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Public attitudes and values for wetland conservation in New South Wales, Australia

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This study, modeled after a study conducted in the New England region of the United States, estimates a willingness-to-pay value and examines attitudes about wetland conservation in New South Wales, Australia. Respondents to a questionnaire survey indicated a median willingness-to-pay of A$100 (A$ = Australian dollars) (upper quartile = A$150, lower quartile = A$50) per household per year for 5 years and a mean of A$124·37 (95%CI = A$107·49–141·24). A conservative estimate of the aggregate value of wetlands in New South Wales, based on willingness-to-pay values reported by respondents and assuming that non-respondents are not willing to pay for wetland conservation, is A$38 million per year for the next 5 years. In absolute terms, willingness-to-pay in New South Wales was somewhat lower than that of New England, but when compared as a fraction of the gross domestic product for Australia and the United States, willingness-to-pay was slightly higher in New South Wales. Over 90% of respondents considered the intrinsic value of wetlands and the importance of conserving wetlands for future generations when answering questions about willingness-to-pay.

Keywords: conservation, non-use values, valuation, wetlands, willingness-to-pay, New England, New South Wales, Australia.

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Introduction

Estimates of a monetary value for wetlands and information about attitudes toward wetland conservation can be used in policy decisions. Both 'use' and 'non-use' values are associated with wetlands (Scodari, 1990). Use values include those resulting from direct use, such as production of timber and harvestable fish, and indirect use, such as flood control and water quality improvement. Krutilla (1967) introduced the concept of non-use values, such as intrinsic value and bequest value, which exist independently of any on-site or off-site use. Brown (1993) has argued that non-use values can be considerably higher than use values.

Many studies have focused on use values. For example, Chabreck (1979) reported the value of fur harvest from wetland species in the United States at over US$35 million (US$ = United States dollars) in 1975–1976, and Morton (1990) estimated the value of marketable fish in the mangrove habitat of Moreton Bay, Queensland, Australia, at A$8380 per hectare (A$ = Australian dollars), or, based on a currency exchange rate of A$1·3 = US$1·0, US$6446 per hectare. 'Scaling and weighting' approaches (Lonard *et al.*, 1981), 'common denominator' approaches (Odum, 1979), and 'replacement value' approaches (Mitsch and Gosselink, 1993) have been advocated for determination of relative and absolute values of wetlands and associated management options.

More recently, contingent valuation methods, which ask individuals about their priorities, preferences, and 'willingness-to-pay' in regard to specific issues (Cummings *et al.*, 1986), have been used to estimate both use and non-use values for various environmental commodities, including wetlands (Kopp, 1992; Stevens *et al.*, 1995). Contingent valuation studies also provide information about the public's impressions and

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opinions that might be useful in targeting education and public awareness programs or in shaping policy. As cost-benefit analysis becomes more important in environmental regulation (Portney, 1994), estimates of both use and non-use values of wetlands will become more important. For example, under US Department of the Interior regulations upheld by the DC Court of Appeals (State of Ohio vs. Department of Interior, 880 F. 2d 432 DC Cir. 1989), damages for loss of non-use values can be recovered through law suits (Stevens *et al.*, 1995).

Stevens *et al.* (1995) published results of a contingent valuation study that estimated values of wetlands in the New England region of the United States, including Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island and Vermont. Stevens *et al.* (1995) sent 2510 questionnaires to randomly selected New England residents. As the design of questionnaires may influence responses, Stevens *et al.* (1995) divided their sample into five groups of 502 residents each, and each group received slightly different versions of the questionnaire. Results suggested an average willingness-to-pay of US$74–115 per year for 5 years for wetland protection or conservation. In this paper, results are reported from a similar survey administered in New South Wales, Australia. To allow for comparison of results between New England in the United States and New South Wales in Australia, questionnaires administered in this study were based on those used by Stevens *et al.* (1995) with minor revisions in formatting and wording to match customary usage in Australia. Currently, dramatic differences exist between the level of Government mandated protection offered to wetlands in Australia and the United States (see Mossop, 1992; Mitsch and Gosselink, 1993; Finlay-Jones, 1997). Differences in public attitudes and values regarding wetlands may justify differences in Government laws and policies.

Methods

Questionnaires

Five questionnaire versions were adapted from those used by Stevens *et al.* (1995) in the New England region of the United States. Wording of the Stevens *et al.* (1995) questionnaires was altered to match Australian spelling and usage. All dollar amounts in questionnaires were changed to roughly equivalent Australian dollar values (based on early 1996 exchange rates). A few questions were changed to better fit the Australian socio-economic and cultural climate. For example, the willingness-to-pay question, which referred to a sales tax in the Stevens *et al.* (1995) questionnaires, was changed to refer to a 'special levy' because sales tax is not customarily used in Australia. Changes were limited to allow direct comparison of results between the Stevens *et al.* (1995) study and this study.

