Asymmetries in Ordered Strength of Preference Models: Implications of Focus Shift for Discrete-Choice Preference Estimation

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ABSTRACT. *This paper explores potential focus shift asymmetries in an ordered strength of preference model applied to contingent choice data. A focus shift occurs when respondents weight factors differently when assessing preference for an "accepted" scenario than they do when assessing preference for a "rejected" scenario, and may imply that respondents do not refer to a single underlying preference function. Using data drawn from a survey which addressed preferences for watershed management, the model results identified focus shift asymmetries in the ordered strength of preference model. The paper discusses implications for policy, survey design, and discrete-choice preference estimation.* (JEL Q26)

I. INTRODUCTION

In contingent valuation studies, researchers often favor the dichotomous-choice format for its simplicity and familiarity to respondents (Mitchell and Carson 1989; Hanemann 1985; Arrow et al. 1993). The dichotomous format asks respondents to choose between two policy or environmental options, each with different levels of environmental and payment characteristics. For example, the respondent may be asked to accept an environmental improvement package along with an increase in taxes, or reject the package and retain the status quo (Swallow et al. 1996). A closely related variant of the dichotomous-choice format is the trichotomous-choice format, in which respondents choose among three categories (i.e., accept, neutral, reject) (Svento 1993).

Although both dichotomous- and trichotomous-choice questions present a simple choice framework to respondents, this simplicity comes at the cost of reduced information efficiency—answers to such questions yield less information per response than do answers to open-ended CVM questions (Mackenzie 1993). Various methods have been used to recover some of this efficiency, while retaining desirable features of the dichotomous-choice format. Options include iterative bidding (Randall, Ives, and Eastman 1974) and double-bounded discrete-choice formats (Hanemann, Loomis, and Kanninen 1991). However, such methods may generate starting-point biases, as respondents may anchor subsequent responses to iterative questions on values provided in prior iterations (Mitchell and Carson 1989; Swallow, Opaluch, and Weaver 1997). Such formats also provide a more complex choice framework, at least partially negating the primary advantage of the discrete-choice format.

An alternate means to capture information efficiency in contingent choice surveys takes advantage of respondents' ability and desire to indicate strength of preference information (Mackenzie 1993; Johnson and Desvousges 1997; Swallow, Opaluch, and Weaver 1997). Strength of preference elicitation allows respondents to first choose the preferred policy option, then choose their strength of preference for that option over the non-preferred option. Strength of preference indicators may take a form such as "strongly preferred," "moderately preferred," "slightly preferred" for a chosen option, or "strongly rejected," "moderately rejected," "slightly

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The authors are, respectively, research assistant professor and associate professor in the Department of Environmental and Natural Resource Economics, University of Rhode Island. The authors would like to thank Jim Opaluch for valuable observations on early drafts of the manuscript, and two anonymous reviewers for detailed and helpful comments. Any remaining errors or omissions are the sole responsibility of the authors. This research was funded by U.S. Geological Survey Award #14-08-G2088, U.S. EPA Grant #R824709-01-0, and the Rhode Island Agricultural Experiment Station, AES #3608.

rejected'' for a rejected option. Responses may be modeled as quasi-cardinal measures, using ordered probit or logit models (Mackenzie 1993; Swallow et al. 1996). Comparisons with typical contingent choice formats suggest that ordered strength of preference models may provide additional efficiency to model estimation (Mackenzie 1990, 1993; Swallow, Opaluch, and Weaver 1997).

Despite the reported efficiency gains from ordered strength of preference models, recent research casts doubt on the empirical validity of such approaches. One of the most significant concerns involves *focus shift effects* (Yamagishi and Miyamoto 1996; Yamagishi 1996). A focus shift occurs when respondents weight factors differently when asked how strongly they accept an option than when asked how strongly they reject an option, subsequent to a binary choice in which one option is chosen or rejected (Yamagishi 1996). In accepting an option, respondents apply one preference weighting to determine strength of preference. In rejecting an option, respondents apply an alternate preference weighting to determine strength of preference. Such behavior counters the neoclassical assumption that respondents refer to a single, stable preference function when choosing among alternatives, or rating strength of preference for those alternatives. If focus shift dominates strength of preference responses, then the fixed functional form of an ordered discrete-choice model will misspecify respondent behavior, as the model forces a single parameter estimate and significance level on a variable that may have a different impact on stated strength of preference, depending on whether the respondent first accepts or rejects.

