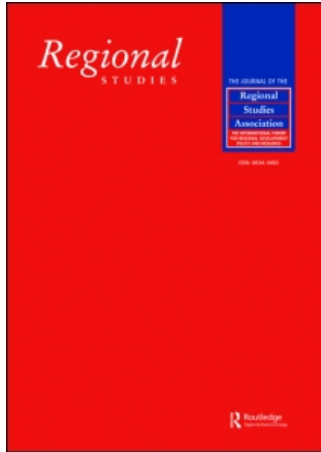


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# Non-users' Willingness to Pay for a National Park: An Application and Critique of the Contingent Valuation Method

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BATEMAN I. J. and LANGFORD I. H. (1997) Non-users' willingness to pay for a National Park: an application and critique of the contingent valuation method, *Reg. Studies* 31, 571–582. A great deal of the ongoing academic debate concerning the contingent valuation (CV) method has focused upon whether or not the method is suitable for assessing non-use values. This paper presents results from a study examining non-users' values for preserving the Norfolk Broads, a wetland area of recognized international importance, from the threat of saline flooding. Discussion of results centres upon the validity of the CV method for eliciting unbiased estimates of non-use value. A graphical representation of findings from a variety of studies is presented to suggest that such results are logically ordered across goods and valuation scenarios. However, as the paper concludes, logicity and validity are not necessarily synonymous.

Contingent valuation    Non-users    Willingness to pay    Norfolk Broads

BATEMAN I. J. et LANGFORD I. H. (1997) La volonté des non-usagers de payer les parcs nationaux: une application et une critique de la méthode de l'évaluation des contingents, *Reg. Studies* 31, 571–582. Beaucoup du débat académique en cours à propos de la méthode de l'évaluation des contingents a porté sur si, oui ou non, la méthode convient à l'estimation des valeurs qui se rapportent aux non-usagers. Cet article cherche à présenter des résultats qui proviennent d'une étude qui a examiné les valeurs aux non-usagers de préserver du risque de l'inondation saline les Norfolk Broads, des terres marécageuses de renommée et d'importance internationales. La discussion des résultats porte sur la validité de la méthode de l'évaluation des contingents comme moyen d'obtenir des estimations sans distorsion de la valeur aux non-usagers. A partir des graphiques, on présente des résultats qui proviennent des études diverses dans le but de proposer que de tels résultats sont organisés logiquement à travers des scénarios de produits et d'évaluations. Toujours est-il que, comme le démontre la conclusion, la logique et la validité ne sont pas nécessairement synonymes.

Evaluation des contingents    Non-usagers  
Volonté de payer    Norfolk Broads

BATEMAN I. J. und LANGFORD I. H. (1997) Die Bereitschaft von Nichtbenutzern, für einen Nationalpark zu zahlen: Anwendung und Kritik der Kontingenten Bewertungsmethode, *Reg. Studies* 31, 571–582. Die gegenwärtige akademische Debatte über die Kontingente Bewertungsmethode (Contingent Valuation CV) konzentriert sich weitgehend auf die Frage, ob die Methode sich zur Feststellung von Nichtnutzungswerten eignet. Der vorliegende Aufsatz stellt Ergebnisse einer Studie vor, die Nichtbenutzerwerte für die Bewahrung der Norfolk Broads, einem Feuchtgebiet von international anerkannter Bedeutung, vor der Bedrohung durch Überflutung mit Salzwasser zu bewahren. Im Mittelpunkt der Diskussion der Ergebnisse steht die Zuverlässigkeit der CV Methode zur Gewinnung unvoreingenommener Schätzungen des Nichtbenutzerwertes. Es wird eine graphische Darstellung von Befunden verschiedener Studien vorgelegt, die darauf schließen lassen, daß solche Ergebnisse über Güter- und Bewertungsszenarios hinweg logisch geordnet erscheinen. Wie der Aufsatz schlußfolgert, sind jedoch Logik und Zuverlässigkeit nicht unbedingt synonym.

Kontingente Bewertung    Nicht-Benutzung  
Bereitschaft, zu zahlen    Norfolk Broads

## INTRODUCTION

In a recent paper OATES, 1994, noted that over the past five years nearly 50% of applied economics papers in the major 'environmental economics' journals were concerned with 'valuing the environment' (or more correctly, valuing individuals' preferences for environmental goods). One of the most important consequences of this debate has been to broaden the focus of empirical attention across the plethora of value types that such goods generate. Theoretical work has attempted to accommodate this wider remit through more holistic definitions such as the 'total economic value' (TEV) concept of PEARCE and TURNER, 1990.

Cost benefit analysis (CBA) has for many years explicitly recognized value in use, both in direct purchase of the market priced goods derived from a resource and, more indirectly, from individuals' enjoyment of the non-market services provided. The ongoing option value debate has extended the definition of use values to include preferences regarding the potential future use of a resource. In addition to these use-based values, non-use values arise independently of an individual's use of the resource, from such motives as a desire to preserve such services for others (bequest or altruistic motives), or from a wish to maintain the biodiversity, habitat or other functions of the resource.

Fig. 1 divides TEV into these broad use/non-use categories and subdivides these into separate motivation-based values. Their sum tells us about how much humans value a particular resource. Such a definition clearly expands upon the market orientated approaches of many simple financial appraisals of projects. However, philosophers have argued that the total value of an environmental resource must exceed this if non-human entities (fauna and, some would argue, even flora) can hold values. Such intrinsic values are the subject of great intellectual debate (see REGAN, 1992). However, for the purposes of this paper we can restrict ourselves to the domain of human values as the basis for all practical decision making.

## THE CONTINGENT VALUATION METHOD

Fig. 1 also lists certain of the methods available to evaluate the various constituent parts of TEV. Market prices are, of course, only applicable to marketed goods although some indirect use values can be estimated by appealing to such prices through revealed preference approaches like the travel cost method. However, only expressed preference techniques, such as the contingent valuation (CV) method can, theoretically, evaluate both use and non-use values.