Each of the five questionnaire versions solicited opinions about wetland conservation issues as well as background information, such as age, sex, education and income. Each version asked respondents to rank the importance of saving four wetland types: (1) wetlands that provide recreation; (2) wetlands containing rare species of plants; (3) wetlands providing food such as shellfish; and (4) wetlands providing flood protection, water supply and water pollution control. Each version also asked a willingness-to-pay question within the framework of a potential special levy, or tax, assessed by local Government. For questionnaire version 1, the willingness-to-pay question was presented as follows:

> *'Suppose that a proposal is submitted to drain and fill the wetland type which you just selected [as the most important wetland to save]. This would make way for housing, commercial development and highways which would boost the local economy. However, this wetland type would be lost in your region. Please assume that a program is proposed to establish a special levy to be added to your local council rates, with the revenue earmarked for purchase and preservation of this wetland type. Suppose that this program would cost you $[seed value between A$10–500] each year for the next five years. Keeping in mind your household income and other financial commitments, and that similar wetlands will continue to exist elsewhere in NSW, would you vote in favour of this program? (Please circle one answer only.)*
>
> 1. *Yes. In fact I would vote to support this program even if it cost me up to $..... (Please write in the maximum amount you would pay.)*

Table 1. Summary of differences and similarities between questionnaire versions

	Questionnaire version				
	1	2	3	4	5
Conservation activity	Preserve	Preserve	Preserve	Preserve	Restore
Prompted on budget constraints	Yes	Yes	Yes	No	Yes
Wetland type	Type chosen by respondent	All	Rare plants	All	Type chosen by respondent

2. *No. I would not vote in favour of this program because the amount is too much. I would, however, vote to support this program if it cost me $..... (Please write in the maximum amount that you would pay.)*
3. *No. I would not vote in favour of this program because (please circle one):*
   i. *Wetlands are not worth anything to me.*
   ii. *I refuse to place a dollar value on wetlands.*
   iii. *I do not approve of the rates levy.*
   iv. *Other (Please specify): .....*
4. *I have no opinion because (please circle one):*
   i. *I don't really care about wetlands.*
   ii. *I can't make a decision without more information.*
   iii. *My opinion won't make any difference.*
   iv. *Other (please specify): .....'*

The willingness-to-pay question differed in different questionnaire versions in terms of: (1) the type of conservation activity that would be undertaken (preservation or restoration); (2) prompting about household budget constraints; and (3) the type of wetland that would benefit from the special levy (Table 1). Individual questionnaires contained a seed value that provided a starting point for the willingness-to-pay response. Seed values were randomly generated dollar amounts between A$10–500 in A$10 increments.

Mail survey

To administer questionnaires, a random sample of 1250 households was drawn from a database containing all households in New South Wales (Desktop Marketing Systems, Marketing Pro, October 1995). The first 1000 households in the sample were divided into five groups of 200 households and each group was assigned to one of the five questionnaire versions. The remaining 250 households from the original sample were used as replacements for invalid addresses within the five groups.

A total of three mailings was undertaken, generally following Dillman's (1978) method for mail surveys. The initial mailing, sent on 16 July 1996, contained a brief cover letter, a copy of the appropriate questionnaire version and a postage-paid return envelope. The cover letter explained the objectives of the study, stated that participation was voluntary, and assured participants that their responses would remain anonymous. On 9 August 1996, a reminder postcard was sent to non-respondents. On 4 September 1996, a final reminder letter, a replacement copy of the questionnaire and a replacement postage-paid return envelope were mailed.

Data management and analysis

As questionnaire responses arrived, data were entered into a Microsoft Access database. Narrative responses that expounded on a particular choice within the questionnaire or answered questions about why particular choices were made were grouped into categories that complemented standard response categories from the questionnaires. Data entry was discontinued on 16 October 1996, 13 weeks after the initial mailing and 6 weeks after the final mailing.

ANOVA and standard regression methods could not be used because willingness-to-pay values were not normally distributed, and neither removal of outliers nor transformations improved normality (Shapiro and Wilk W-test, $P<0{\cdot}01$ for all questionnaire versions) (Zar, 1984). As regression methods could not be used, consumer surplus and marginal

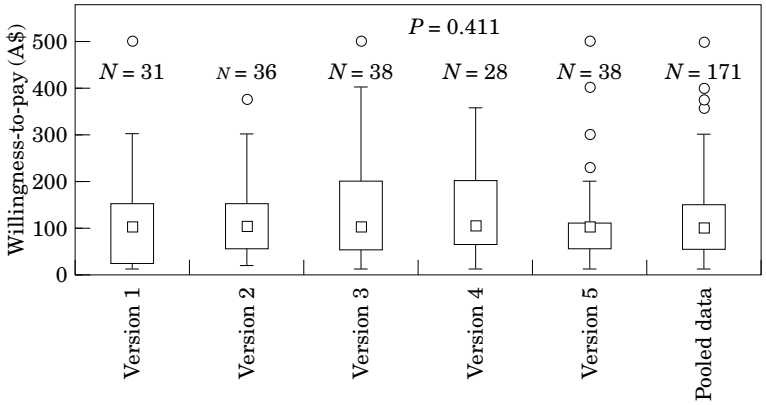

Figure 1. Median, first and third quartiles, and ranges of willingness-to-pay values for wetlands from five versions of a questionnaire. Open circles represent outliers. One extreme outlier (A$1000) from version 2 is not shown on the figure. Sample sizes are noted for each questionnaire version, and the *P*-value testing for differences between questionnaires is given (Kruskal-Wallis test).

values could not be estimated. Instead, Kruskal-Wallis tests were used to compare willingness-to-pay between questionnaire versions, reported attitudes about wetland conservation, reported rationales for assessment of willingness-to-pay values, reported sex and reported membership in a conservation organisation; where significant differences were detected for comparisons of more than two groups, additional Kruskal-Wallis pair-wise comparisons were used to identify specific differences. Spearman correlation analyses were used to assess the influence of seed values, age, income and education on willingness-to-pay values. All analyses were run on StatSoft's Statistica 4·5 for Windows.

