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VALUING MANAGEMENT FOR BIODIVERSITY IN BRITISH FORESTS AT THE FORESTRY COMMISSION

CASE STUDY: UNITED KINGDOM

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FOREWORD

This report was contributed as a national case study to an OECD project on the Applied Evaluation of Biodiversity, being carried out by the Working Group on the Economic Aspects of Biodiversity. It does not necessarily reflect the views of individual OECD Member countries or of the OECD Secretariat. It is published under the responsibility of the Secretary General.

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by

The Environmental Resources Management on behalf of The Forestry Commission

Executive Summary

The study consisted of a four stage approach to measure the existence value society attaches to the biodiversity aspects of different forestry management regimes in remote British conifer plantations. Contingent valuation and contingent ranking studies were used to obtain estimates which were tested on a series of focus groups.

Ecosystem studied: single species coniferous plantations

Valuation methods used: contingent valuation and contingent ranking studies

Main lessons learned:

- respondents found it difficult to understand the difference between the existence value of biodiversity and the amenity and landscape values more associated with forests;
- respondents had not previously considered biodiversity an issue in Britain;
- the studies showed that 80% to 90% of respondents were prepared to pay some additional taxes for improved management standards;
- the aggregated and amended results of the contingent valuation and contingent ranking surveys, when extended to all the households in Britain and weighted to reflect the known population, range from £6.6 to £13.15 per household;
- the annual costs of these forestry management standards for 300,000 hectares of remote forest estate range from £3.3 million to £5.1 million, and the benefit to cost ratios range from 23 to 70.

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1. General description

The Forestry Commission is responsible for the management of state-owned forests throughout Great Britain. As part of its objective to protect the environment, it must consider the impact of forestry on biodiversity. A large proportion of the state-owned forest estate currently consists of single species, evenly aged conifer plantations. Although being of high commercial value, these offer limited diversity in terms of habitats, communities or species, although they are beneficial for some rarer species such as red squirrels and pine martens.

The main objective of this study was to assess the biodiversity existence values in remote conifer forests where there is limited species diversity and little recreational value. It did not intend to measure option values or use values, which had been the subject of earlier work.

Four key questions were to be answered:

- What is the public's understanding and attitude towards biodiversity and who do they expect to be involved in making decisions about where and how much biodiversity we have?
- To what extent is it worth restructuring remote forests to increase biodiversity?
- How much should the Forestry Commission spend on such a programme?
- How should this be allocated between different management standards?

2. Identification of causes and sources of pressures

The pressure on biodiversity arises because the biodiversity objectives are taken forward by forest management strategies such as creating open spaces, allowing trees to live longer and increasing the proportion of deciduous trees grown. These all conflict with the objective of maximising the financial return from these forests, particularly when they are remote so that minimal, if any, benefits from usage (other than timber values) can be internalised.

3. Impacts on ecosystems

The main cause of pressure on biodiversity arises from the Forestry Commission growing coniferous trees on previously open land. Such coniferous plantations do not necessarily support the same level of biodiversity as either open land or deciduous forests.

4. Considering the impacts on economy and welfare

The study consisted of four main stages.

First stage

A scoping study was undertaken to agree definitions and a detailed methodology. It was necessary to define: forest management standards; the costs of applying such standards to 300,000 ha of remote forest estate; the biodiversity benefits resulting from each of the management standards and the mix

of management standards to be used in the study (i.e. the options). Three "do something" options were defined, these being: a minimum enforceable standard; an enhanced standard and conversion to native woodland, each representing differing levels of biodiversity.

Second stage

This stage involved discussions in eight separate focus groups selected by sex, age/life stage, geographical location and the extent of their interest in nature. The topics covered in the discussions included: the significance of biodiversity as an issue; perceptions over forests; ideas about forest management; variety in forest wildlife and presentation of management options and standards.

Despite environmental issues being a major concern, interviewees generally had no real appreciation of the importance of biodiversity in its own right. Respondents had very little knowledge about the forestry industry and the state of forests, but showed a desire to see an increase in the number of deciduous trees. There was limited knowledge of the economics of forestry, but a strong belief that the drive for higher financial returns would outweigh the needs of wildlife conservation. Interviewees had difficulty evaluating the benefits of remote forests, making their valuations primarily on the basis of human benefits.

When choosing between the alternative management standards the most advanced standard (conversion to native woodland) was favoured although regarded as unrealistic. Consequently the enhanced standard was considered the most suitable compromise and more feasible. When the alternative standards were combined into a number of management options the public gave less consideration to biodiversity than to the financial implications of the more costly options. Notably the respondents appeared to attach little significance to the tax increases associated with the cost of each of the options.

Third stage - the main stage

Due to the number of biases that may be associated with the use of open-ended dichotomous choice contingent valuation questions to elicit individuals' willingness to pay, an iterative bidding methodology was used. The actual **contingent valuation** questioning took two forms:

- a referendum-type question asking whether respondents' households were willing to pay an extra £0.25 pa reflecting the cost of implementing each of the three "do something" options presented, over and above the "do nothing/continue as now" option;

- iterative questioning on whether, and how willing, the respondents would be to pay increasing amounts for the same option, with an eleven point scale from –5 to +5 being used to determine their willingness/unwillingness to pay. If the individual was willing to pay (>0 on the scale) the amount to pay was increased over an 18 step price range from £0.25 to £1,000.

