in tree cover, especially if aligning with those urban areas that have been identified as priorities for town-scale strategic action in section 2.5.

1–570 WIMD wards have already been identified as having serious social, economic and environmental problems. The low levels of tree cover that exist in the majority of these needy communities also emphasise how poorly they are provided for, in terms of pleasant, leafy surroundings. These initial findings are particularly powerful in highlighting the case for action, once further detailed scoping for opportunities has been undertaken.

Regeneration schemes focusing on deprivation and designated Community First cluster areas should integrate urban forestry improvement measures looking at both quantitative and qualitative enhancement ensuring:

- Amenity trees are present where people live, shop, work and play;
- Existing woodlands are designed and managed to bring value to local communities.

One of the avenues to explore includes reviewing existing regeneration grant funding to make sure quantitative and qualitative enhancement to the local tree resource are qualifying expenditures.

Natural Resources Wales' focus on supporting and targeting action in areas of deprivation, especially Communities First cluster areas should, through working with partners, enable a better spatial understanding of where the priority planting needs are. Where realistic opportunities exist, pilot projects need to be resourced, implemented and publicised as exemplar case studies.
(As of October 2016 the Welsh Government has decided to bring the Communities First programme to an end – too recent to re-vamp the focus of the TCWTC study).

Llandrindod: © Crown Copyright: RCAHMW

5. Estimating the potential for tree planting - pilots for Newtown and Brecon

This section presents a desktop methodology that was piloted across a sample 27 urban areas across Wales, including Newtown and Brecon, to identify where new tree planting might be possible.
The approach and its findings are presented as follows:

5.1 Estimating the realm of the possible: the TCWTC method – Potential canopy cover (PCC)
5.2 Potential green areas for targeting tree planting – the Newtown and Brecon pilots
5.3 Summary: actionable findings

5.1 Estimating the realm of the possible: the TCWTC method

To enable tree strategies and canopy cover targets to be fully developed, national and local government not only need a clear picture of the existing resource but also an indication of what's potentially possible to achieve.

A number of cities in the United States have been particularly proactive, in conjunction with the United States Department of Agriculture's Forest Service, in underpinning urban tree management with canopy cover mapping, stocking level information and canopy cover targets. This is all part of a far more structured approach to urban forest management than exists in the UK. *Planning the Urban Forest* and *Sustaining America's Urban Trees and Forests* are two useful introductory publications by the American Planning Association and Forest Service respectively.

Over and above existing canopy cover data, many US cities now have information on land that is potentially 'plantable' and could form 'Potential Canopy Cover' (PCC). This often focuses on:

- Impervious areas, particularly streets, through assessments of 'stocking levels'; the number of street trees that can realistically be planted within a neighbourhood.
- Green space – based on land allocation and context.

The pilot assessment of tree planting potential, conducted as part of the TCWTC study, does not have the sophistication of American models. The datasets available to Natural Resources Wales confined this exercise to identifying 'green' land without existing canopy cover. It was not possible to identify potential 'grey/impervious' land, albeit these are often the locations in tough challenging urban environs where canopy cover is most needed.

Whilst not offering a holistic assessment of the realm of the possible, the method adopted below offers the advantage of highlighting potential 'easy wins': tree planting is typically less expensive in soft landscape environs than in hard landscapes. Trees are also likely to have better chance of survival and better fulfil their genetic potential (i.e. grow as big as they can) if they have access to large soil volumes.

Twenty-seven pilot towns were selected across Wales' 22 local and three national park planning authorities based on selecting a major county town per authority, e.g. Newtown.

Three basic categories have been identified within the urban boundary:

- Existing cover (based on 2009 canopy cover survey & NFI woodland data);
- Grey, impervious and blue areas – i.e. buildings, roads, rail and water – which might provide opportunities for tree planting, particularly along streets or within civic spaces and parking lots, but which were not included within the scope of this study;
- Green areas that theoretically could be recruited for additional tree planting, and could help increase the overall local canopy cover – i.e. areas of bare soil, grass and beds of shrubs / young trees.

The aim, of this pilot exercise is to:

- Highlight green areas to investigate for potential new (and low-cost) tree planting within, a) each urban area, b) their constituent wards, and c) each land-use category on a ward-by-ward basis.
- Offer observations as to where the key opportunities to investigate lie, in particular where the study's findings are already making the case towards increasing canopy cover in certain towns and wards.

