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PS 5.1 The Future - Changing People

Future funding of urban forests – time to move to a beneficiary pays model?

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3 Research Stages

We're willing to pay for a healthier, more attractive place to live

We'll contribute if it enhances our reputation and productivity

I wish we could deliver this, but we just don't have the resources

Stage 3

415 x citizen questionnaires

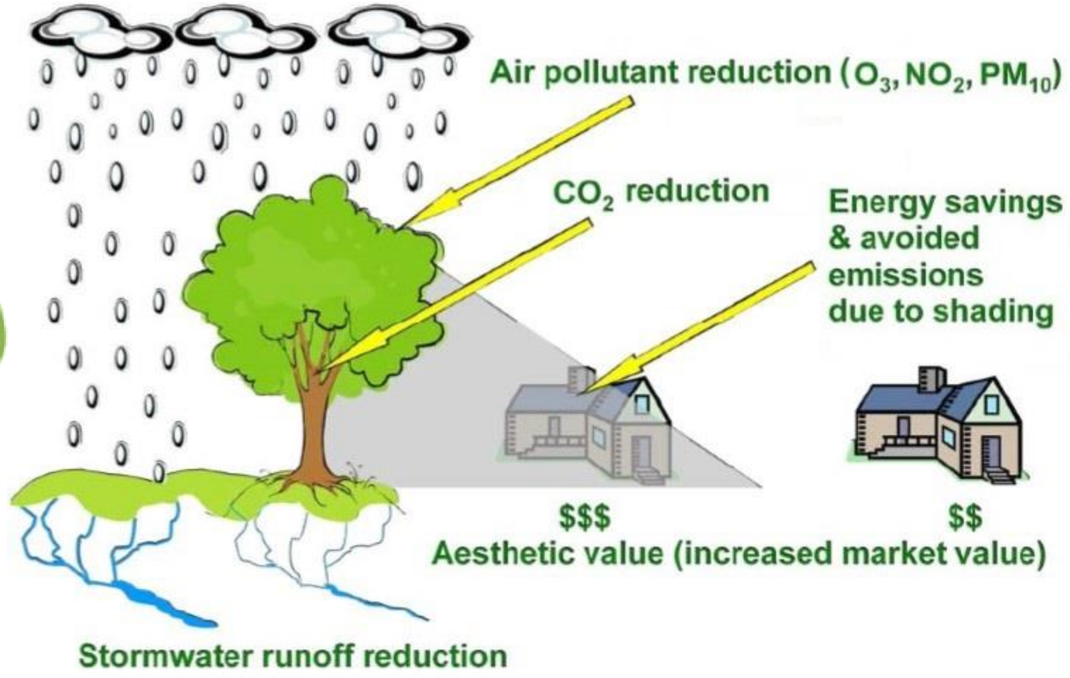
Stage 2

30 x business interviews

Stage 1

15 x tree officer interviews

An ecosystem services approach to urban forest management can bring a wealth of benefits to people:



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Publications

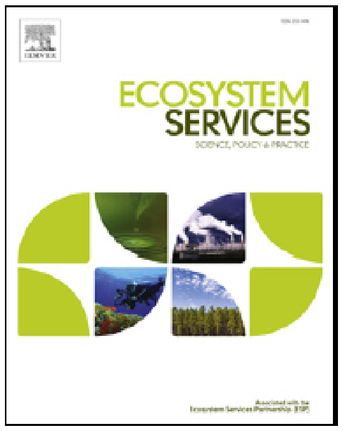
Stage 1

Environmental Research 156 (2017) 97–107

Challenges for tree officers to enhance the provision of regulating ecosystem services from urban forests

Helen J. Davies[a,*], Kieron J. Doick[b], Malcolm D. Hudson[a], Kate Schreckenberg[a]

http://dx.doi.org/10.1016/j.envres.2017.03.020



Stage 2

Ecosystem Services 32 (2018) 159–169

Business attitudes towards funding ecosystem services provided by urban forests

Helen J. Davies[a,*], Kieron J. Doick[b], Malcolm D. Hudson[a], Marije Schaafsma[a], Kate Schreckenberg[c], Gregory Valatin[d]

https://doi.org/10.1016/j.ecoser.2018.07.006

Stage 3

Results revealed for the first time, here in Mantova!

