World Forum on Urban Forests
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PS 4.2 Changing people

Local government management of urban trees and implications for ecosystem service delivery

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Forest Research

Research Outline

Local Policy	Drivers: budget limits, national legislation, local policy, threats, targets, understanding of tree stock
Management Practises	Species selection, planting and establishment, tree maintenance and pruning, tree removal
Tree Characteristics	Species, stature, age, condition
Tree Ecosystem Service (ES) Delivery	Carbon storage, air pollution removal, avoided stormwater runoff, support physical and mental health…

Research Outline

Local Policy

Management Practises

Tree Characteristics

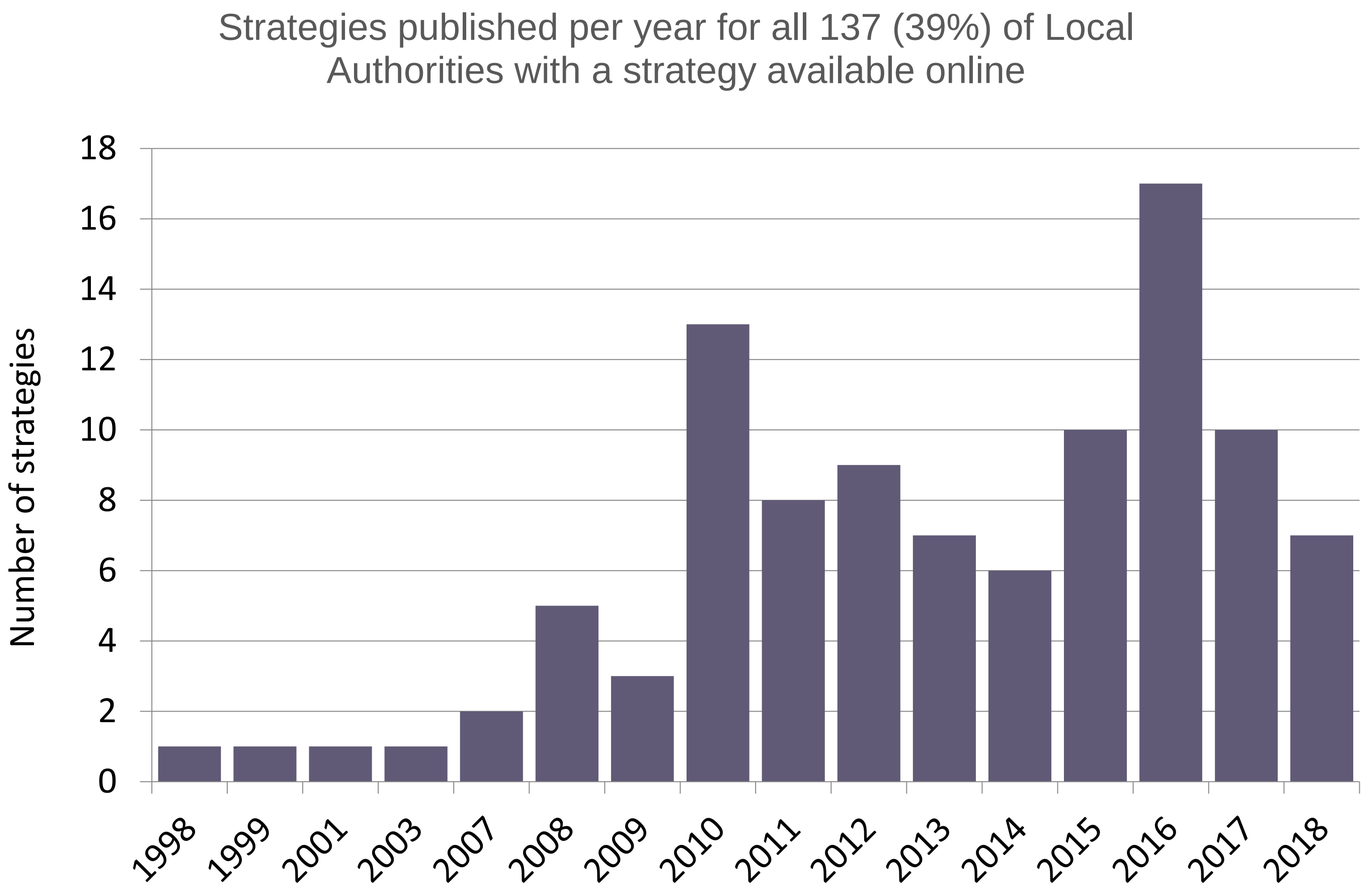
Tree Ecosystem Service (ES) Delivery

Literature review of:

- Industry reports
- Academic reports
- National government reports & reviews
- Local Authority urban tree strategies

English local government tree strategy review

Step 1: Identify which English Local Authorities (n = 353) have some form of urban tree strategy



Research Outline

Local Policy

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Tree Ecosystem Service (ES) Delivery

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Review ES delivery at individual tree level:

- Data for >8,000 trees from 10 i-Tree Eco surveys in UK.
- Selected 30 most common species (>6,000 trees). Classified as large (>12 m height), medium (6 – 12 m) or small stature (<6 m).
- Ran trees through i-Tree Eco and compared ES delivery at individual tree level.