While CUMMINGS and HARRISON, 1995, accept that at least some individuals do hold non-use values,

they question both whether these will be any more than an insignificant part of TEV and whether any techniques, CV or otherwise, would be capable of measuring such values. Much of the criticism of the CV method, particularly with respect to non-use values, focuses upon the hypothetical nature of contingent markets. Critics argue that the answers obtained in hypothetical situations are subject to a variety of biases which make them invalid as valuations of the good in question (see, for example, DIAMOND and HAUSMAN, 1994; CUMMINGS *et al.*, 1995). However, CV techniques have many supporters who argue that many of these biases can be traced to inadequate survey design (see HANEMANN, 1994; SMITH, 1994).

CV assesses such values by creating a hypothetical market for the good in question and, most usually, asking respondents to state their willingness to pay (WTP) regarding differing levels of provision. Whilst subject to a variety of potential biases (BATEMAN and TURNER, 1993) proponents argue that these can be controlled for via careful study design (MITCHELL and CARSON, 1989). Such a view has been supported by tacit endorsement of the technique by the UK Department of the Environment (DOE, 1992) and explicit, if cautious, approval by the eminent members of a specially convened 'blue-ribbon' panel examining the CV method for the US National Oceanic and Atmospheric Administration (ARROW *et al.*, 1993).

Despite such support, there is still much debate over the application of CV techniques particularly with respect to the estimation of non-use values. However, in the literature to date, the evaluation of non-use (as well as use) values has been dominated by expressed preference techniques such as CV.<sup>1</sup> We have no preconception over who is right. Instead we present more evidence on the nature and practice of CV and comment upon its implications for this debate.

This paper extends our previous work regarding an on-site survey of visitors' WTP to preserve the Norfolk Broads from the threat of saline flooding (BATEMAN *et al.*, 1994). A CV study of non-visitors is presented and findings contrasted with those previously reported. However, at the outset we are presented with a definitional problem. Just as visitors can hold both use and non-use values, so can those surveyed away from the site. Those who are, at the time of survey, non-users may well value the preservation of Broadland even if they have no intention or desire to visit (i.e. non-use values). However, others of these respondents may have previously visited and/or value the possibility of future visits (i.e. direct, indirect and option use-values may be held). Given this, just as we cannot directly equate our on-site sample with the use value of the area, so we cannot say that off-site respondents represent only non-use values. Therefore we can only identify down to the level of values held by what are at the time of survey, *users* or *non-users*, and cannot separate out *use* and *non-use* value.

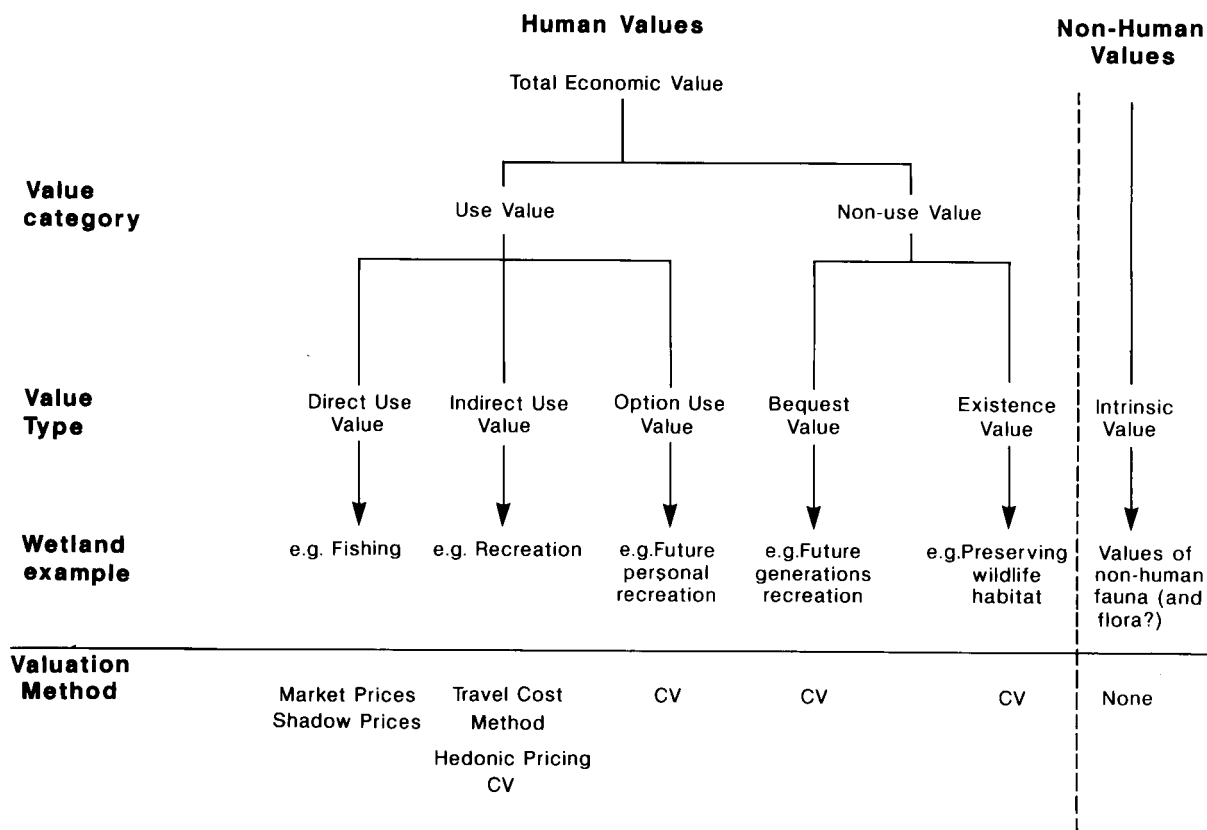


Fig. 1. The total economic value of a wetland

Source: Draws upon PEARCE and TURNER, 1990; BARBIER, 1991; and TURNER 1991.