A pilot stage was also carried out to develop and refine the survey materials (i.e. questionnaire and flashcards) and to pilot and fine tune the contingent valuation methodology. The responses from the main study, together with information about the respondents' preferences and household characteristics, were analysed to determine the willingness to pay for each management option. The study was carried out over 1,100 respondents who were also asked about their interest in the environment to provide explanatory variables.

The contingent valuation survey found that 78% of those interviewed indicated they were prepared to pay at least £0.25 per annum to increase the level of biodiversity in remote forests.

Statistically there was very little difference by management option offered between those who were prepared to pay an additional £0.25 per annum and those who were not. The main reason given to justify their willingness to pay was conservation benefits to wildlife and bequest value, whilst the main reasons given to justify not being willing to pay were existing high taxes and a perceived inability to pay.

For each of the management options, incorporating differing proportions of each management standard, 50% of respondents were prepared to pay more than £2 for all three options, and more than £5 for the option offering the greatest biodiversity gains. Having eliminated illegitimate bids the unweighted mean willingness to pay for the existence value of biodiversity ranged from £21.41 to £28.64 per annum in household taxation. Eliminating the outliers (the 5% lowest and 5% highest bids) resulted in an overall mean willingness to pay of between £6.62 and £13.15 pa per household. This implies a sizeable consumer surplus, with willingness to pay far exceeding the cost of any of the options offered.

Modelling the results and a number of explanatory variables generated an overall R-squared value of 27-39%. Positive relationships were found between willingness to pay and household income levels, but no strong links were found with age and education, environmental activity/membership of environmental groups and geographic location.

A **contingent ranking** process asked individuals to make a discrete choice between the four woodland management plans (biodiversity scenarios) each with a specified cost representing a hypothetical household's annual tax contribution towards the given improvement in biodiversity. This methodology forces individuals to concentrate on biodiversity rather than substitute goods. The main contingent ranking survey was carried out over 648 respondents and the results were analysed using a logit-based discrete choice model. Again, respondents were asked about their interest in the environment so as to provide explanatory variables.

As with the contingent valuation exercise, a pilot study was carried out to develop and refine the survey materials and to pilot and fine tune the methodology. Over 90% of the respondents selected a preferred option that resulted in increased taxes and improved management for biodiversity. Two-thirds selected the no extra tax option as their least preferred option out of the four offered, confirming the results of the contingent valuation study of a high degree of willingness to pay for some improvement. The most popular management standard was the mid one of the three improved biodiversity options, which was perceived as giving good value for money, it providing increased biodiversity at a reasonable cost. For those respondents whose household income was known, suggested households were willing to pay an additional £0.19 to £0.52 per annum in household taxes for increased biodiversity. However this includes bids which tended to include an element of option value. The lowest amount households were willing to pay was for that option offering the greatest biodiversity benefits.

The untruncated willingness to pay results form the contingent valuation and contingent ranking approaches gave results in the same order of magnitude. Once the results are weighted and the outlying values removed the differences that emerge can be explained by the different context in which interviewees are making their responses. In the contingent ranking study, unlike the contingent valuation study, the respondents were offered more opportunity to make a trade-off between biodiversity and cost.

Fourth stage

The final stage of the study reassembled the earlier focus groups. It aimed to test and validate the results of the contingent ranking and contingent valuation methodology, as well as exploring the impact that greater information on biodiversity might have on perceptions of value. The discussion focussed on different management options and their value for biodiversity with prompting on cost and willingness to pay.

The selection of the mid-range options as preferred was found to be genuine. Although many of the respondents might have been considered "out of their depth", they would not prefer such trade-offs to be left to specialists. Whilst respondents still found it difficult to quantify how much they would be willing to pay for greater biodiversity, the majority claimed they were still willing to pay for such improvements; however they became more thoughtful when given the scenario of an additional £10 of new money to distribute between worthy causes. In addition, when information on particular species was conveyed, the desire for spending on biodiversity increased, suggesting that willingness to pay figures would have been higher had specific species been used to prompt respondents.

5. Policy relevant conclusions

People found it difficult to understand the difference between the existence value of biodiversity and the amenity and landscape values more associated with forests. They had not previously considered biodiversity an issue in Britain, but quickly appreciated and grasped the issues. There was support for the underlying principle that priorities needed to be changed to reflect biodiversity objectives, but accepted that decisions needed to be made which allowed the Forestry Commission to make a profit, the UK timber industry to prosper and jobs to be safeguarded.

Once people understood the issue of forest management, the contingent valuation and contingent ranking studies showed that 80% and 90% of respondents respectively were prepared to pay some additional taxes for improved management standards.

The aggregated and amended results of the contingent valuation and contingent ranking surveys, when extended to all the households in Britain and weighted to reflect the known population, range from £6.6 to £13.15 per household. These provide the most reliable range, but with no indication of which is really the preferred option; they are also known to include some amenity value and not to take account of declining marginal willingness to pay for an additional unit of each management standard. The annual costs of these forestry management standards for 300,000 hectares of remote forest estate range from £3.3 million to £5.1 million, and the benefit to cost ratios range from 23 to 70.