Literature Review: Government, Academia & Industry

- Species selection
- Planting and establishment
- Tree maintenance
- Tree removal

Literature Review: Government, Academia & Industry

Species selection	**Preferential planting of smaller stature trees**	• Smaller trees seen as having lower maintenance costs and less likely to cause conflicts (e.g. damage to buildings) in the future.
Planting and establishment		
Tree maintenance		
Tree removal		

Tree characteristics and ecosystem service delivery

Species:

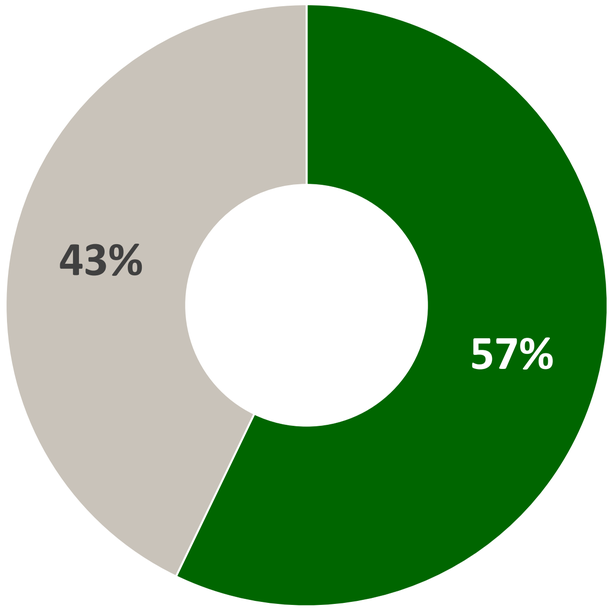
- Large stature species typically provide more ES
- But species specific variation

Large stature
Medium stature
Small stature

Rank	Carbon storage per tree (kg)	Gross carbon sequestration per tree (kg/year)	Avoided runoff per tree (m³/year)	Pollution removal per tree (g/year)
1	Oak spp.	Oak spp.	London plane	London plane
2	London plane	English elm	English elm	English elm
3	English Yew	English Yew	Oak spp.	Oak spp.
4	Beech	London plane	English Yew	Wych elm
5	Sycamore	Beech	Wych elm	Beech
6	Ash	Sycamore	Beech	English Yew
7	English elm	Holm oak	Lime spp.	Lime spp.
8	Holm oak	Ash	Sycamore	Sycamore
9	Wych elm	Wych elm	Norway maple	Norway maple
10	Norway maple	Silver birch	Ash	Ash
11	Lime spp.	Sweet cherry	Holm oak	Holm oak
12	Hornbeam	Lime spp.	Sweet cherry	Sweet cherry
13	Silver birch	Norway maple	Hornbeam	Hornbeam
14	Scots pine	Hornbeam	Silver birch	Scots pine
15	Sweet cherry	Scots pine	Scots pine	Silver birch
16	Lawson's cypress	Alder	Lawson's cypress	Lawson's cypress
17	Alder	Rowan	Field maple	Field maple
18	Downy birch	Field maple	Holly	Leyland cypress
19	Field maple	Lawson's cypress	Leyland cypress	Holly
20	Leyland cypress	Hawthorn	Bird cherry	Goat willow
21	Hawthorn	Downy birch	Goat willow	Bird cherry
22	Goat willow	Apple spp.	Rowan	Rowan
23	Apple spp.	Leyland cypress	Alder	Alder
24	Holly	Goat willow	Hawthorn	Hawthorn
25	Rowan	Holly	Hazel	Hazel
26	Hazel	Callery pear	Apple spp.	Apple spp.
27	Callery pear	Hazel	Downy birch	Downy birch
28	Bird cherry	Bird cherry	Callery pear	Callery pear
29	Elder	Plum spp.	Plum spp.	Plum spp.
30	Plum spp.	Elder	Elder	Elder