### AN OVERVIEW OF THE PROBLEM AND PREVIOUS WORK

The Norfolk Broads is a site of recognized national and international wildlife importance. Recently accorded National Park status, most of the area is a designated Environmentally Sensitive Area (ESA), and contains 24 Sites of Special Scientific Interest and two sites notified under the international RAMSAR convention. The character of the low lying landscape of the Broads is dependent on 210 km of river embankments for protection from saline tidal water. However, these flood defences are increasingly at risk from failure, both because of their considerable age and ongoing erosion from passing river traffic and, more fundamentally, because of settlement and sinkage of the adjacent and underpinning marshes. Thus, the standard of flood protection afforded by these defences is decreasing over time. The consequences of increased saline flooding upon affected flora and fauna, recreation, agriculture, property and infrastructure are likely to be significant (NATIONAL RIVERS AUTHORITY (NRA), 1992a).<sup>2</sup> While full impacts may take up to 50 years to develop, short term flooding and considerable consequent damage is thought quite likely (NRA, 1991). Consequently in 1990 work was started upon a thorough CBA of schemes to alleviate the flood risk. Market priced items (particularly agriculture, property and infrastructure)

were dealt with conventionally while non-market recreational and environmental values were assessed via the CV study reported in this paper.

WTP results for the on-site survey of users values are summarized in Table 1.<sup>3</sup> These show that users held high values for the unflooded state of Broadland and associated recreational and environmental goods and services. Full details of the on-site study are provided in BATEMAN *et al.*, 1994.

### THE NON-USER STUDY

#### Design

*Overview.* The non-user survey was designed in consultation with analysts at the Flood Hazard Research Centre (Middlesex University) and in accordance with the acclaimed Total Design Method of DILLMAN,

Table 1. Willingness to pay (WTP) to preserve the Broads landscape: on site (users) survey (£, 1991 prices)

	WTP (£)
Mean WTP	76.74
Standard deviation	154.40
Median	50.00
Number of observations	756

1978. This supports the use of mail rather than telephone surveys of off-site samples on the grounds that respondents are somewhat resistant to the latter and may benefit from the extra thinking time permitted by the former.<sup>4</sup>

*Mail survey information provision.* Prior to answering the questionnaire, the mail survey interviewee had to be given some basic information concerning Broadland and the changes likely to take place in the absence of further defence investment in the region. The information provided was a précis of that used in the on-site interviews, the text being divided into various sections as follows:

- geographical location and extent
- existing landscape, ecology and recreational attributes
- present extent and condition of flood defences
- likely future impacts of flooding under a 'do-nothing' scenario
- the feasibility of flood alleviation.

The text was supported by a colour map (9X 10 cm) situated on the front page of the booklet. This detailed the extent and salient features of Broadland and defined the likely limits of flooding expected in the absence of further investment in river defences. A smaller inset map showed the relationship of Broadland to the rest of Britain. To add some interest, the section of text describing existing Broadland was supported by a small (13X 13 cm) black and white outline drawing showing hire cruisers on the river Thurne.

*The questionnaire.* Design and piloting of the mail questionnaire drew upon experience gained during the on-site survey (BATEMAN *et al.*, 1994) combined with advice from the sources listed above and a focus group discussion with a number of non-academic university staff. This process helped improve the clarity of information provided and reduced average completion times to about 15–20 minutes. The revised questionnaire was then mailed out in a package also containing a covering letter and a reply-paid envelope. The covering letter served a variety of purposes: it introduced the survey to respondents; provided a brief summary of the situation in Broadland (explained in greater detail in the questionnaire booklet); outlined the nature and purpose of the questionnaire; and guaranteed the confidentiality and anonymity of individual responses. Following the advice of DILLMAN, 1978, each covering letter was personally signed by the principal investigator.

#### *Sampling strategy and response*

*Sampling strategy.* The sampling strategy had two basic aims: (1) to detect any relationship between distance and stated value; for example, did WTP decline with

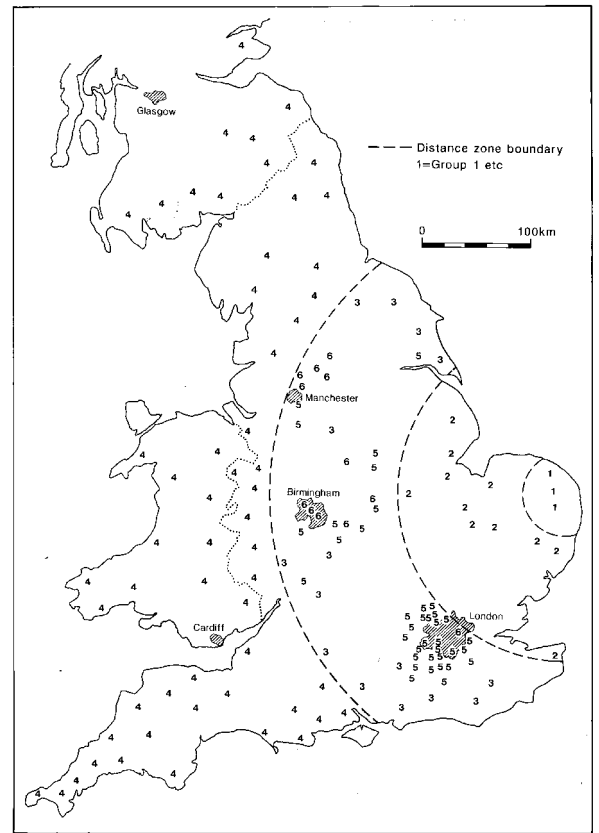


Fig. 2. Mail survey distance zones and survey address locations

distance of home residence away from the Broads; and (2) to detect any socio-economic valuation gradient, i.e. did WTP alter across social class, income, and/or other socio-economic characteristics.

By analysing these two factors it was hoped that a defensible aggregation across Great Britain might be achieved.