Results and discussion

Survey outcome

The overall response rate was 36·9%, a rate typical of complex mail surveys (Mitchell and Carson, 1989). Male respondents accounted for 49·7% and female respondents accounted for 50.3% of all responses, closely matching the 50% division of males and females in New South Wales (Australian Bureau of Statistics, 1991). The mean age of respondents was 50 years, while the mean age of residents of New South Wales is 32 years (Australian Bureau of Statistics, 1991). The number of respondents holding university degrees was 31·4%, while only about 7·9% of residents in New South Wales hold degrees (Australian Bureau of Statistics, 1991). Discrepancies between demographics for respondents and those for New South Wales as a whole suggest that some caution should be exercised when interpreting results from this study. However, mail surveys are commonly biased because of non-response problems (Mitchell and Carson, 1989; Stone, 1992), and this in itself does not necessarily invalidate results, especially if they are considered in the context of the respondent population or in a relative sense against other mail surveys.

Many respondents did not answer all parts of the questionnaire, so sample size varied for different parts of the survey. Telephoned and written comments suggest that some respondents found specific questions intrusive, such as requests for information about income, and other questions confusing, such as the willingness-to-pay question and associated questions about the rationale for willingness-to-pay decisions. These comments may explain why some respondents failed to fully complete questionnaires.

Willingness-to-pay

The absence of a significant difference in willingness-to-pay between questionnaire versions (Kruskal-Wallis test, $P = 0{\cdot}411$) (Figure 1) suggests that provision of information on type of conservation activity, wetland type and household budget constraints (Table 1)

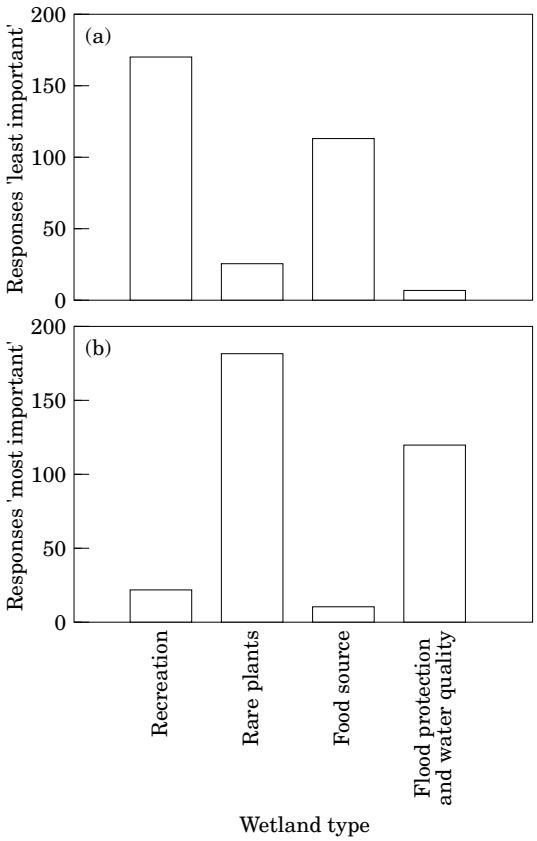

Figure 2. Results of a question asking respondents which type of wetland (or which wetland value) they would rank as (a) 'least important' and (b) 'most important' if they had to set priorities about conservation based on wetland type.

has little influence on willingness-to-pay. Although differences in questionnaire versions, which included differences in the type of wetland to be supported by the hypothetical special levy, did not appear to lead to differences in willingness-to-pay, there was a strong tendency among respondents to favor two of the wetland type categories; when asked to prioritise wetland types for protection, respondents favored 'wetlands containing rare species of plants' and 'wetlands which provide flood protection, water supply, and water pollution control' over 'wetlands which provide recreation' and 'wetlands which provide food' (Figure 2).

As there is no significant difference in willingness-to-pay between questionnaire versions, pooling of data from the five versions can be justified. For the pooled data, the median willingness-to-pay value was A$100·00, with a lower quartile of A$50 and an upper quartile of A$150. The mode for pooled data was also A$100·00. The mean was A$124·37 (SD = 111·78), with a 95% confidence interval of A$107·49–141·24. As responses were skewed to the right, the median value may provide a more representative estimate for the central tendency of willingness-to-pay values than the mean and confidence interval. However, the mean and confidence interval may be useful for comparison with estimates from other studies and in other regions.

A conservative willingness-to-pay value per household in New South Wales can be calculated by using the median value of A$100 per household from this study and assuming that all non-respondents to the willingness-to-pay question place no value on wetland conservation; this conservative willingness-to-pay value is about A$17·10 per household. This value can be multiplied by $2{\cdot}23 \times 10^6$, the total number of households in New South Wales (Australian Bureau of Statistics, 1993), to yield an estimated total aggregate value for wetlands in New South Wales. Based on these figures, it can be argued that over A$38 million should be spent each year for the next 5 years on wetland conservation in New South Wales.

The seed value, or suggested starting value that was inserted into each questionnaire's willingness-to-pay question, was significantly correlated with willingness-to-pay responses (Spearman rank correlation, $P<0{\cdot}0001$, $r_s = 0{\cdot}384$, $N = 171$), indicating the presence of starting point bias. Schulze *et al.* (1981) and others have also found that starting point bias influences willingness-to-pay values. As seed values impact willingness-to-pay responses, the use of a single seed value in a questionnaire survey could bias results. In this study, use of a range of randomly generated seed values prevents a systematic bias (i.e. a consistently upward or downward bias).