5.2 Potential green areas for targeting tree planting – the Newtown and Brecon pilots

Assuming that the existing tree cover level remains stable as new planting conducted in target green spaces achieves 100% coverage of all these areas, Table 12 above shows that canopy cover could potentially increase by 42% and 48% in Newtown and Brecon respectively, resulting in an overall tree coverage as high as 57% and 61%. In reality, several constraints will reduce the actual potential for increase:

- Achieving a sustainable cover in the target green areas will take a significant amount of time. Maintaining tree cover levels in existing areas will require good planning and management, underpinned by a good understanding of required tree replacement rates (and capacity to implement the required replacements). The age pyramid and species distribution of the existing tree stock will have a strong influence on the timeframe within which this will be achievable.
- Achieving a 100% cover in the target green areas is unlikely to be suitable or desirable without compromising other highly valued benefits associated with green spaces e.g. playing fields, biodiversity sites with open habitats, allotments, etc. Ground-truthing and community engagement is required, to narrow down the identified wide range of potential green locations, to ear-mark realistic and suitable sites for planting, and to determine a consensual canopy cover target.

URBAN AREA	Urban Area (ha)	'Grey' Areas (ha)	Existing Cover* (ha)	'Green' areas for potential planting (ha)	**2009 Cover* %**	Potential cover increase** %	**Existing* + Potential** Canopy Cover %**
Brecon	407	157	53	197	**13**	**48**	**61**
Newtown	475	205	72	198	**15**	**42**	**57**

Table 12: The potential to increase canopy cover in Newtown and Brecon by assessing green space without trees.
* Assuming existing tree cover remains stable overtime; ** Assuming 100% coverage is achieved in green areas targeted for planting

The figures presented in Table 12 confirm space is available to consider undertaking new planting. Together with the constraints and associated mitigation steps presented above, this suggests a methodology and starting point to begin defining approaches for increasing the local urban tree resource. What is encouraging is that those already identified as 'low cover' towns, especially Holyhead, Port Talbot and Rhyl, are all rich in green areas where increasing canopy cover might be possible.

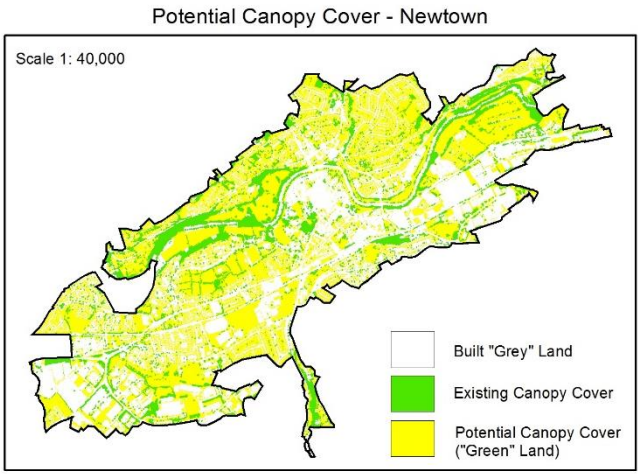

Figure 14: Newtown's canopy cover and green areas with potential to explore new planting

Newtown: © Crown Copyright: RCAHMW

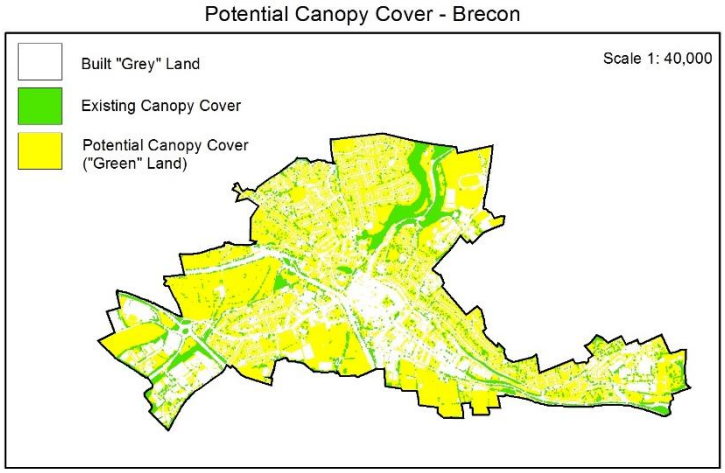

Figure 15: Brecon's canopy cover and green areas with potential to explore new planting

Brecon: © Crown Copyright: RCAHMW

5.3 Summary: actionable findings

All towns and wards offer scope for increasing planting and canopy cover

The pilot analysis of potential areas for tree planting has focused on what might be considered as 'easy wins': tree planting in green spaces has fewer constraints, and often lower upfront costs, than accommodating trees within hard landscapes.