In order to elicit a suitable sample for distance-decay analysis, a number of concentric zones centred upon Broadland were defined (Fig. 2). The first and central zone consisted of a circular area of 40 km radius, centred on and encompassing all of Broadland and its immediate environs. Due to concerns regarding likely response rates, subsequent distance bands were of greater width, zone 2 being roughly 110 km wide (comprising the remainder of East Anglia, Lincolnshire, north east London and the north Kent coast), as was zone 3 (comprising Yorkshire, Manchester, the Midlands, Home Counties, the remainder of London and the South Coast), with a final zone comprising the remainder of England, all of Wales and Scotland up to the southern edge of the Highlands. It was decided not to survey beyond the confines of Great Britain although in theory non-use values should not be confined by national boundaries.

Having identified the different distance zones, the next stage was to control for socio-economic variance

within the distance-decay analysis by identifying populations in each of the zones with similar socio-economic characteristics. This selection process was based upon work by CRAIG, 1985. In this the 459 local authorities in Great Britain (metropolitan and non-metropolitan districts, London boroughs, Scottish regional districts and island areas) are divided into 10 classes based upon socio-economic characteristics identified in the 1981 census. These characteristics included factors concerning demographic structure, household composition, housing and employment. On this basis Broadland district (which dominates zone 1) falls within class 2A: More Rural Areas. Therefore the distance-decay analysis sampled all 89 of the local authority areas within this particular socio-economic class, across the four distance zones.

In order to analyse any socio-economic WTP gradient, in the third distance zone two additional, different socio-economic classes were selected for survey, namely all local authorities within the classes 1A: Established High Status Areas and 4A: Traditional Manufacturing Areas within this zone. Adopting the above approach results in six distinct groups of local authority being sampled, being the four constant socio-economic groups of zones 1 to 4 and the upper and lower socio-economic groups of zone 3. Table 2 summarizes this sampling strategy.

*Mailing out and survey response.* Within each of the six sample groups, 167 addresses were obtained by random selection from the postcode register. This resulted in a total mail-out of 1,002 questionnaires with two follow up mail-outs to non-respondents being undertaken subsequently. Response numbers declined from 184 received from the first mail-out, to 79 from the second and 46 from the third. From this it would appear likely that the response to a fourth mailing would have been minimal.

A total of 344 responses were received which represents an overall response rate of 34%. However, a number of these were not usable, primarily because respondents had not fully completed the questionnaire, although a few others had removed their serial number so that the sample group could not be identified. In total 34 non-usable responses were received, leaving a

Table 2. Sampling strategy

Sample group identification label	Distance zone <sup>1</sup>	Socio-economic class of area <sup>2</sup>
1M	1	Middle (2A)
2M	2	Middle (2A)
3M	3	Middle (2A)
4M	4	Middle (2A)
3U	3	Upper (1A)
3L	3	Lower (4A)

Notes: 1. Zone 1 = central (Broadland) distance band; zone 4 = most distant band.

2. Brackets denote classification from CRAIG, 1985.

Table 3. Response rate by sample group

Sample group identification label <sup>1</sup>	No. of usable responses	Group response rate (%) <sup>2</sup>	Proportion of total usable responses (%)
1M	58	34.7	18.7
2M	66	39.5	21.3
3M	59	35.3	19.0
4M	47	28.1	15.2
3U	52	31.1	16.8
3L	28	16.8	9.0
Group mean	52	30.9	16.7
Total	310	—	100.0

Notes: 1. See Table 2 for definitions of groups.

2. 167 questionnaires mailed out to each sample group (total mail out = 1,002).

total of 310 usable responses.<sup>5</sup> Table 3 details response rates by sample group.

Analysis of Table 3 reveals some interesting trends. Considering the distance dimension by holding socio-economic class constant (i.e. ignoring groups 3U and 3L), tests showed no significant difference in response rates across the first three distance zones although the lower rate in zone 4 was weakly significant ( $p < 0.1$ ). However, response rates from group 3L (lower social class) were very significantly different ( $p < 0.01$ ) from either of the other socio-economic groups in the same distance band (3M and 3L), indicating that socio-economic characteristics may be having a substantial effect upon the decision to respond here.

#### Respondents' characteristics

The questionnaire elicited a variety of details regarding respondents' experience of visiting Broadland, their age, income, and recreational interests and expenditure. These questions were asked both to answer specific queries (for example, what proportion of respondents were users; i.e. could the survey be deemed to be representing non-users) and to provide validation data, both generally and with specific reference to WTP responses. A further issue to be addressed was the extent to which respondents could be said to be representative of a wider population.

*Age and income distribution.* Comparison with statistics for Britain as a whole (CENTRAL STATISTICAL OFFICE, 1994) showed that our sample age structure was statistically similar to that of the general adult population. However, tests showed that our sample enjoyed a significantly higher income distribution than the national average indicating that, in this important respect, our sample is not representative of the rest of Britain.

*Recreational interests, experience and expenditure.* In answering questions regarding their recreational interests, respondents indicated that, on average, they regularly participated in many of the activities which typify

Table 4. Household visitation experience of Broadland by distance zone<sup>1</sup>

Distance zone	Day visits			All
	only	Holidays <sup>2</sup>	Never	
1	55.2 (32)	39.7 (23)	5.2 (3)	100.0 (58)
2	34.9 (23)	37.9 (25)	27.3 (18)	100.0 (66)
3	15.8 (22)	38.1 (53)	46.0 (64)	100.0 (139)
4	10.6 (5)	36.2 (17)	53.2 (25)	100.0 (47)
All	26.5 (82)	38.1 (118)	35.5 (110)	100.0 (310)

Notes: 1. Upper value in each cell shows the row (zone) percentage; lower value (in brackets) details respondent count.

2. Some of these households had also experienced day visits, however such respondents are not counted in the 'day visits only' column.

recreation in the Broads (boating, walking, enjoying nature, etc.). Rates of membership of related organizations were also high. These statistics indicate that survey responses are likely to be biased towards relevant user groups.