Attitudes toward wetlands and willingness-to-pay

The majority of respondents stated that wetland preservation was either very important or somewhat important (Figure 3). To assess willingness-to-pay among respondents with different attitudes about the importance of

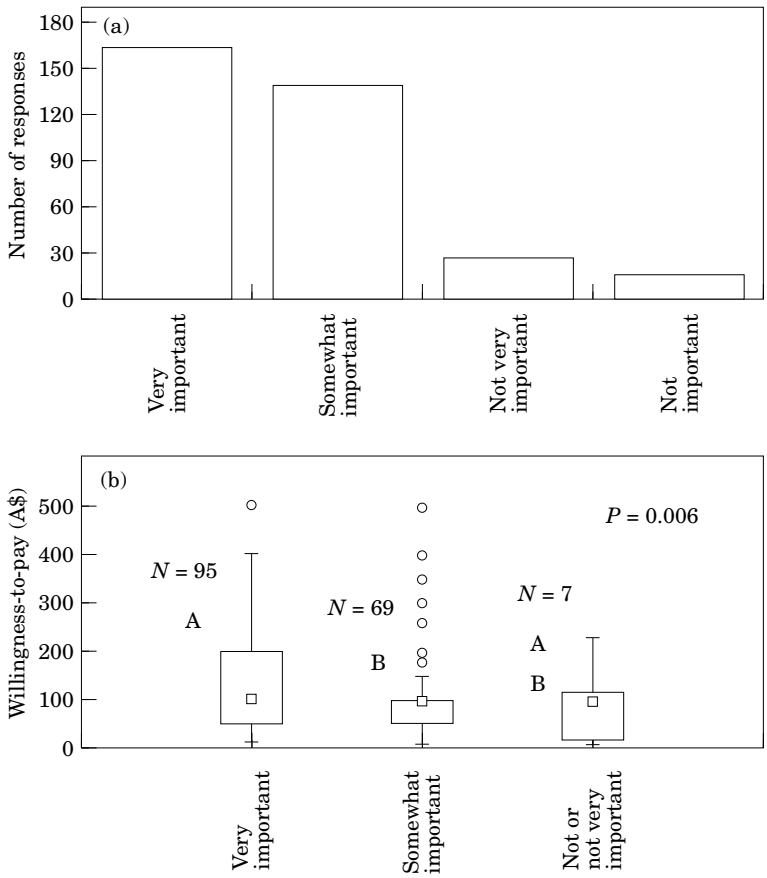

Figure 3. (a) Responses to the question 'How important is wetland preservation?' (b) Effect of response category on willingness-to-pay, with median, first and third quartiles, and ranges. 'Not important' and 'Not very important' were combined for this analysis. Open circles represent outliers. Sample sizes are noted for each response category. The *P*-value tests for overall differences in willingness-to-pay between categories (Kruskal-Wallis test). Different letters designate categories with significantly different ($P<0{\cdot}05$, pair-wise Kruskal-Wallis tests) willingness-to-pay values.

wetland preservation, the categories 'not important' and 'not very important' were combined. Among respondents who answered both the question about the importance of wetland preservation and provided a willingness-to-pay value, the willingness-to-pay value differed significantly among categories (Kruskal-Wallis, $P=0{\cdot}005$). Respondents who felt that wetland preservation was 'very important' gave significantly higher willingness-to-pay values than those who felt that preservation was only 'somewhat important.' However, there was no significant difference in willingness-to-pay between those answering 'very important' and 'not or not very important,' and there was no significant difference between those answering 'somewhat important' and those answering 'not or not very important.'

In considering the outcome of statistical tests, the importance of sample size on statistical power should be considered (Zar, 1984; Marks, 1990). Throughout this discussion, initial Kruskal-Wallis tests assessed differences between all groups and multiple pair-wise comparisons were used to assess differences between specific groups. In some cases, small sample sizes and subsequent low power may have led to counterintuitive results in pair-wise analyses. This explains why, in the questions about willingness-to-pay and the importance of wetland preservation, the 'very important' group gave significantly higher willingness-to-pay values than the 'somewhat important' group, while the 'very important' group was not significantly different from the 'not or not very important' group (Figure 3). In cases where