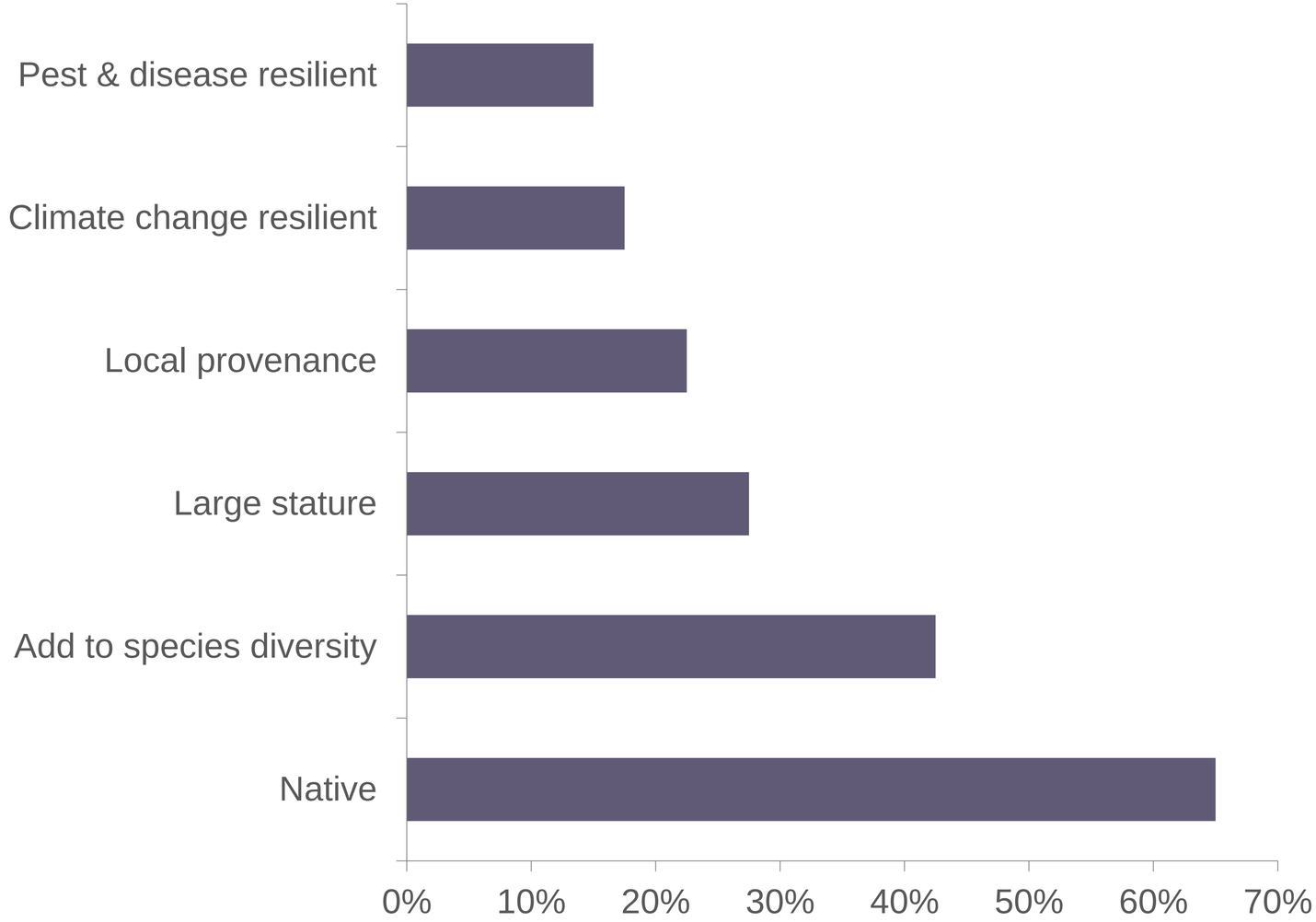
English local government tree strategy review: Species selection

Percentage of strategies which describe species preference



- Describe species preferences
- Do not describe species preferences

Most commonly listed tree species preferences



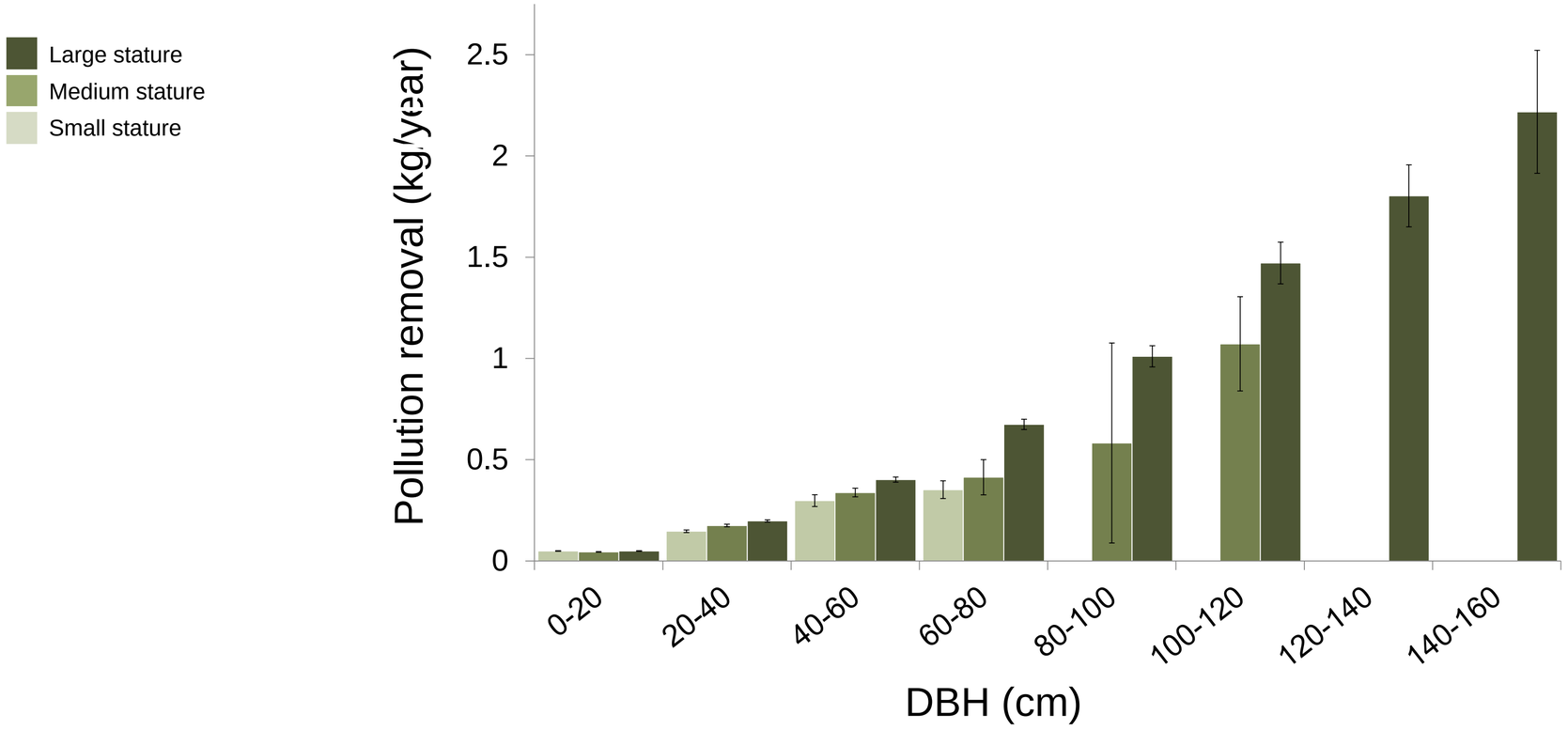
Literature Review: Government, Academia & Industry