Turning to consider visitation experience, 26.5% of respondents had visited the Norfolk Broads for at least one day trip while a further 38.1% had taken at least one holiday (of at least one night's duration) in Broadland. These are large percentages which indicate a strong response bias towards users (and justify our concerns regarding subsequent WTP results being labelled as estimates of non-use value).

The geographical distribution of these holidaymakers was remarkably consistent, ranging only from 39.7% of respondents in the nearest distance band to 36.2% in the farthest. Again, this reflects the selective return of questionnaires by those who have had a holiday on the Broads as the proportion of users within each zone would be expected to fall significantly with distance. For day trips, there was a clear distance effect upon response rates, falling from 55.2% for the central zone to 34.9% for zone 2 and dropping off to 15.8% and 10.6% for zones 3 and 4 respectively. Consequently the residual number of respondents with no visitation experience declines consistently across distance zones as detailed in Table 4. Chi-squared analysis confirmed the strong significance of these relationships ( $p < 0.0001$ ).

Turning to consider recreation expenditure, the upper class group (3U) was shown to have a significantly higher holiday rate (46.2%) than others. As per WILLIS and GARROD, 1993, all respondents were asked to state how much they spent annually upon countryside recreation and preservation. This question was asked both to elicit information on the level of expenditure (mean = £265 p.a.; s.d. = £280, i.e. a skewed distribution) and, more importantly, to address the problem of 'budget constraint bias' (MITCHELL

and CARSON, 1989) wherein respondents fail to take into account their existing levels of relevant financial commitment prior to answering a WTP question.

*Respondents' characteristics: summary.* Two major conclusions can be drawn from this data. Firstly, our sample of respondents is not representative of the wider British populace. While it has a roughly similar age structure, it has a significantly higher income. Secondly, our sample is strongly biased towards those with interests in the type of recreation offered in the Broads and towards members of countryside groups. This self-selection is most obvious in the very high numbers of respondents who have visited the Broads either for day trips or holidays. This latter point reinforces our opening comments with respect to this being a survey of those who were, at the time of interview, non-users, but who have been in the past (or may be in the future) users of Broadland. Such conclusions do not invalidate the findings of this survey as such individuals do genuinely value the preservation of the area. However, they do highlight the error of equating off-site mail survey findings with the non-use value of this, or any similar, resource.

#### Willingness to pay results

The following aspects of respondents' WTP for flood defences in Broadland were analysed:

1. All respondents were asked whether or not they were prepared to pay at least some amount (the 'payment principle' question)
2. Those who responded positively to (1) were asked to state: (a) the maximum amount they would be WTP per annum (in response to an 'open-ended' question in which no amount was mentioned and any answer could be given); (b) how long they would be prepared to maintain such annual payments; and (c) the maximum amount they would be WTP as a once-and-for-all lump sum (again in response to an open-ended format question.)

Responses to these questions are analysed below.

*The payment principle.* As noted above, prior to any WTP question, respondents were asked whether or not they agreed with the principle of incurring extra personal taxes to pay for flood defences in Broadland. The main aim of this question was to validate refusals as it was felt that respondents presented directly with a request to state how much they would pay might feel either intimidated about stating a zero amount (and consequently state false positives) or conversely, offended at the presumption of some positive WTP (which might lead to 'protest' behaviour; see SAGOFF, 1988).

Of the 310 respondents, 166 (53.5%) answered positively to the payment principle question. Such

responses were significantly higher ( $p < 0.025$ ) in the Broadland zone (with an acceptance rate of 65.5%) than in more distant zones (acceptance rates of 48.5%, 47.5% and 48.9% in zones 2, 3 and 4 respectively). A number of other effects upon the likelihood of accepting the payment principle were identified including positive relationships with income and relevant recreational interests. The joint impact of these variables was analysed by modelling the discrete yes/no response to the payment principle question using a logit transformation (see MCCULLAGH and NELDER, 1989) where we define:

$$LOGIT(YES) = \ln \left[ \frac{\pi_i}{1 - \pi_i} \right]$$

where  $\pi_i$  = the probability of saying 'yes' to the payment principle question.

Equation (1) details our best model of payment principle responses. This model fits the data well with reported relationships as expected giving no reason for us to suspect the validity of our findings:

$$LOGIT(YES) = 0.379 - 0.866 DISTANT \quad (1)$$

$$\begin{aligned} & (0.16) \quad (2.59) \\ & + 0.602 FISH + 0.446 SOMEVIS \\ & (2.16) \quad (1.68) \\ & + 1.112 OFTVIS + 1.458 INCMID \\ & (2.23) \quad (2.81) \\ & + 1.924 INCHI \\ & (3.45) \end{aligned}$$

where:

- DISTANT* = 1 if respondent lives outside zone 1 (= 0 otherwise)
- FISH* = 1 if respondent participates in fishing at least occasionally (= 0 otherwise)
- SOMVIS* = 1 if respondent sometimes but not often visits the countryside for relaxation/scenery (= 0 otherwise)
- OFTVIS* = 1 if respondent often visits the countryside for relaxation/scenery (= 0 otherwise)
- INCMID* = 1 if household income is £10–30k per annum (= 0 otherwise)
- INCHI* = 1 if household income exceeds £30k per annum (= 0 otherwise)

scaled deviance = 378.89; df = 300; figures in brackets are *t*-values.

Those who refused the payment principle were asked to state their reasons for so doing. Major reasons included income constraints, existing tax commitments, intervening substitutes and a preference for the

Table 5. Mean WTP per annum by distance zone (payment principle refusals included as zeros)

Distance zone	No. of respondents	Mean WTP (£)	s.d.
1 (closest)	58	39.34	94.81
2	66	27.67	86.15
3	139	13.97	27.41
4 (furthest)	47	14.72	28.69
All	310	21.75	60.94

Table 6. Mean WTP per annum by visitation experience (payment principle refusals included as zeros)

Visit experience	No. of respondents	Mean WTP (£)	s.d.
Holiday	118	27.86	70.92
Day trip	82	25.65	77.37
Never visited	110	12.29	26.83

flooded state. Most importantly (from the view of study validity) very few respondents appear to have objected to the fundamental principle of valuing the preservation of Broadland.