This paper explores the impact of focus shift on the ordered strength of preference model, with an emphasis on the implications of such effects for applied CVM research. The paper will proceed as follows. Section 2 describes and contrasts the strength of preference and focus shift models. Sections 3 and 4 present an empirical evaluation of the strength of preference model, compared to a standard trichotomous model. Sections 5 and 6 test for the presence of focus shift in the strength of preference model, and explore statistical, theoretical, and practical implications.

II. THE STRENGTH OF PREFERENCE MODEL

The strength of preference model discussed here is applied to ordinarily trichotomous-choice (accept, neutral, reject) data. In the current application, respondents are asked to compare the ''current conditions'' in a specific local watershed (the current state of watershed environment and tax/fee levels) to a proposed ''amendment package,'' which alters the current conditions. The amendment package may offer environmental improvements or degradation, along with increases or decreases in taxes and fees. Respondents may vote to accept the amendment package, reject the amendment package, or remain neutral between the amendment package and the current conditions. Respondents are then asked to express their strength of preference for the chosen response. If ''reject'' is chosen, respondents are given the choice to ''strongly reject,'' ''moderately reject,'' or ''slightly reject.'' If ''neutral'' is chosen, respondents are given the choice to be ''leaning towards rejecting,'' ''absolutely neutral,'' or ''leaning towards accepting.'' If ''accept'' is chosen, respondents are given the choice to ''slightly accept,'' ''moderately accept,'' or ''strongly accept.'' Note that the strength of preference responses capture all information provided in the initial trichotomous response, together with additional strength of preference information. In effect, the respondent chooses from nine categories, ranging from ''strongly reject'' to ''strongly accept.''

Following Swallow, Opaluch, and Weaver 1997 and Swallow et al. 1994, we apply the neoclassical model based on its assumption that each respondent's strength of preference for a specific amendment package will depend on the utility generated by that plan, compared to the utility generated by the current conditions. That is, each respondent compares the utility that would be generated by the amendment package to that which results from the current conditions, and chooses a particular strength of preference response based on this difference. In accordance with standard discrete choice CVM (Hanemann 1984; McConnell 1990), utility from a management plan is assumed to be a function of both the non-monetary environmental attributes of the plan and the money cost of the plan (to the respondent).

Within the neoclassical framework, we define a simple utility function that includes arguments for environmental characteristics (or aspects of an environmental management plan), net income under the management plan, and the demographic characteristics of the respondent:

$$U(\cdot) = U(\mathbf{X}^A, Y - F_A, \mathbf{D}) = v(\mathbf{X}^A, Y - F_A, \mathbf{D}) + \varepsilon_A, \quad [1]$$

where:

$\mathbf{X}^A$ = a vector of variables describing the characteristics of the environment under policy plan A.
Y = a respondent's household income.
F_A = the change in mandatory taxes and/or fees under policy plan A.
$\mathbf{D}$ = a vector of variables describing demographic characteristics of the respondent.
$v(\cdot)$ = a function representing the empirically measurable component of utility.
ε_A = a term representing standard econometric error.

For our discussion, we assume that a respondent compares Plan A to Plan B, where Plan B represents the status quo, or the current conditions. The respondent compares $U_A(\mathbf{X}^A, Y - F_A, \mathbf{D})$ to $U_B(\mathbf{X}^B, Y - F_B, \mathbf{D})$. The utility difference between the two plans is given by

$$dU = U(\mathbf{X}^A, Y - F_A, \mathbf{D}) - U(\mathbf{X}^B, Y - F_B, \mathbf{D}) = v(\mathbf{X}^A, Y - F_A, \mathbf{D}) - v(\mathbf{X}^B, Y - F_B, \mathbf{D}) - [\varepsilon_B - \varepsilon_A] \quad [2]$$

$$= f(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) - \theta = dv - \theta. \quad [2']$$

where we define the function $f(\cdot)$ to represent the observable utility difference dv.