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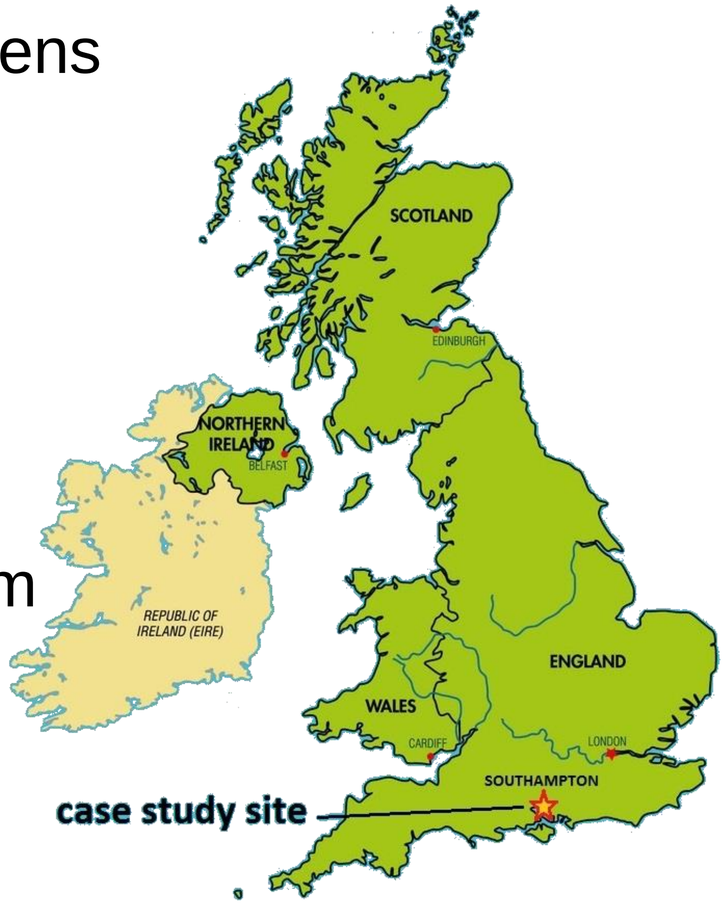
Stage 3 Purpose

a) To determine the willingness-to-pay (WTP) of citizens in Southampton, UK for urban tree planting, to:
   - reduce air pollution;
   - reduce surface water run-off; and
   - provide aesthetic benefits.

b) To determine whether WTP for tree planting is affected by uncertainty in the delivery of ecosystem services (ES), in terms of:
   - objective information; and/or
   - subjective beliefs.



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Method & Sample

Online survey comprising questions on:

- Attitudes towards tree benefits/nuisances, air pollution, and flooding
- Discrete choices, requiring trade-offs between different levels of ES provision and costs relating to a proposed tree planting scheme
- Subjective belief in ES delivery (asked before and after discrete choices)
- Demographics and socio-economics

Randomly chosen citizens → **6,500 postal invites** → **415 online responses** → **339 completed surveys** → **105 'certain' version**

339 completed surveys → **234 'uncertain' version**

Random parameter logit choice models run in R software to determine WTP

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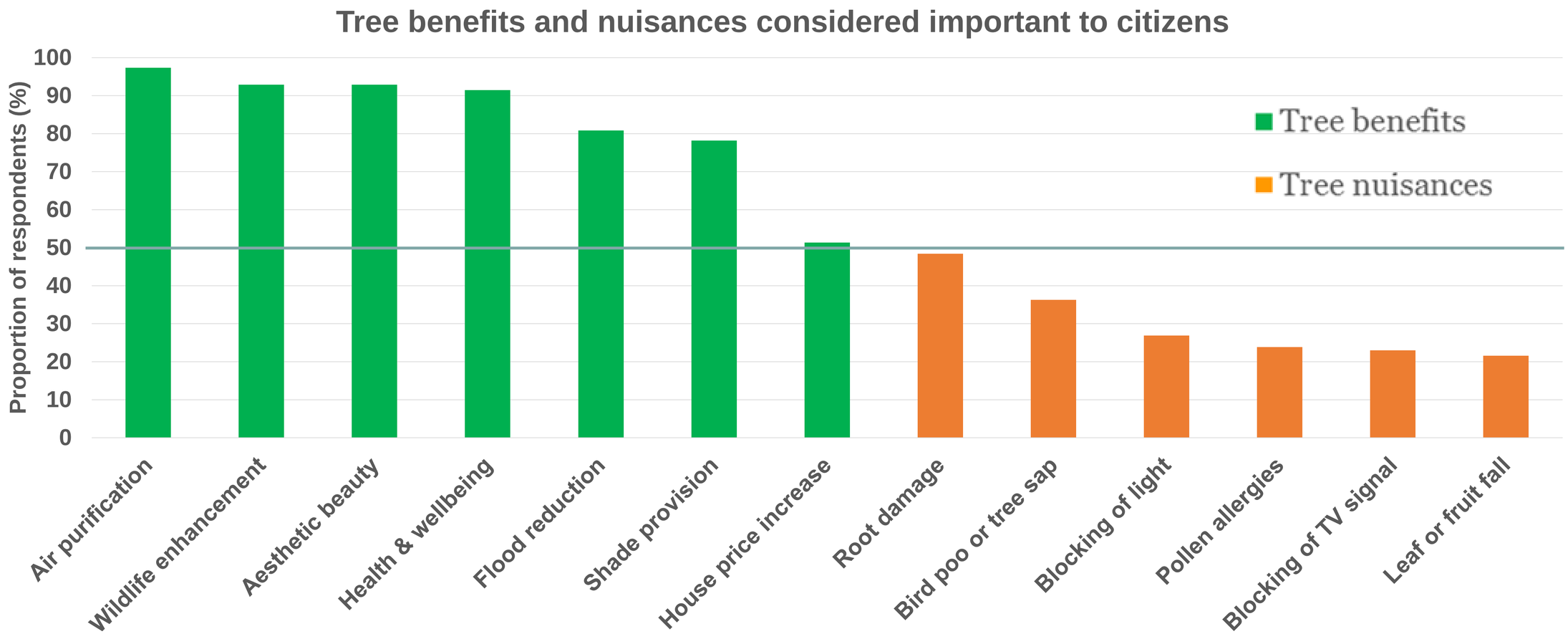
Attitudes to Trees