*Willingness to pay per annum.* Those respondents who accepted the payment principle were asked to state the maximum amount of extra taxes they would be WTP per annum to ensure the preservation of Broadland from the effects of increased flooding. Including, as zeros, those respondents who refused the payment principle (i.e. those who stated they were not willing to pay to prevent flooding), this question elicited a whole-sample mean WTP of £23.29 per annum (95% CI: £17.53 to £32.45).<sup>6</sup> Table 5 decomposes these bids across our zonal distance variable, showing a marked decrease in mean WTP as distance from Broadland increases.

With the expected WTP-distance gradient established, analysis moved to attempt to determine further explanatory variables. Table 5 groups together all of the three socio-economic groups of zone 3 to produce a zonal mean WTP of £13.97. Decomposing this shows that mean WTP for the upper socio-economic group (3U) was somewhat higher (£18.62) than that of the other groups who had similar levels of mean WTP. However, as a result of the high variance of bids, the socio-economic gradient indicated by such a result failed to prove statistically significant.

Table 6 decomposes annual WTP bids across the various categories of visitation experience defined previously, showing that non-visitors have a substantially lower WTP than those who have visited the area.

While the means reported in Table 6 are logically ordered by visitation experience, the very high levels of bid variance in visitors' responses make this a statistically weak predictor of annual WTP response. Indeed WTP bids throughout the sample as a whole were highly



variable with a few relatively high bids resulting in a positively skewed distribution. To facilitate bid curve analysis, this skew was controlled for by modelling the natural logarithm of annual WTP bids:  $\ln(WTP_{pa})$ . However, analysis showed that there was little in the findings of the survey which adequately predicted the amount respondents were WTP. Our best fitting model is reported in equation (2):

$$\ln(WTP_{pa}) = 6.124 - 0.651 DISTANT + 0.183 BUDGET \quad (2)$$

(14.24) (2.93) (4.16)

where:

<i>DISTANT</i>	=	respondent lives in either distance zone 3 or 4
<i>BUDGET</i>	=	stated annual spending upon countryside recreation and preservation
<i>n</i>	=	166.
$R^2(\text{adj})$	=	13.4%
Figures in brackets are <i>t</i> -values		

The highly significant nature of the constant in equation (2) may suggest that respondents have a common conception of an appropriate WTP for the good under investigation. Discussion of this and other explanations is presented subsequently. Further testing of the model showed that, although the *DISTANT* variable was particularly robust, the predictive power of the *BUDGET* variable declined substantially when certain influential observations were removed, although the variable remained statistically significant and its value remained reasonably similar.

*Time span of commitment.* To some respondents, per annum WTP questions may seem somewhat vague in that they imply an open-ended commitment. In an effort to quantify relevant perceptions, immediately after the annual WTP question, respondents were asked to state over how many years they would be prepared to pay the amount specified. Responses to this question are detailed in Table 7.

Analysis of commitment responses indicated that

Table 7. Length of commitment to pay stated annual sum

Length of commitment (years)	No. of respondents	% of those asked
1	8	4.8
2-5	34	20.5
6-10	58	34.9
11-20	31	18.7
21-50	17	10.2
Lifetime	17	10.2
Don't know	1	0.6
Total	166	100.0

the modal group (10-year commitment; 57 responses) appeared to define a threshold attained in general by those with higher household incomes. A simple logit model was created relating commitments of 10 years and above (*COM10*) to respondent income as detailed in equation (3):

$$LOGIT(COM10) = 0.501 + 1.003 INCMID + 0.913 INCHI \quad (3)$$

(1.77) (2.23) (1.96)

Variables as previously defined.

Scaled deviance = 167.88; df = 151. Figures in brackets are *t*-values.

For simplicity, equation (3) uses the same income variables as previous and produces a model which fits the data well. *LOGIT(COM10)* was also negatively related to respondents being old, possibly indicating that they may be taking life expectancy into account when answering this question. However, collinearity with income prevented the inclusion of age variables in the above model and means that we have to be circumspect with respect to the life expectancy argument.

*Willingness to pay a lump sum.* All those who faced the annual payment question were then asked to state how much they would be WTP as a once-and-for-all lump sum for the same provision. Including payment principle refusals as zeros, this produced a mean WTP of £50.86. As before, the WTP was positively skewed and so responses were modelled using a natural logarithm transformation of the dependent variable:  $\ln(WTP_{lump})$ . The best fitting model contained the same explanatory variables as that for per annum bids and is reported as equation (4):

$$\ln(WTP_{lump}) = 3.797 - 0.633 DISTANT + 0.492 BUDGET \quad (4)$$

(5.28) (1.93) (6.65)

Variables as previous defined.

$n = 166$ . Figures in brackets are *t*-values.  $R^2(\text{adj}) = 23.1\%$

These relationships, and the performance of the model are similar to those of equation (2) and are discussed subsequently.

## DISCUSSION

Our mail survey has raised certain fundamental issues regarding the practical problems of eliciting non-use values for non-market public goods such as the Norfolk Broads. Considering the characteristics of our respondents, we can see, firstly, that there has been significant sample self-selection regarding the decision to complete

and return the questionnaire such that our sample is not representative of the British population either socio-economically (response rates from our lower socio-economic group were particularly poor) or in terms of visitation experience (a clear majority of the sample had visited the Broads at some time). Therefore our survey cannot easily be used to produce meaningful aggregation estimates.

