Estimating amenity values of street trees and woodland views: a methodological review

Amenity values of street trees and woodland views can be evaluated from a number of perspectives, including economic, social, historical, health and recreation. Estimates of the value of woodland views were made as part of a recent Forestry for People project using applied spatial analysis. Reviewing the current methods and approaches to valuing amenity street trees and woodland views – and greenspace generally – by focusing on modern applied spatial GIS techniques, is timely prior to further development and application of spatial valuation methods. The review revealed a paucity of nationwide or large-scale valuations of street trees or woodland views in the UK, based on GIS analysis.

Background

As amenity values of both street trees and woodland views can be capitalised in property prices, considering approaches to their valuation may also help inform future work on evaluating the impact of greening initiatives on property values. The review may also help inform future research on land use planning, and on trade-offs and synergies in ecosystem service provision.

Objectives

This research aimed to:

○ review approaches to valuing street trees and woodland views, and previous findings;

○ inform further development of GIS viewshed methods and facilitate their application to datasets for other parts of Britain.

Methods

The primary focus of the review is on studies that have applied GIS methods to estimating the *visual* amenity value of urban and peri-urban woodlands and street trees. However, as many methods used to estimate amenity values of street trees and woodland views can equally be used to value other types of greenspace, while some studies on greenspace include estimates for street trees and/or woodland views, it was decided to broaden the review to methods to value visual amenity and greenspace in general.

Considering both street trees and woodland views within the same project makes sense as, at least at the margin[1], views of street trees and of woodlands are substitutes, such that associated amenity values may be expected to lie on a continuum. This work comprised literature, methodological and data reviews.

Findings

The amenity value of woodlands often depends on species composition and condition. In the majority of UK studies, broadleaved or mixed woodland have been found to exert a positive effect on house prices, while the effect of coniferous woodland (mostly Sitka spruce) is generally negative.

Amenity values differ between inner-city, peri-urban and rural areas. As expected, the value of woodland views and open space is generally much lower in rural settings than near the urban fringe. In the UK the urban fringe has been identified by a recent study as the place where new woodlands yield the highest marginal benefits.

Household characteristics, including education and income level, and the presence of children can affect the valuation of amenity woodland and open space. For example, higher levels of education and income and the presence of children tend to increase the willingness to pay (WTP) estimates.

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1 The point at which the addition of an extra tree would result in a group of urban trees being reclassified as 'urban woodland' rather than 'street trees'.

Potential substitutability exists between amenity values of woodland views and of street trees. One paper attempts to capture substitution effects between living with green trees on a housing parcel (0.142 ha) or in the neighbourhood around that parcel, and living near large blocks of forest. This is tested through the inclusion of the interaction term between parcel greenness and the proximity to forest (greenness times distance-to-forest) in regression analysis. For private forests, the positive coefficient on the interaction term found is consistent with the interpretation that greater parcel greenness can compensate for living a greater distance from a forest block.

Forest management practices can affect visual amenity values, with trade-offs between timber production and visual amenity values of woodland, especially at the urban fringe. Visible clear-cut sites can have major negative impacts on visual amenity values, which can reportedly be reduced by using distributed (scattered) harvesting systems.

A variety of valuation methods are used. The two main categories are revealed preference methods and stated preference methods.

Revealed preference methods include hedonic price models. These only measure use values, with the value of open space deduced from the estimated relationship between the value of a property and measures of proximity to open space and other property and neighbourhood characteristics. (Based upon analysis of actual market data, revealed preference methods are often preferred by economists.)

Stated preferences methods use surveys and direct work with people to elicit their preferences with respect to open space. In principle their advantage is that they can be used to estimate the total value, i.e. both use and non-use values.

The value of the view is separated from the total value of the landscape in hedonic price models by the use of control variables to account for other landscape characteristics (for example, woodland size, shape and species composition), property features and the individual's socio-economic background. In the stated preference approach this separation is achieved by questionnaire design including context set-up.

Recommendations

1. Hedonic pricing methods are appropriate for case studies where small changes and use value linked to the property market and recreation are investigated (subject to data availability). A good example is the valuation of woodland views from properties and of small changes of woodland cover in cities or near urban fringes.

2. Stated preference methods (i.e. surveys or benefit transfer from the previous surveys) are most appropriate for large-scale changes and/or where non-use or total values are sought.

3. Two major methodological recommendations for future econometric studies are made:
   a) test for functional specification in hedonic models;
   b) test for the presence of spatial autocorrelations and control for them.

Reports and publications
Edwards, D., Elliott, A., Hislop, M., Martin, S., Morris, J., O'Brien, L., Peace, A., Sarajevs, V., Serrand, M. and Valatin, G. (2009). *A valuation of the economic and social contribution of Forestry for People in Scotland*. Research Report for Forestry Commission Scotland by Forest Research, Edinburgh.