The model assumes that a respondent compares a proposed amendment package (Plan A) to the current conditions (Plan B), assesses the difference between the utility resulting from each plan, and indicates within which of nine intervals the utility difference falls (each interval corresponding to a specific strength of preference response from "strongly reject" to "strongly accept"). The respondent's answer is represented by the strength of preference indicator variable I_j, which takes a value of one if the respondent provides strength of preference answer j. Hence:

$$I_j = 1 \text{ if } \alpha_{j-1} < dU \leq \alpha_j; \quad = 0 \text{ otherwise.} \quad [3]$$

The respondent's strength of preference answer, with a potential range from "strongly reject" to "strongly accept," is represented by the preference interval indicator I_j, where $j = 1, 2, 3 \ldots 9$. For example, if the respondent "strongly accepts" Plan A, then $I_9 = 1$, and $I_1 = \cdots = I_8 = 0$. If the respondent answers "absolutely neutral," then $I_5 = 1$, and $I_1 = \cdots = I_4 = I_6 = \cdots = I_9 = 0$.

Equations [1] to [3] allow one to estimate the probability that a respondent gives a particular strength of preference response (that is, to estimate the probability that the utility difference falls in category j).

$$= \Pr(\alpha_{j-1} < dU \leq \alpha_j) = \Pr(dU \leq \alpha_j) - \Pr(dU \leq \alpha_{j-1}) \quad \text{for } j = 1, 2, \ldots, 9.$$
$$= \Pr(dv - \theta \leq \alpha_j) - \Pr(dv - \theta \leq \alpha_{j-1}) = \Pr(-\theta \leq \alpha_j - dv) - \Pr(-\theta \leq \alpha_{j-1} - dv) \quad [4]$$

where Pr is the probability operator. Given a probability density function for θ, model parameters may be estimated by maximizing the likelihood function:

$$L = \prod_k \prod_j [\Pr(-\theta_k \leq \alpha_j - dv_k) - \Pr(-\theta_k \leq \alpha_{j-1} - dv_k)]^{I_{kj}} \quad [5]$$

where k designates individual responses. While the boundaries of the intervals on the utility scale are unobserved, maximum likelihood estimation treats them as parameters, so that the ordered response model may leverage the information represented by the indicator variables (Swallow et al. 1996; Maddala 1983). Depending on assumptions regarding the distribution of the disturbance term, model [1]–[5] may be estimated using the ordered logit or ordered probit model, described by Maddala (1983).

In order to estimate the random utility model described in equations [1] through [5], it is necessary to make assumptions regarding the functional form of the utility difference function (dU) and regarding the probability distribution of the disturbances. The utility difference function is usually assumed to be linear in the parameters, but need not be linear in the program elements (Mazzotta and Opaluch 1995). Theory provides little guidance regarding the choice of functional form. In this application, trials with various common functional forms (e.g., linear, quadratic, semi-log) resulted in negligible differences in fundamental model results or implications. Therefore, the simple linear model is illustrated. If the random error terms, ε, are assumed to have a Weibull distribution, then θ has a logistic distribution, leading to the ordered logit model described by Maddala (1983), and applied by Svento (1993), Swallow et al. (1996), and Swallow, Opaluch, and Weaver (1997).

To specify the linear econometric form of dv, we note that the characteristics and additional cost of the current conditions (Plan B) do not change, hence $\mathbf{X}^B$ and F_B do not change. In addition, the demographic characteristics (and income) of respondents are identical for both Plan A and Plan B. The only variable characteristics differentiating the two plans are $\mathbf{X}^A$ and F_A, defined as the vector of variables describing the characteristics of the environment under Plan A, and the change in mandatory taxes and/or fees under Plan A. Accordingly, the econometric specification of dU (the utility difference function) is given by (2) where:

$$dv = \boldsymbol{\beta}(\mathbf{X}^A - \mathbf{X}^B) + \beta_{fee}F_A \qquad [6]$$

is the part of the utility difference function observable to researchers.