Species selection	**Preferential planting of smaller stature trees**	• Smaller trees seen as having lower maintenance costs and less likely to cause conflicts (e.g. damage to buildings) in the future.
Planting and establishment	**Poor tree survival**	• 20% mortality rate for newly planted trees. • Only 65% received post-planting care. Trees in Towns II (2008)
Tree maintenance		
Tree removal		

Tree characteristics and ecosystem service delivery

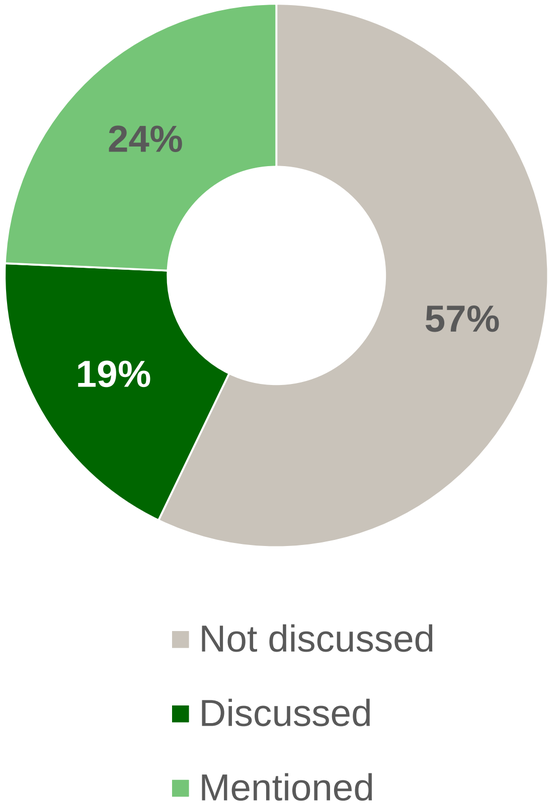
Tree age:

- Older trees of any stature provide greater ES than younger trees (except for carbon sequestration)



English local government tree strategy review: Planting & establishment

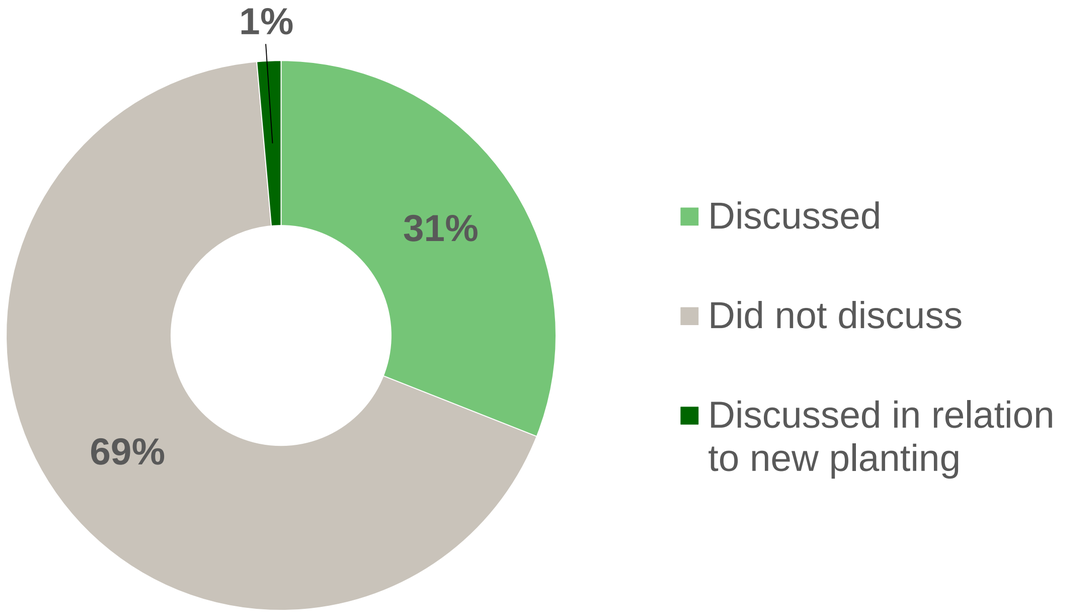
Percentage of Local Authorities which discuss tree planting & establishment practises