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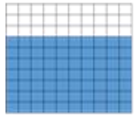
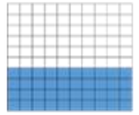
Choice Experiment

	Tree programme A	Tree programme B	No tree programme
Yearly reduction in pollution-related deaths (AirQ)	1 fewer pollution-related death	7 fewer pollution-related deaths	No reduction (115 pollution-related deaths)
Reduction in residential flood risk (Flood)	100 fewer properties at risk of flooding	500 fewer properties at risk of flooding	No reduction (10,000 properties at risk of flooding)
Likelihood that reductions in pollution-related deaths and residential flood risk will occur (ObjCert)	70% chance of reductions in deaths and flood risk occurring 	40% chance of reductions in deaths and flood risk occurring 	0% (no tree programme means no reductions) 
Change to appearance of Southampton's streets (AppLarge / AppMixed)	Large trees planted 	Small trees planted 	No change 
Payment by your household to support new street tree planting in the city (Price)	£24 per year (£2 per month)	£168 per year (£14 per month)	£0

'uncertain' version only

$$U = ASC + AirQ + Flood + ObjCert + AppLarge + AppMixed + Price + \varepsilon$$

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WTP for Programme

Compared to a ‘no tree planting’ baseline, mean WTP per household per year

= ASC Price + AirQ Price + Flood Price + ObjCert Price + AppLarge Price + AppMixed Price

	Certain version	Uncertain version	Sig. difference?
WTP for planting trees, of small stature (**ASC**)	£128	£63	Yes
WTP for each avoided pollution-related death (**AirQ**)	£9	£11	No
WTP for each 100 properties no longer at risk of flooding (**Flood**)	£5	£10	Yes
WTP to improve objective certainty from 40% to 100% (**ObjCert**)	-	£84	Yes
WTP for planting large rather than small trees (**AppLarge**)	£0	£0	No
WTP for planting mixed rather than small trees (**AppMixed**)	£0	£0	No
Total WTP for Tree Planting Programme	**£142**	**£167**	**Yes**

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Subjective Beliefs

SQ. On a scale of 0-10, how confident are you that planting new trees on Southampton's streets would reduce pollution / flooding in the city?

	Mean prior belief score (out of 10)	Proportion of respondents with score > 7 (trusters)	Proportion of respondents with score ≤ 7 (doubters)
Reduced air pollution	7.4	52.5%	47.5%
Reduced surface water flooding	6.5	34.5%	65.5%
Average for both ES	6.9	43.5%	56.5%

RQ. How does being a truster or doubter affect WTP for tree planting with objectively certain (100%) or uncertain (40% or 70%) ES outcomes?