The preceding model assumes that respondents' choices among environmental plans are governed by a fixed, well-defined preference ordering, represented by the empirical form of the utility difference function (equation [6]). To estimate this utility difference function, researchers assume that the preference weights ($\boldsymbol{\beta}$, β_{fee}) given to specific variables are approximately constant over the range of possible outcomes, subject to increasing or decreasing returns or interactions captured by the functional form. Accordingly, the assessment of utility differences should be "procedure invariant" (Tversky, Slovic, and Sattath 1988), meaning independent of the particular method or direction of assessment. For example, when comparing two mutually exclusive environmental plans the underlying preference weights $\boldsymbol{\beta}$ and β_{fee} are assumed to be constant, regardless of whether the respondent is asked to choose the *superior* plan (i.e., which plan should be accepted) or is asked to choose the *inferior* plan (i.e., which plan should be rejected). Violation of procedure invariance can lead to preference reversals and other apparent violations of the neoclassical model (Tversky, Slovic, and Sattath 1988; Fischoff, Slovic and Lichtenstein 1980; Shafir 1993).

Focus shift represents a class of behavior that violates procedure invariance (Yamagishi 1996). Assume that an individual is asked to compare two policy plans, Plan A and Plan B, composed of a variety of environmental characteristics. Further assume that Plan A is preferred to Plan B. Standard preference theory assumes that the individual will weight component characteristics equivalently, whether he/she is subsequently asked "*How much better* is Plan A than Plan B?", or is asked the logically equivalent question "*How much worse* is Plan B than Plan A?". A focus shift occurs when judgments of *how much better* result in a different component weighting than judgments of *how much worse*, following a binary choice in which one option is either chosen or rejected (Yamagishi 1996; Yamagishi and Miyamoto 1996). In initial experiments (Yamagishi 1996; Yamagishi and Miyamoto 1996), choices were designed such that one option (Plan A) was always preferred over the other (Plan B), and focus shift manifested in different responses to logically equivalent questions (i.e., *how much better* versus *how much worse*). In the current choice framework, focus shift manifests when strength of preference for a "rejected" amendment package is based on a *different preference weighting* than that used to assess strength of preference for an "accepted" package.

Assume that a survey respondent compares two hypothetical policy plans, Plan A (the amendment package) and Plan B (the current conditions). Within the neoclassical framework, the strength of preference for one plan versus the other is determined by the observable utility difference, dv, as modeled by [2] and operationalized by [6]. Unlike the neoclassical model, which assumes a single utility difference function such as [2′], the focus shift model allows the effective function to vary, depending on whether one is making an inferiority or a superiority judgment. The focus shift model defines two categories of dv, depending on whether a question asks for a *reject strength of preference* (an inferiority judgment) or an *accept strength of preference* (a superiority judgment). Accordingly, the focus shift model replaces equation [2′] with:

$$dv_r = f_r(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) \quad [7]$$

$$dv_a = f_a(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) \quad [8]$$

where dv_r is the perceived utility difference (or difference judgment) when asked how strongly one rejects an inferior plan, and dv_a is the perceived utility difference when asked how strongly one accepts a superior plan. The assumption of neoclassical preference theory is that a focus shift does not occur between inferiority and superiority judgments. This is formally represented by:

$$\begin{aligned} dv_r &= f_r(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) \\ &= dv_a = f_a(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) \\ &= dv = f(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}). \end{aligned} \quad [9]$$

Assuming that dv_r and dv_a are linear functions of the form illustrated in [6] above, and recalling that the characteristics ($\mathbf{X}^B$) and cost (F_B) of Plan B do not change, and that the demographic characteristics ($\mathbf{D}$) and income (Y) of respondents are constant, the applied dv functions for the focus shift model become:

$$\begin{aligned} dv_r &= f_r(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) \\ &= \boldsymbol{\beta}_r(\mathbf{X}^A - \mathbf{X}^B) + \beta_{(\text{fee})r} F_A \end{aligned} \quad [10]$$

$$\begin{aligned} dv_a &= f_a(\mathbf{X}^A, \mathbf{X}^B, Y, F_A, F_B, \mathbf{D}) \\ &= \boldsymbol{\beta}_a(\mathbf{X}^A - \mathbf{X}^B) + \beta_{(\text{fee})a} F_A \end{aligned} \quad [11]$$