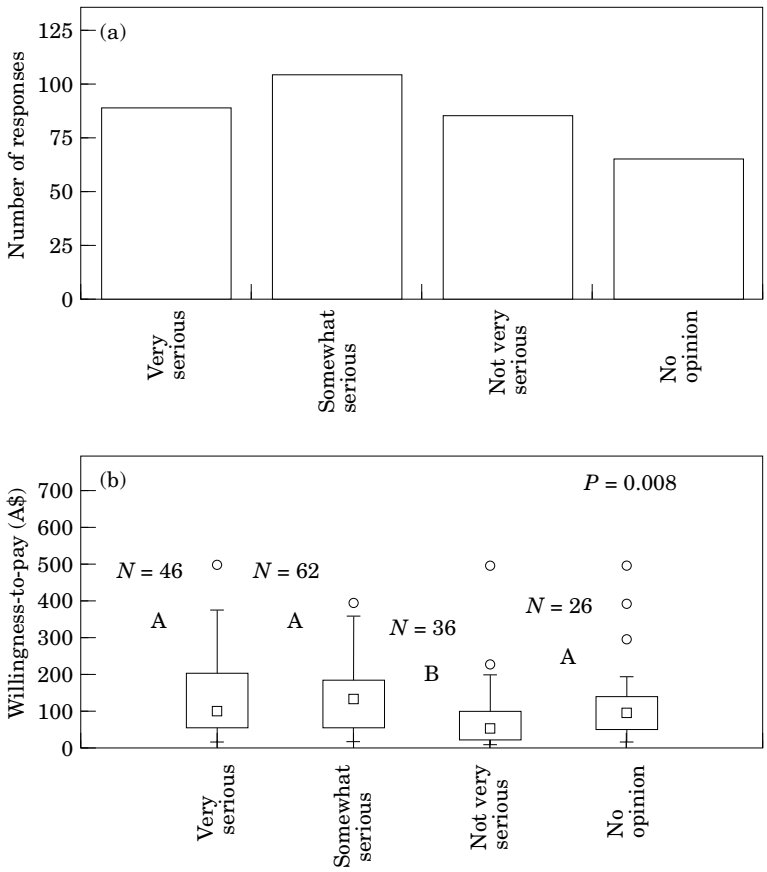

Figure 4. (a) Responses to the question 'Do you think that wetland drainage, filling, or other destruction is a serious problem?' (b) Effect of response category on willingness-to-pay, with median, first and third quartiles, and ranges. Open circles represent outliers. Sample sizes are noted for each response category. The *P*-value tests for overall differences in willingness-to-pay between categories (Kruskal-Wallis test). Different letters designate categories with significantly different ($P<0{\cdot}05$, pair-wise Kruskal-Wallis tests) willingness-to-pay values.

small sample size may affect statistical power, simple graphical comparison may offer better insight than statistical comparisons.

The majority of respondents stated that wetland drainage, filling, or other destruction is either a 'very serious' or a 'somewhat serious' problem (Figure 4). Among respondents who answered both the question about the seriousness of wetland loss as a problem and provided a willingness-to-pay value, the willingness-to-pay values significantly differed among categories (Kruskal-Wallis test, $P=0{\cdot}008$). Respondents who felt that drainage, filling, and other destruction were 'not very serious' gave lower willingness-to-pay values than those respondents who believed that it was a 'very serious' or 'somewhat serious' problem or who had 'no opinion.'

Most respondents believed that wetland destruction would probably cause a reduction in wildlife within the next 25 years (Figure 5). To assess willingness-to-pay among respondents with different beliefs about wildlife, the categories 'small chance' or 'very small chance' were combined. Among respondents who answered both the question about wildlife and provided a willingness-to-pay value, the willingness-to-pay value was significantly different among categories (Kruskal-Wallis test, $P=0{\cdot}005$). Respondents who believed that there was a 'very high chance' of wildlife loss gave higher willingness-to-pay values than those who believed that there was 'some chance' or a 'small or very small chance' of wildlife loss. There were no significant differences in willingness-to-pay between the 'no opinion' category and other categories.

The majority of respondents had no opinion about the strength of laws and regulations

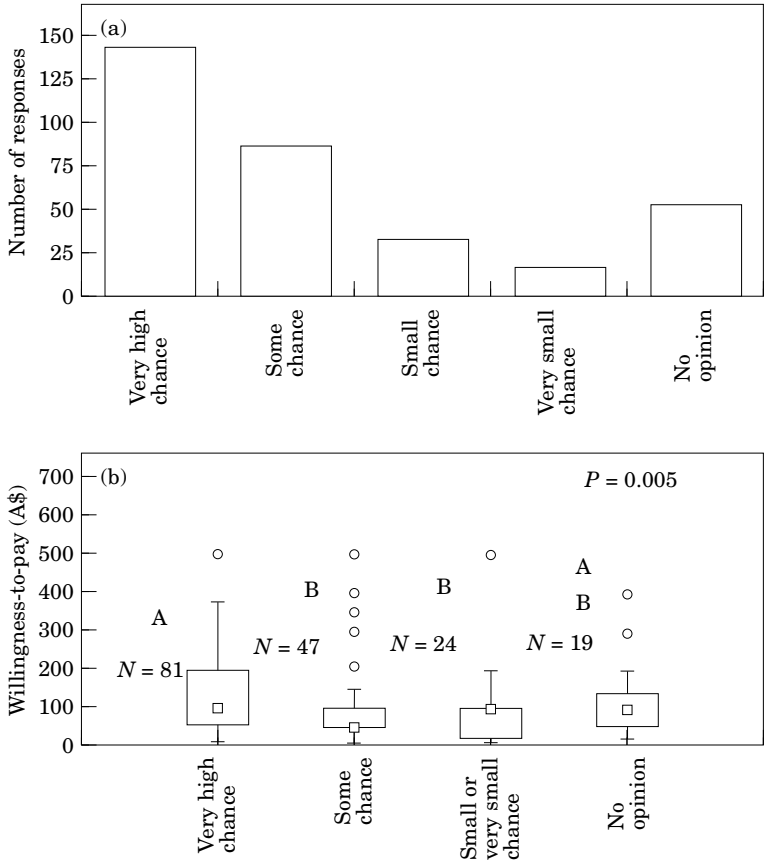

Figure 5. (a) Responses to the question 'What are the chances that wetland destruction will cause a reduction in wildlife within the next 25 years?' (b) Effect of response category on willingness-to-pay, with median, first and third quartiles, and ranges. 'Small chance' and 'Very small chance' were combined for this analysis. Open circles represent outliers. Sample sizes are noted for each response category. The *P*-value tests for overall differences in willingness-to-pay between categories (Kruskal-Wallis test). Different letters designate categories with significantly different ($P<0{\cdot}05$, pair-wise Kruskal-Wallis tests) willingness-to-pay values.

intended to protect wetlands, but among those respondents who reported an opinion most felt that laws and regulations had not gone far enough (Figure 6). Among respondents who answered both the question about legal issues and provided a willingness-to-pay value, there was no significant difference in willingness-to-pay values between categories stating different opinions about the strength of laws and regulations (Kruskal-Wallis test, $P=0{\cdot}246$).