Opportunities:

- Making planting survival more of an issue
- Public stewardship of newly planted trees

Percentage of strategies which discuss engaging public in tree stewardship



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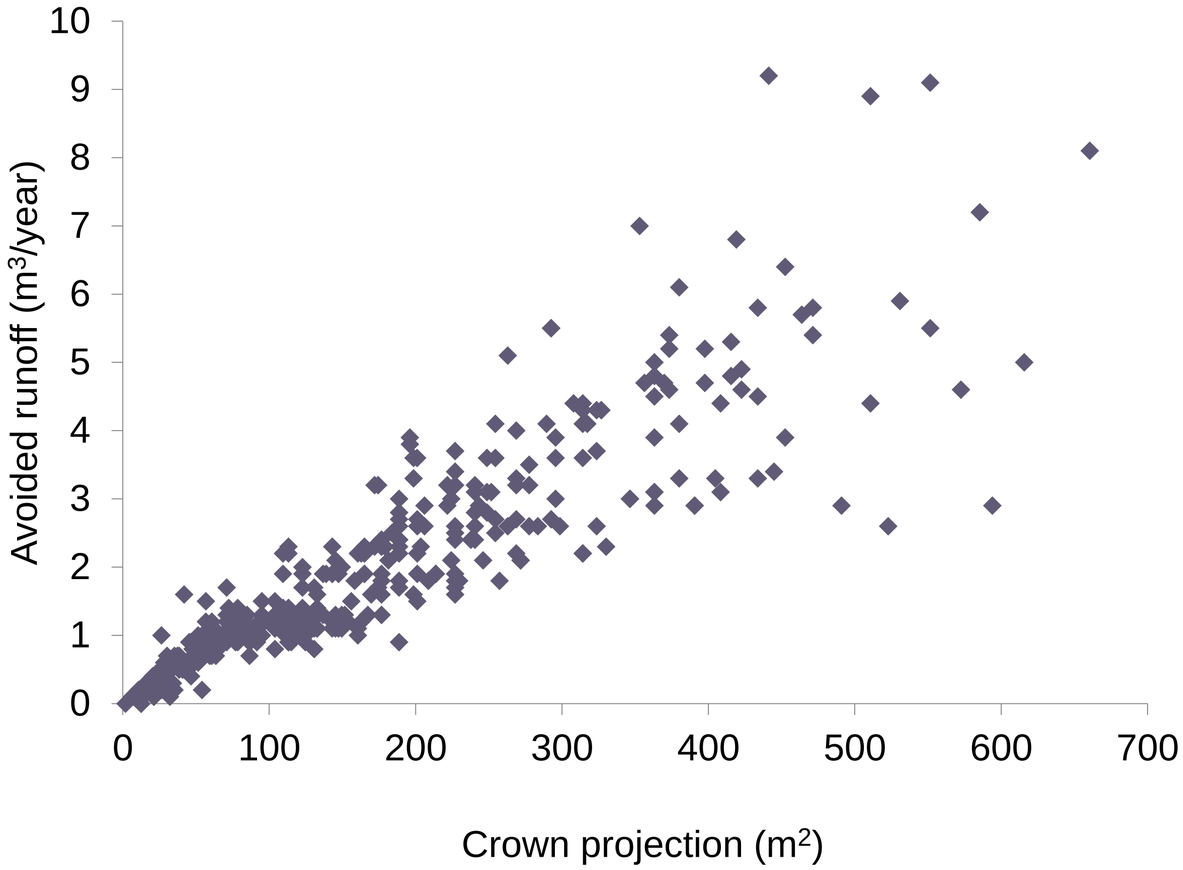
Tree maintenance	**Excessive or severe pruning**	• Reactive regimes can lead to lower quality of maintenance. • Pressure to reduce liability can lead to excessive pruning.
Tree removal		