The neoclassical framework assumes that $dv_r = dv_a$ as in [9], so that the vector of coefficients $\boldsymbol{\beta}_r = \boldsymbol{\beta}_a$ and $\beta_{(\text{fee})r} = \beta_{(\text{fee})a}$. A focus shift occurs when $\boldsymbol{\beta}_r \neq \boldsymbol{\beta}_a$ or $\beta_{(\text{fee})r} \neq \beta_{(\text{fee})a}$. For example, neoclassical framework assumes that the impact of a specific resource quality change (i.e., a change in water quality) on the utility difference remains invariant between inferiority (reject) and superiority (accept) judgements. However, a focus shift could cause water quality to have a different revealed impact on the utility difference, depending on whether the amendment package is first accepted or rejected, including the possibility of a non-zero impact under one "focus" and a zero impact under the alternate "focus."

III. A CASE STUDY: PUBLIC PREFERENCES FOR WATERSHED MANAGEMENT

The "Wood-Pawcatuck Watershed Management Survey" was designed to elicit public preferences for watershed management options. The survey emphasized coordinated management packages and substitutability between program characteristics (Smith et al. 1995). The studied watershed is located in southwestern Rhode Island, a relatively rural, undeveloped area valued by residents for its pristine environment and natural resource base. Survey development required over eighteen months and involved background research, interviews with regional "experts" and policymakers, individual interviews with local residents, over fifteen focus groups (Johnston et al. 1995), and extensive pretesting.

Based on respondent behavior in focus groups and pre-tests (Smith et al. 1995), the survey was designed so that respondents compared a proposed watershed management plan (the "amendment package") to a constant set of "current conditions," representing the current state of watershed resources and taxes/fees. Each question involved no more than seven program elements, and provided explicit information on only those elements that would be affected by the amendment package. Respondents were told that all other elements would remain constant as described by the current conditions. To ensure that all respondents understood the current conditions, each was shown an eight-minute video review of the watershed, its resources, and the survey format.

Model variables were chosen based on the results of focus groups with watershed residents and consultations with local watershed management "experts," including state and local government officials. Chosen variables characterized water quality; open space; development intensity; public access to freshwater resources; policy towards disposal of household wastewater; and finances (the payment vehicle). All variables described end results of management—impacts of management plans that influenced residents in their day-to-day lives, as indicated by focus group discussions. The full list of variables is summarized in the Appendix.

Researchers used Addelman's fractional factorial design to construct the range of survey questions (Addelman and Kempthorne 1961), resulting in 192 unique contingent-choice questions. Questions included both improvements or degradations of environmental variables, and both increases and decreases in the payment vehicle. This provided respondents with the opportunity to accept or reject some plans that would degrade portions of the environment and lower taxes, as well as plans that would improve the environment and raise taxes. Each respondent answered six questions, and was instructed to consider independently each question in the booklet. When comparing the "current conditions" to the proposed "amendment package," respondents could choose to accept the amendment package, reject the amendment package, or be neutral between the amendment package and the current conditions. Respondents were then asked to express their strength of preference for their chosen response as described in Section 2. Complete responses were obtained from 301 respondents, providing 1,800 trichotomous responses to contingent choice questions, and 1,780 responses to strength of preference questions.[1] Table 1 illustrates the distribution of responses across the nine ordered categories. These data show that 18.9% of responses were in the neutral categories, 44.5% were in the accept categories, and 36.6% were in the reject categories, showing that survey questions generated a full range of potential responses.

TABLE 1
DISTRIBUTION OF ORDERED RESPONSES

Response	Number
Accept: Strongly	363
Accept: Moderately	349
Accept: Slightly	80
Neutral: Closer to Accepting	150
Neutral: Absolutely Neutral	83
Neutral: Closer to Rejecting	104
Reject: Slightly	61
Reject: Moderately	221
Reject: Strongly	369

Note: The above distribution accounts for 1,780 of the 1,800 total responses. Twenty responses do not include usable strength of preference data, and are not included in the strength of preference models.