Rationale for willingness-to-pay

'Future generations' and personal 'financial well-being' were the most frequently chosen rationales in determining a willingness-to-pay value (Figure 7). Among respondents who answered both the willingness-to-pay question and the question about their rationale, there were significant differences between categories (Kruskal-Wallis test, $P=0{\cdot}001$). Due to the relatively large number of categories, no single rationale can be associated with a high willingness-to-pay. However, the two categories that were most often cited as the rationale in determining willingness-to-pay, 'future generations' and 'financial well-being,' were among the categories with the lowest willingness-to-pay values.

In a separate question, respondents were asked why they would pay for wetland conservation. Over 90% of respondents answered 'benefit to future generations' and 'intrinsic

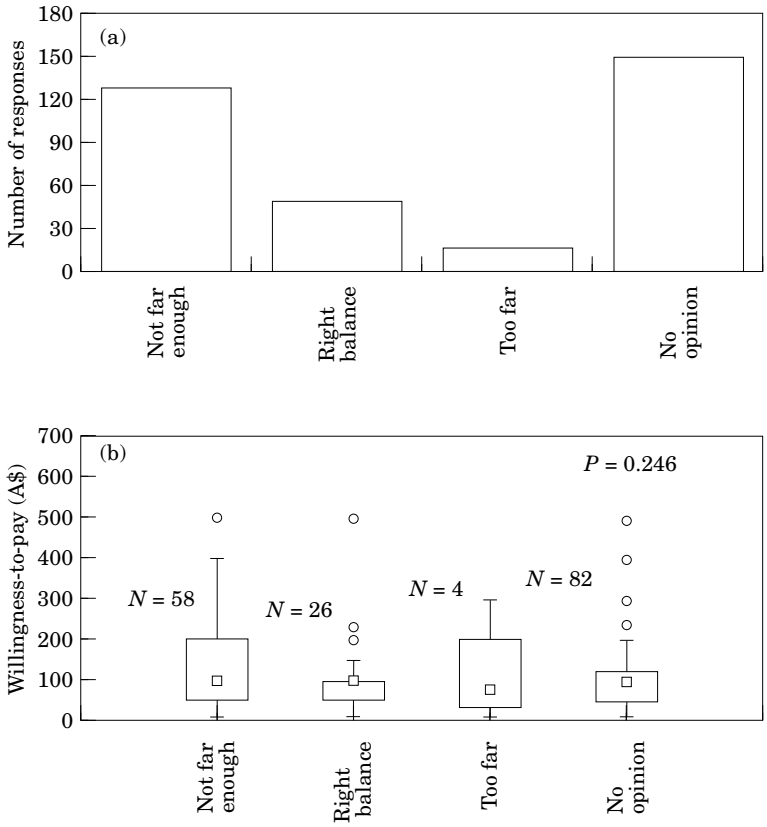

Figure 6. (a) Responses to the question 'Have laws protecting wetlands gone too far, not far enough, or struck the right balance?' (b) Effect of response category on willingness-to-pay, with median, first and third quartiles, and ranges. Open circles represent outliers. Sample sizes are noted for each response category. The *P*-value tests for overall differences in willingness-to-pay between categories (Kruskal-Wallis test).

value' (Figure 8), suggesting the importance of non-use values. In the questionnaires, the intrinsic value category was explained by the phrase 'should exist regardless of any benefit or harm to people.' To assess willingness-to-pay among respondents, the categories 'personal benefit and pleasure' and 'other people might benefit' were combined. There was no significant difference in willingness-to-pay among different categories of respondents (Kruskal-Wallis test, $P=0{\cdot}505$) (Figure 8).

Demographics and willingness-to-pay

Respondents were asked about their sex, membership in conservation organisations, age, income and education. There was no significant difference in willingness-to-pay between males and females (Kruskal-Wallis test, $P=0{\cdot}176$) or between people holding memberships in conservation organisations and those not holding memberships (Kruskal-Wallis test, $P=0{\cdot}063$). Similarly, there were no significant correlations between willingness-to-pay and age (Spearman rank correlation, $P=0{\cdot}181$, $N=166$), income (Spearman rank correlation, $P=0{\cdot}265$, $N=152$), or education (Spearman rank correlation, $P=0{\cdot}214$, $N=166$). The absence of relationships between willingness-to-pay and these basic demographic variables suggests that there are no clear segments of the population that are prepared to pay more for wetlands than other segments.