Results have shown that large tracks of 'green' land – both public and private – seem to offer potential for tree planting. However, a detailed, on-the-ground appraisal is needed to enable decision makers to fully understand where planting is most achievable and desirable, so as to plan effectively for a more substantial and robust urban forest.

Consideration of this town assessment approach to potential canopy cover would benefit from:

- Feedback from stakeholders, especially local authorities, as to the usefulness of this approach. Closer analysis of and comment on each county's pilot town findings would be useful.
- An indication as to the merits of expanding the approach to other towns.
- Exploring methods to best identify and map potential 'grey' planting areas.

The importance of identifying land-use and available 'green' and 'grey' areas in understanding where it's feasible to plant and set realistic canopy cover targets

The pilot conducted has also shown that in some of the densely populated and more challenging areas, focusing exclusively on green areas for spotting opportunity to increase tree cover was not enough. The approach to mapping potential areas for planting across both green and grey areas to the level of detail that US cities adopt, deserves to be investigated further and utilised as the way ahead for realistically developing tree strategies and setting urban canopy cover targets.

The next steps here would be to:

- Engage with pilot local authorities keen to take this approach to the next level of investigation;
- Select a pilot town or county, and work to build up comprehensive site-based data, enabling an approach to setting meaningful canopy cover targets.

Princes Avenue, The Lakeside - Llandrindod Wells

6. Conclusion: disseminating, refining and updating the data

The 'Tree Cover in Wales' Towns and Cities' – Powys study makes a significant contribution in pinpointing where and how much tree cover the county's towns possess.
Making the most of these finding requires concerted efforts towards:

6.1 Disseminating the data
6.2 Improving and updating the dataset
6.3 Using the findings: sustaining and growing canopy cover

6.1 Disseminating the data

Communicating the Powys' findings

The target audience is the Powys County Council's policy and programme formulators, the chief executive and heads of department, politicians, professional practitioners and organisations working in both, the urban green space realm and, less advantaged communities.

Copies of this county report are available from: **urbantrees@naturalresourceswales.gov.uk** , to where queries on its content can be forwarded.

The national TCWTC report and summary can be accessed by visiting the urban trees page on NRW's website.

Data sharing

The county and national reports are supplemented by:

- Visiting the County Local Evidence Packages from the Infobase Cymru website, to identify those towns assessed for their canopy cover.
- Accessing the Welsh Government and Natural Resources Wales Lle geo-portal website for the study datasets in GIS and tabular formats.

6.2 Improving and updating the dataset

Gathering feedback

Comments on the usefulness and format of the data provided in the county report would be welcome via: **urbantrees@naturalresourceswales.gov.uk** .

Following the 2016 updated TCWTC study main report and summary, continued feedback on the methodology used, the findings and next steps will be sought from the target audiences.

This will aid Natural Resources Wales to further, a) refine the evidence gathering approach, b) build on where there are gaps in knowledge, and, c) work closer together to promote urban canopy cover

Aerial photography

The next planned aerial photography capture for Wales is due in 2017. It would therefore be timely, if feasible, following the 2006, 2009 and 2013 aerial assessments, to carry out a Phase 4 survey in 2018-19. With a suite of aerials of the same resolution spanning eight years, the picture of change in canopy cover comparison will become that much more reliable.

Pre-2006 aerial photography is potentially available to test change over time for specific towns and areas of interest.

The urban boundary

A review of the land-use rules, boundary checking and, in the light of any feedback, the urban areas as currently defined by Natural Resources Wales would be beneficial. Consideration should be given to aligning with the Powys County Council's 'settlement boundaries'.

Tree and canopy data

To provide more consistent canopy cover figures, the urban NFI components need to be analysed more closely, and where canopy diameter does not exceed 3.0 metres, these need to be omitted from the findings.

No ground-truthing has been done to date, e.g. does taking the median for each of the three tree size categories give a fair reflection of actual canopy cover?

There would be merit in separately identifying canopy cover for those 1.0–3.0 metre diameter trees - their contribution to those 'grey' areas in low cover wards, while not adding greatly to canopy cover, does have an important 'greening' impact.

What would be useful is to ascertain to what degree the Powys County Council has, in recent years, invested heavily in planting which has yet to register as canopy cover, or has there been minimal or no programme of young recruitment planting.