This raises the fundamental question of how genuine non-use value may, in practice, be elicited; a question which our study only throws into sharper contrast. Nevertheless, these 'present non-users' do clearly value the preservation of assets such as Broadland and our study produces valuation results which are ordered logically in terms of relationships with distance from Broadland, visitation rate, interests and socio-economic factors. Such relationships can be interpreted as providing strong theoretical validation (MITCHELL and CARSON, 1989) for the responses elicited.

While not wishing to repudiate such a positive assessment of our findings, we would, however, recognize that the same results can be used to argue that WTP responses were, at best, very approximate estimates of values and, at worst, spurious guesses primarily motivated by a subconscious desire to support a 'good cause' irrespective of the particular good under evaluation (as per ANDREONI, 1990). Such an argument focuses upon the bid curves estimated for the per annum and lump sum WTP responses (equations (2) and (4) respectively). Both of these relate bids to the same two explanatory variables, *DISTANT* and *BUDGET*, a finding which would normally be considered supportive of overall validity. However, an alternative explanation can be constructed from the 'anchoring heuristic' proposed by TVERSKY and KAHNEMAN, 1974. Here a respondent who is uncertain about his true level of WTP may cast about for other sums which appear relevant to this, and use these as anchoring points from which WTP bids may be divined. An obvious starting point for such an operation is for the respondent to work from the *BUDGET* sum which he/she has specified just prior to the WTP question. Under such a rationale, the strong relationship between *BUDGET* and the WTP response is not, as economic theory might argue, a reflection of preferences (those with high *BUDGET* sums are interested in the countryside and therefore have a high WTP for Broadland), but due to the psychological impact of uncertainty in the survey process.

A second line of criticism, again linked to our estimated bid curves, concerns the low degree of overall explanation and high significance of the constant in both equation (2) and (4). While this could simply be indicative of omitted variables, a different interpretation is that this shows that respondents are not basing WTP sums purely upon their own circumstances and preferences, but are experiencing considerable uncertainty in answering and are therefore resorting to a

roughly common conception of a socially acceptable level of payment for such a good. Recent findings from focus group and verbal protocol approaches to CV as well as cross-study analyses suggest that respondents are strongly influenced by a notion of social fairness in determining WTP responses (SCHKADE and PAYNE, 1994; BATEMAN *et al.*, 1995).<sup>6</sup> The strength of the constant in these bid functions may therefore be reflecting the strength of this 'social norm' payment level across respondents from which the *DISTANT* and *BUDGET* variables are creating some individual level variance.

Similar conflict in interpretation can arise from comparison of the per annum and lump sum WTP bids elicited. Interestingly the mean of the latter is only just greater than twice that of the former, a result which implies an inordinately high discount rate. As before, conflicting explanations can be put forward. A 'pro-CV' interpretation is that, as respondents have a deep concern for Broadland, so they are WTP a large proportion of their annual countryside/recreation budget towards its preservation such that budget constraints quickly bind upon their attempt to convert this to a once-and-for-all payment. Here then the similarity between the two WTP means is indicative of respondents taking the questions seriously, weighing together all pertinent factors (such as relevant budget constraints) and answering as honestly as possible.<sup>7</sup> However, an 'anti-CV' view is that this apparent anomaly is further evidence of responses being anchored, here by both budget and annual WTP statements.

While these are interesting arguments, so long as respondents are genuinely prepared to pay the sums stated then, for practical policy purposes, their theoretical derivation is a purely academic question. Assuming this is so, we shall end on a positive note by noting the logicity of findings not only within our study but when they are compared with our prior on-site survey of users WTP for Broadland (BATEMAN *et al.*, 1994)<sup>8</sup> and a few other comparable studies. Table 8 lists per annum sums for these studies along with two columns describing, very subjectively, our own rating of two aspects of the good under evaluation. 'Substitutes' gives a rating of the number of similar substitute sites available. This ranges from a value of 1 for a site whose services have no ready substitutes (such as the unique boating facilities and landscape of Broadland) to a value of 10 for sites which have multiple substitutes (here represented by woodland walks). Similar, '△ Provision' is assessed on a scale from 1, which refers to small temporary changes in provision, to 10 which indicates major and permanent changes (such as the major saline inundation considered in the Broadland study). Both of these scales and the ratings given are the subjective assessment of the authors. However, while the absolute values used are meaningless, relative positionings are, we believe, defensible.

Considering Table 8, a first observation is the satis-

Table 8. *WTP per annum in comparable user and non user studies*

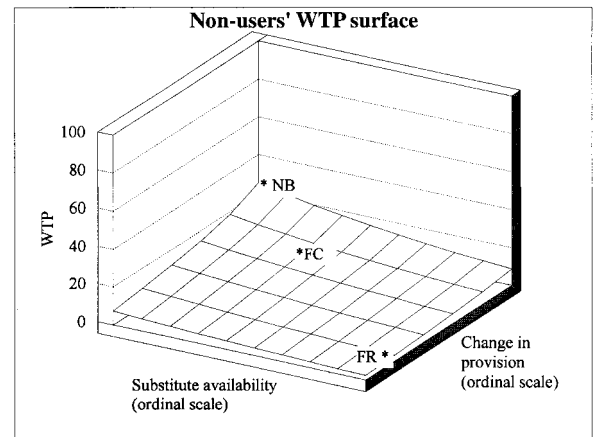
Study	Good	Study label	Sample size	Mean WTP (£ pa)	Substitutes	$\Delta$ Provision
<i>User surveys</i>						
BATEMAN <i>et al.</i> , 1994	Preservation of Norfolk Broads	NB	854	76.74	1	10
WILLIS and GARROD, 1993	Conservation of Yorkshire Dales	YD	1,288	24.56	3	7
PEARSON and BATEMAN (unpub.)	Cleaning up Rutland Water	RW	641	16.74	5	5
BATEMAN and LANGFORD, 1995	Woodland walks	WW	351	12.55	10	2
<i>Non-user surveys</i>						
This study	Preservation of Norfolk Broads	NB	310	23.29	1	10
HANLEY and CRAIG, 1991	Preventing afforestation of Flow Country	FC	58	12.15	4	7
BATEMAN <i>et al.</i> , 1996	Provision of forest recreation	FR	49	3.51	10	2

factory relationship between users and non-users' WTP for the two studies of Broadland, with the former being over 3.5 times larger than the latter. Given that those who had never visited Broadland had a mean WTP of roughly half that for the overall non-user sample, these relationships appear highly logical.