Tree characteristics and ecosystem service delivery

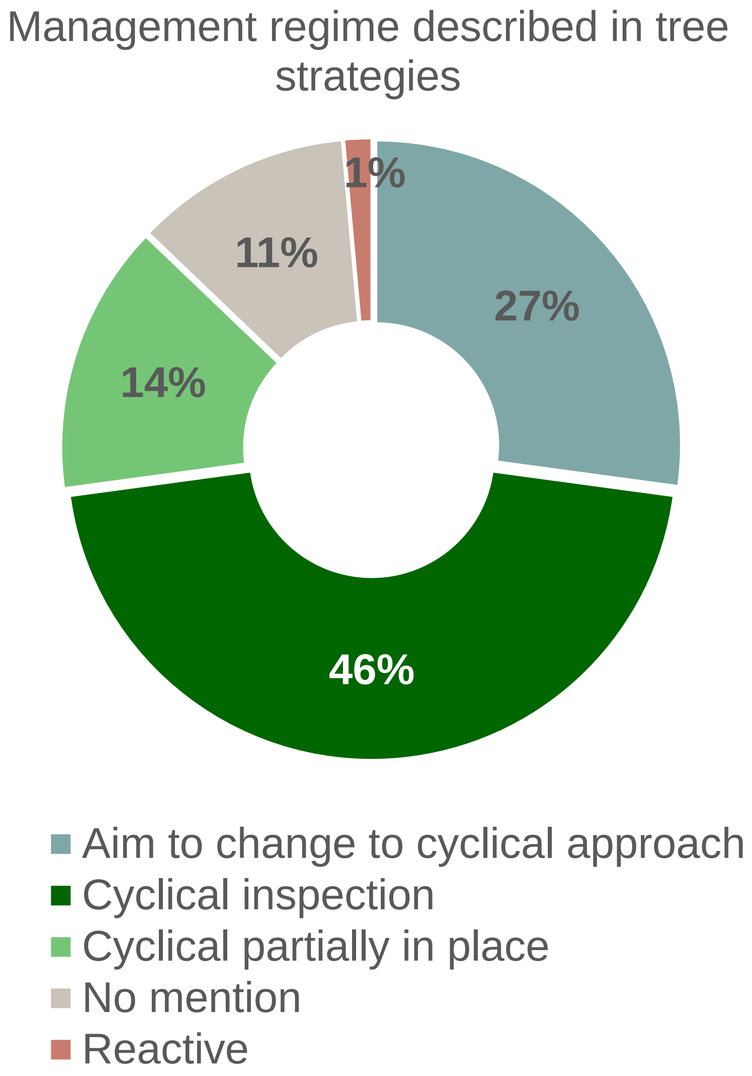
Tree Condition:

- Canopy size key in determining ES delivery

Association between canopy area and ES provision for London plane trees



English local government tree strategy review: Tree maintenance



Opportunities:

- More Local Authorities adopting cyclical tree inspection and pruning approaches.
- LTOA[1] – Local Authorities which took on cyclical pruning regime reduced number of trees felled by half.

[1] London Tree Officer Association: Risk Limitation Strategy (2008)

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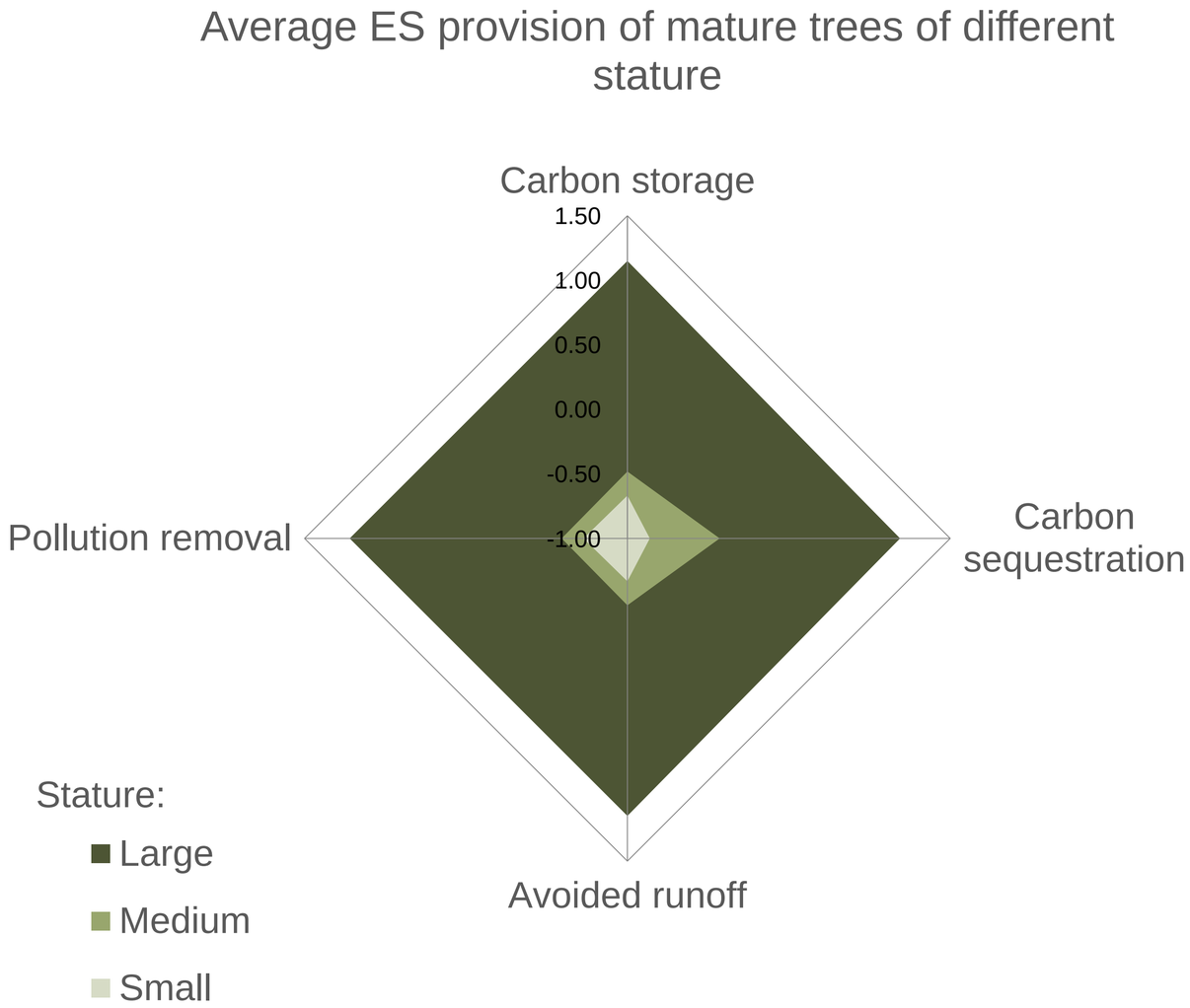
Tree removal	**Early removal of healthy trees – particularly mature and large trees**	• Loosing large and mature trees due to higher liability and management costs. • UK legislation gives more powers for tree removal than tree protection.