Comparison with Stevens et al. *(1995)*

The Stevens *et al.* (1995) study in the New England region of the United States and this study used almost identical questionnaires

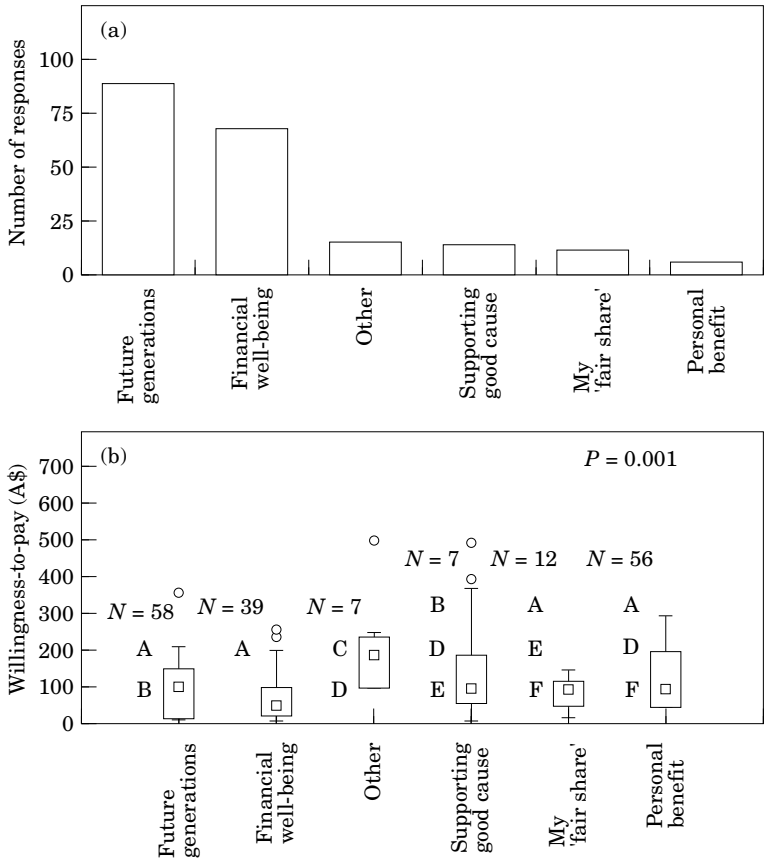

Figure 7. (a) Responses to the question 'What did you consider in deciding how much to pay for wetland conservation?' (b) Effect of response category on willingness-to-pay, with median, first and third quartiles, and ranges. Open circles represent outliers. Sample sizes are noted for each response category. The *P*-value tests for overall differences in willingness-to-pay between categories (Kruskal-Wallis test). Different letters designate categories with significantly different ($P<0{\cdot}05$, pair-wise Kruskal-Wallis tests) willingness-to-pay values.

and methods for administering questionnaires. Also, response rates (34 and 36·9%, respectively) and response bias for age (median age of respondents 44 and 47 years, respectively) and education (43 and 31% college degree holders, respectively) were similar in both studies. Table 2 provides a summary comparison for various parts of the questionnaire survey. In general, results were remarkably similar. In both studies, respondents were clearly concerned about wetland conservation. In both studies, the majority of respondents stated that they considered non-use values when deciding to pay for wetland conservation. Australian and American respondents were about equally likely to feel that wetland laws had gone too far, despite the absence of wetland laws in Australia that are as strong as Section 404 of the Clean Water Act in the United States. One difference between the two data sets was the tendency among Stevens *et al.* (1995) respondents to prioritise preservation of wetlands offering flood protection and water quality benefits over wetlands with rare plant species; results from New South Wales showed prioritisation of preservation for wetlands with rare plant species.

The Stevens *et al.* (1995) study reported that the average respondent's willingness-to-pay for all wetland types was US$114, while this study indicates an average willingness-to-pay of A$124·37, or US$95·66, with a 95% confidence interval of US$82·68–108·64. Means and confidence intervals should be interpreted with the realisation that willingness-to-pay values may be skewed to the right. The median value for this study, A$100, or US$77, may provide a more realistic description of central tendency for New South

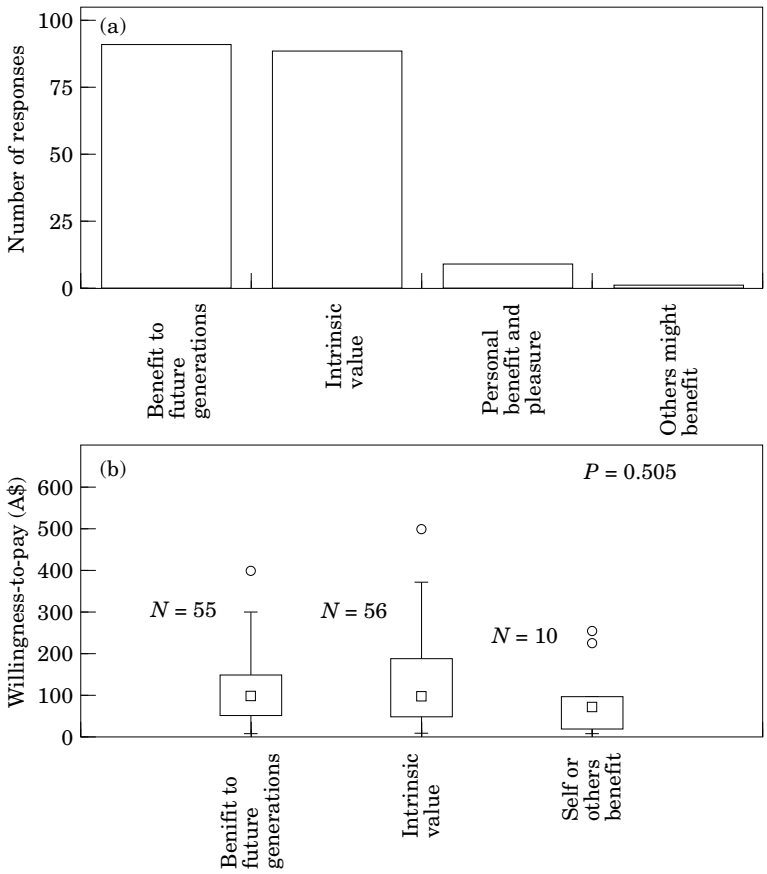

Figure 8. (a) Responses to the question 'Why would you pay for wetland conservation?' (b) Effect of response category on willingness-to-pay, with median, first and third quartiles, and ranges. 'Personal benefit and pleasure' and 'Others might benefit' were combined into 'Self or others might benefit' for this analysis. Open circles represent outliers. Sample sizes are noted for each response category. The *P*-value tests for overall differences in willingness-to-pay between categories (Kruskal-Wallis test).