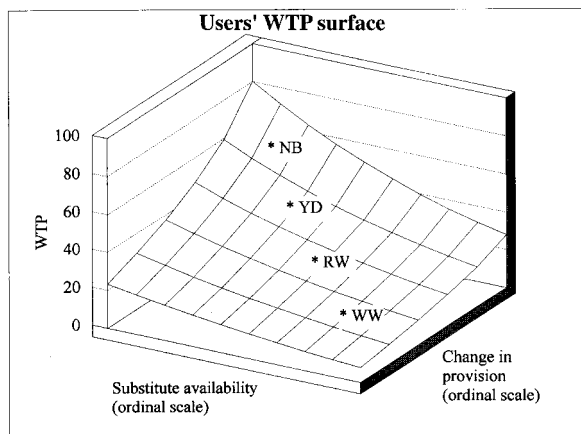
A second source of support for these findings arises from comparing these WTP results without our subjective 'substitutes' and ' $\Delta$  Provision' scores. We can see that for both user and non-user studies where there are few substitutes and large changes in provision, WTP sums are relatively high. Conversely the presence of many substitutes and small changes in provision are synonymous with low levels of WTP.

These relationships can be combined and illustrated as 'bid surfaces' as shown in Fig. 3 for user surveys and Fig. 4 for our non-user surveys. These figures use the study labels defined in Table 8 to plot mean WTP observations. The bid surfaces show that both user and non-user values rise with increasing change in provision and fall with increasing substitute availability. Furthermore the absolute level change in WTP between the user and non-user surfaces logically conveys the differing preferences of these two groups.

Such bid surfaces provide simplified illustrations of

Fig. 4. *Mean WTP bid surface for non-user surveys*

the concept of benefit transfer analyses. Here data are taken from a number of studies and analysed to show how evaluations vary according to site characteristics (see, for example, SMITH and KAORU, 1990; WALSH *et al.*, 1992). Such analyses examine the potential for extrapolating the findings of previous studies to other unsurveyed sites thus obviating the need for expensive and time consuming new surveys (see LOOMIS, 1992).

Fig. 3. *Mean WTP bid surface for user surveys*

## CONCLUSIONS

Our study has highlighted the extreme practical difficulties which face researchers attempting to estimate *non-use* value. Indeed, we stress that our study has failed to isolate such a value, instead eliciting the preferences of those who, at the time of survey, were *non-users*. Our findings suggest that even large scale mail surveys may be inherently incapable of teasing out such an ephemeral notion as *non-use* value. However, if, as current best practice guidelines dictate (ARROW *et al.*, 1993), large samples are considered a vital precondition for validity, such a conclusion seems to leave researchers with no clear way in which to address this issue.

That said, the values expressed by our sample do

appear to be significant and should, arguably, be considered by decision makers. In support of such a view, the apparent consistency and logicity of CV findings across user and non-user groups is encouraging for, while logicity is not of itself sufficient to prove validity, it is a very necessary precondition. However, a contrary position is adopted by critics such as YOUNG and ALLEN, 1986, or DIAMOND and HAUSMAN, 1994, who argue that, given the extent of controversy surrounding CV, then the argument that 'some number is better than no number' (*ibid.*) is invalid and dangerous. While not rejecting such a viewpoint we would note that on the basis of our 'conventional' CBA study (ignoring both users' and non-users' WTP) a flood alleviation scheme just fails the unity benefit–cost ratio test used by the relevant funding authority (ratio = 0.98; NRA, 1992b) while inclusion of CV estimates of the environment and recreational value of preservation makes such defence works clearly worthwhile (ratio = 1.94; *ibid.*). While we may question the precision of CV evaluations in cases like these, it may well be that some expression of at least the magnitude of values concerned is a useful input to the decision-making process.

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## NOTES

1. Note that LARSON, 1993, argues that indirect methods may also be applied to the measurement of non-use values.
2. Impacts upon flora and fauna include compositional changes and losses of water plants and zooplankton with consequent effects further up the food chain. Recreation impacts include aesthetic effects and the loss of downstream footpaths and moorings leading to increased congestion upstream. Agricultural effects include losses of pasture and crops while property and infrastructure would suffer direct flood damage.
3. The results presented in Table 1 derive from an open-ended WTP question. Results from other WTP elicitation formats are discussed in BATEMAN *et al.*, 1995a.
4. It is interesting to note that the NOAA report (ARROW *et al.*, 1993), which was published after this study was completed, while broadly supporting the CV method criticised the use of mail survey because of problems such as low response rates (see discussion).
5. This seems typical of UK mail survey CV studies: see, for example, the study by HANLEY and CRAIG, 1991, who report a 32% useable response rate.
6. Non-parametric confidence intervals for mean WTP were calculated using the BCa percentile bootstrap method (EFRON and TIBSHIRANI, 1993) using 999 simulations. This method is based on a refined normal approximation which corrects for bias and skewness in the distribution of mean WTP and is hence an improvement on the basic non-parametric bootstrap. This is of importance in cases such as this where sample WTP values are both skewed and truncated at zero. Standard tests for outliers were also carried out but failed to identify any substantially unusual observations. All observations were therefore included in our estimate of the mean.
7. The implication is that we should not immediately interpret once-and-for-all sums as discounted perpetuity benefit values.
8. This paper reviews a number of other user studies which, for clarity of exposition, have been omitted from Table 8. We recognize that the remaining studies are mainly those which we or colleagues at the University of Newcastle upon Tyne have conducted rather than being a cross section of UK work.

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