Tree characteristics and ecosystem service delivery

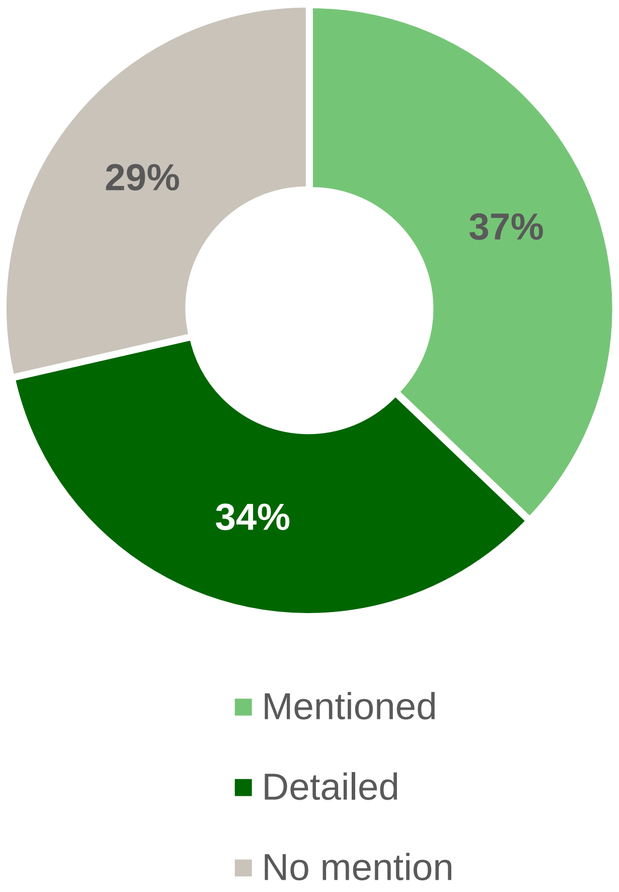
Tree Stature:

- Maximum tree size key in determining ES delivery

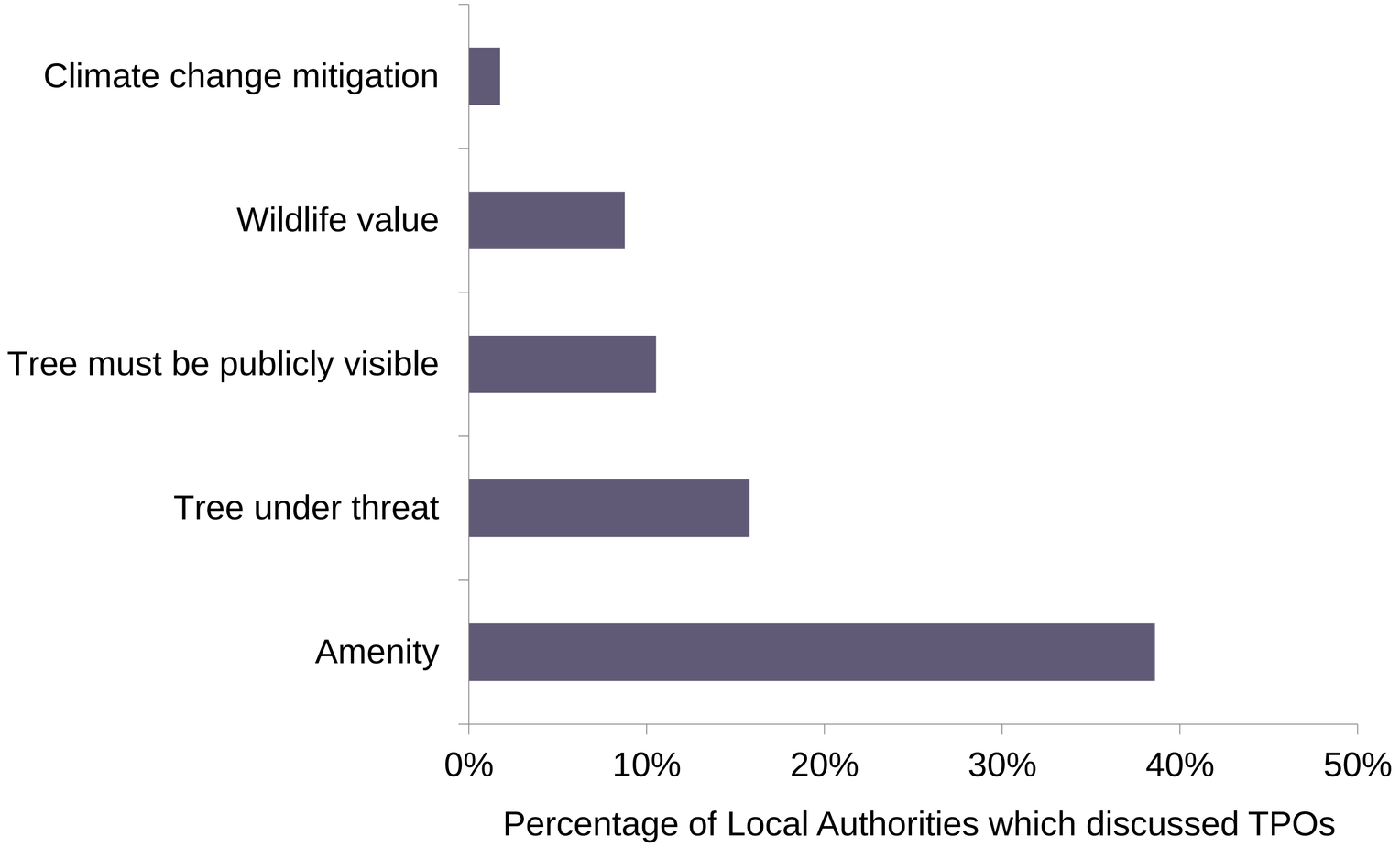


English local government tree strategy review: Tree removal

Discussion of Tree Preservation Orders (TPO) in strategies



Most commonly listed criteria to award tree a TPO



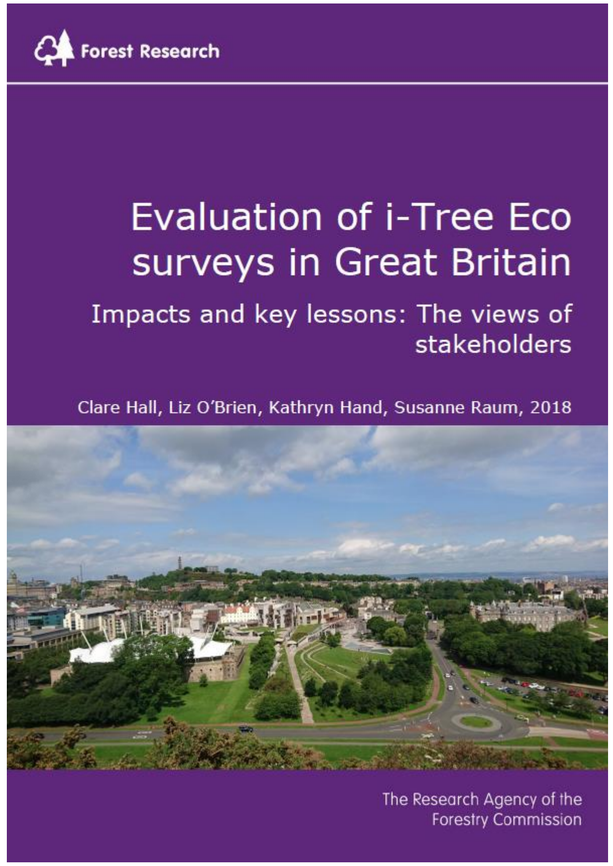
English local government tree strategy review: Tree removal

Enhance protection

- TPO legislation does not define Amenity
- Expand ‘supporting’ benefits to allow trees to be protected, e.g. climate change benefits.

Valuation of tree ES benefits

- ES valuation, using tools like i-Tree Eco, can help inform tree management and secure more funding for the urban forest



Conclusions

Large variation between local authority tree strategies

- Many different and competing drivers
- Little governance from national level

Improving tree management at the individual tree level can build up to much greater benefits at the urban forest scale

- Guidance documents from Industry and NGOs can impact local policy
- Adopting an ecosystem service approach to urban tree management could help maximise benefits from urban forests