Wales. Thus, while the values from the Stevens *et al.* (1995) study are somewhat higher than those from this study, they are comparable.

Differences between the economies of the two countries justify a comparison based on a percentage of the per capita gross domestic product rather than on absolute dollar values. The per capita domestic products for the United States and Australia are US$27 607 and US$20 514, respectively, based on statistics presented in Famighetti (1997). Thus, average willingness-to-pay in the Stevens *et al.* (1995) study was about 0·41% of the per capita gross domestic product for the United States, while the average willingness-to-pay in this study was about 0·47% of the per capita gross domestic product for Australia. Again, values from the two studies are comparable.

Questionnaire version did not significantly impact willingness-to-pay in either study, while seed values, which were randomly generated and assigned in both studies, significantly impacted willingness-to-pay in both studies. Respondents who believed that wetland preservation is important gave significantly higher willingness-to-pay values in both studies. In the Stevens *et al.* (1995) study, willingness-to-pay was significantly impacted by membership in conservation organisations, age, income and education, none of which significantly impacted willingness-to-pay in this study. Differences in sample size and analytical methods may account for some of the differences in significance of

Table 2. Comparison of Stevens *et al*. (1995) and this study.

Question	Summary of responses	
	New England, USA (Stevens *et al*., 1995)[a]	New South Wales, Australia (this study)
How important is wetland preservation?	10% not important	10% not or not very important
Do you think that wetland drainage, filling, or other destruction is a serious problem?	55% serious problem	50% serious problem
What are the chances that wetland destruction will cause a reduction in wildlife in the next 25 years?	79% agree that there is at least some chance	78% agree that there is at least some chance
Have laws protecting wetlands gone too far, not far enough, or struck the right balance?	11% say laws have gone too far	9% say laws have gone too far
Which types of wetlands should be preserved?	48% flood protection and water quality, 38% rare plants, 9% recreation, 4% food source	36% flood protection and water quality, 55% rare plants, 6% recreation, 3% food source
Why would you pay for wetland conservation?	54% future generations, 35% intrinsic value, 11% self or others may benefit	47% future generations, 46% intrinsic value, 6% self or others may benefit
What did you consider in deciding how much to pay for wetland conservation?	50% future generations, 21% financial well-being, 10% 'fair share,' 7% personal benefit, 5% supporting good cause	43% future generations, 33% financial well-being, 6% 'fair share,' 4% personal benefit, 7% supporting good cause

Respondents who did not state an opinion about the question are not included in percentage estimates.
[a]Some data are from Benin (1993), a Master's thesis presenting detailed information about the Stevens *et al*. (1995) study.

various factors on willingness-to-pay in the two studies.

Conclusions

Information from this study may be useful in developing public awareness programs. For example, based on the absence of a strong relationship between demographic variables and willingness-to-pay in this study, there may be little point in targeting wetland education toward specific segments of society. Also, the large number of respondents who had no opinion about wetland laws suggests that these laws are not widely understood and that there may be a need for a public awareness program regarding these laws. The large number of respondents who considered future generations and intrinsic values suggests that the public considers non-use values to be important; in public relations activities for wetland projects, which typically emphasise use values of wetlands, the importance of non-use values should not be overlooked.

Information about the value of wetlands can be important in wetland management decisions in Australia, as recently noted by Morrison and Kingsford (1997). However, results from this study should not be blindly accepted or considered in isolation. Australian decision makers are wary of valuation studies because of criticism resulting from the Resource Assessment Commission's use of valuation methods to assess environmental damage that would result from mining in the Kakadu Conservation Zone (Morrison *et al*., 1996). In Australia, the continuing need for information about the value of environmental commodities, coupled with disillusionment regarding commonly used valuation methods, has spawned interest in approaches such as contingent rating, contingent ranking, paired comparison and choice modeling (Morrison *et al*., 1996). In light of misgivings about

contingent valuation methods and development of other approaches, how can the willingness-to-pay values from this study be used? They can provide policy makers with input that should be considered along with other estimates, such as those by Bennett *et al.* (1997) and Gerrans (1994), which suggest values of A$39 and A$33 per household per year, respectively, for wetlands in South Australia and Western Australia. Also, results from this study underscore the need to consider non-use values in policy decisions and wetland management.

Public attitudes and values for wetlands are similar in New England in the United States and New South Wales in Australia, but Government mandated wetland conservation is considerably weaker in New South Wales. Differences between the two regions' wetland protection laws and policies cannot be explained by differences in public attitudes and values. In short, the New South Wales respondents' support of wetland conservation suggests that Australian Government initiatives for wetland conservation, such as Government wetland policies (e.g. New South Wales Department of Land and Water Conservation, 1996; Biodiversity Group of Environment Australia, 1997) and strong involvement in the Ramsar convention (Finlay-Jones, 1997), reflect the wishes of the public but may not go far enough.

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