Consider other tree and canopy data capture techniques, e.g. infrared hyperspectral imagery to identify tree height and species.

There is a case for adding additional layers of specific tree interest, partly related to canopy cover, e.g. tree preservation orders (TPOs), historic, ancient and veteran trees.

Public – private land ownership

There would be value in identifying private and public tree cover in towns, i.e. where Powys County Council could influence change greatest. Public land could be categorised further e.g. parks, street trees or educational, in the quest for more informed management and seeking out opportunities for planting. Identifying canopy cover and planting opportunities on land holdings, such as Registered Social Landlords, would appear in line with much of the WIMD and 'Communities First' cluster area focus this study has adopted.

Potential planting

The planting opportunities pilot assessments for Newtown and Brecon deserve more investigation and validating on site. Case studies would help to raise the profile of this approach to setting canopy cover goals. Consider extending the approach to all towns along with refining the methodology, especially identifying potential paved 'grey' areas for trees when suitable datasets are available.

Cross-referencing datasets

The cross mapping with WIMD has been revealing and it would be equally invaluable to do more research against datasets such as air quality, health, temperature, flood risk, property values, crime, wildlife connectivity and access to green-space. In terms of an ecosystem approach these would no doubt highlight particular urban areas that would benefit from additional canopy cover.

This study only identified trees and woodland within the built boundary. Urban fringe woodland is also important for potential recreational access and as a backdrop to life. An assessment of the degree of woodland beyond town boundaries would highlight communities lacking in trees on both counts, making their case for 'action on the ground' greater.

Valuing the benefits of tree cover

In due course NRW, The Open University and Forest Research intend to upload this study's dataset onto the Treezilla 'Monster Map' site as point data. Over time Powys County Council, community groups and individuals can input species, girth, height, crown and ground surface information to those specific trees, which then generates values as to the benefits that tree provides society.

The ‘Valuing Wrexham’s Urban Forest’ i-Tree Eco report (2014) revealed an understanding of the county’s urban forest structure and also crucially quantified and valued the ecosystem benefits urban trees provide. The report highlighted the cost / benefit effectiveness of trees in contributing to tackling many of today’s urban challenges from infrastructure provision to the health and well-being of communities. Similar studies have been completed in 2015 for the Tawe catchment and Bridgend County Borough. ‘Valuing Trees in the Tawe Catchment’ included Powys’ Ystradgynlais and Cwmtwrch urban areas.

6.3 Using the findings: sustaining and growing canopy cover

The TCWTC study provides Powys County Council with a critical component of the evidence base they need to produce a tree and green infrastructure strategy that can be embedded in policy through guidance, development and related infrastructure plans. However, a tree strategy must be fully costed to realistically sustain and grow the urban forest. To this end Powys County Council first need to know their tree resource. A major outcome from the strategy should be the setting of a local canopy cover goal, grounded in a good understanding of their existing tree resource – which the TCWTC data goes a long way in facilitating.

The TCWTC study provides the Powys County Council and others with solid evidence of the state of the county’s urban forest, both in terms of extent and distribution as well as of its evolution. This has highlighted some important issues regarding:

- Canopy cover loss: the TCWTC study show clear evidence that 8 urban areas have lost canopy cover between 2009 and 2013.
- Canopy cover discrepancies between towns and wards.
- Unfulfilled potential to better use land for increasing cover.
- The findings provide grounds to undertake a review on current legislation and guidelines as to their effectiveness on delivering ecosystem goals, e.g. TPOs and ensuring robust conditions are adhered to on development sites.

The TCWTC study provides local community champions and third sector organisations, such as local tree ambassadors and tree wardens, with an open source dataset to inform their work in taking local action to increase and care for canopy cover, as well as to spread the word about the value of trees to the wider public:
Public Service Boards have a crucial role to play in bringing together public, private and voluntary organisations to address issues where tree cover can offer solutions.
Active local campaigners groups such as GAG (Greener Aberystwyth Group) work tirelessly to raise tree and green space issues amongst fellow residents and work alongside Ceredigion Council. Their existence has been very much a contributory factor in securing the 2012-14, £375,000 funded, Coed Aber project.
Examining the neighbourhood tree approach, adopted successfully in many US cities and piloted over here in places such as Hackney, London and Bristol, there is potentially the appetite to engage more fully with residents in tree-planting and on-going maintenance projects.