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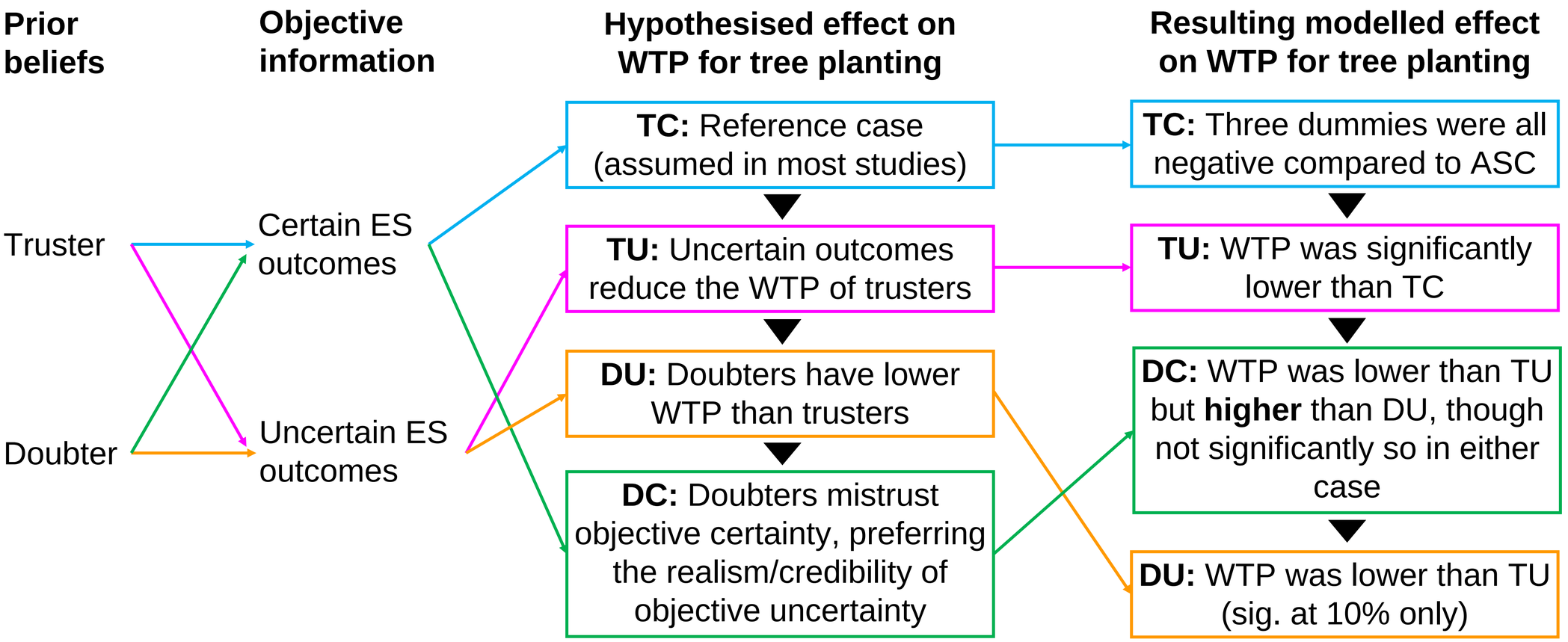
Subjective*Objective



$$U = ASC + AirQ + Flood + Large + Mixed + Payment + U + D + U*D + \varepsilon$$

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Drivers of WTP

RPL models revealed strong preference heterogeneity amongst respondents

Reducing pollution-related deaths	Reducing residential flood risk	Improving objective certainty re Reg. ES	Changing appearance by using large trees	Changing appearance by using mixed trees
• **Support scheme because "air pollution important"** • **Subjective belief about air purification ES** • **Gender (male)** • **Member of env'l organization** • **Household income**	• Benefit of flood reduction is important • Age	• **Support scheme because "appreciate honesty about uncertainty"** • Subjective belief about air purification ES • Gender (female) • Education level	• **Nuisance of blocking light is important** • **Benefit of shade provision is important** • **Support scheme because "aesthetics important"** • **Age** • Member of env'l organization	• Nuisance of bird poo/ tree sap is important • **Benefit of house price increase is important** • **Member of env'l organization**
Key: Significant at 5% level = **bold**; Positive relationship = green; Negative relationship = red				

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Conclusions

- Strong support amongst citizens for hypothetical street tree planting programme, funded through a “City Tree Fund” (a tax).
- Additional WTP for air purification, flood reduction, & improving certainty.
- Aesthetic benefits important, though size of trees does not matter.
- Many factors, including subjective beliefs, drive preferences & WTP.
- If outcomes are uncertain, then honesty & education of doubters are cautiously advised over false claims of / implied outcome certainty.

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Thank you!

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The Scottish Forestry Trust

Forest Research

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