IV. NEOCLASSICAL MODEL RESULTS

The final model comprises 14 variables characterizing the state of the watershed and 2 variables characterizing the payment vehi-

[1] A small number of respondents did not complete all discrete-choice questions within the survey, reducing the 1806 potential discrete-choice responses to 1,800 usable responses. Further, of these 1,800 usable responses, twenty do not include strength of preference responses, accounting for the difference between the 1,800 usable responses and the 1,780 responses for which strength of preference information is available.

cle. Variable descriptions are provided by the Appendix. The model also estimates a vector of intercepts defining each of the strength of preference intervals, as described above. All watershed management characteristics present in the survey are included in the final model, save *pondch* (the change in pond access sites), which was excluded due to clear lack of statistical significance. Table 2 compares model results of a standard trichotomous model (accept/neutral/reject) with those of the ordered strength of preference model, both estimated using ordered logit. Overall, model results are similar. Variances of parameter estimates are slightly smaller in the strength of preference model, as one would expect given the additional information provided by the strength of preference responses (Swallow, Opaluch, and Weaver 1997). In each model, the same 13 non-intercept variables are significant at the 10% level. At the 5% level, the trichotomous model has 13 significant variables, while the ordered model has 12. The signs of estimated parameters are identical in both models.

In both models, signs and general magnitudes of model parameters are as one would expect. WTP is calculated by first setting *dv* in equation [6] equal to zero, then estimating the increase (or decrease) in taxes/fees that would maintain $dv = 0$ (i.e., leave the respondent indifferent) after a single unit increase in an independent variable (Hanemann 1984). Accordingly, the WTP for a

TABLE 2
COMPARISON OF ORDERED STRENGTH OF PREFERENCE MODEL WITH TRICHOTOMOUS MODEL: ORDERED LOGIT RESULTS

Ordered Strength of Preference Model				Trichotomous-Choice Model			
Variable	Parameter Estimate	Std. Error	$Pr > \chi^2$	Variable	Parameter Estimate	Std. Error	$Pr > \chi^2$
Intercept1	−1.4328	0.1857	0.0001	Intercept1	−0.3124	0.1961	0.1113
Intercept2	−0.7241	0.1826	0.0001	Intercept2	0.5634	0.1964	0.0041
Intercept3	−0.5542	0.1822	0.0024	—			
Intercept4	−0.2773	0.1818	0.1272	—			
Intercept5	−0.0637	0.1817	0.7261	—			
Intercept6	0.3167	0.1818	0.0816	—			
Intercept7	0.5223	0.1821	0.0041	—			
Intercept8	1.5753	0.1863	0.0001	—			
swqavech	−0.3618**	0.1029	0.0004	swqavech	−0.3806**	0.1133	0.0008
swqminch	−0.2328**	0.0658	0.0004	swqminch	−0.2562**	0.0724	0.0004
gwqch	−1.1882**	0.3852	0.0020	gwqch	−0.9414**	0.4239	0.0264
sownch	−0.0548**	0.0164	0.0008	sownch	−0.0585**	0.0176	0.0009
undevch	−0.0307**	0.0093	0.0009	undevch	−0.0267**	0.0099	0.0076
purchmod	−0.3111**	0.1585	0.0497	purchmod	−0.3754**	0.1699	0.0271
purchful	−0.4085**	0.1470	0.0055	purchful	−0.4765**	0.1577	0.0025
dlevch	0.2802**	0.0530	0.0001	dlevch	0.2720**	0.0578	0.0001
ruralyes	−0.3346**	0.1419	0.0184	ruralyes	−0.4112**	0.1537	0.0075
repairs	−0.0563	0.1895	0.7666	repairs	−0.0150	0.2091	0.9428
success	−0.7795**	0.1992	0.0001	success	−0.9609**	0.2220	0.0001
trust	−0.1458*	0.0848	0.0854	trust	−0.2048**	0.0925	0.0269
swimch	−0.0420	0.0535	0.4322	swimch	−0.0655	0.0578	0.2570
riverch	−0.0173*	0.0099	0.0833	riverch	−0.0213*	0.0110	0.0528
swqdec	0.4723**	0.1666	0.0046	swqdec	0.4580**	0.1816	0.0117
fee	0.2525**	0.0544	0.0001	fee	0.2280**	0.0590	0.0001
χ^2	290.28 (16 df)			χ^2	256.18 (16 df)		
Prob. $> \chi^2$	0.0001			Prob. $> \chi^2$	0.0001		
N	1780			*N*	1800		

Note: An asterisk (*) denotes significance at the 10% level; (**) denotes significance at the 5% level.

one-unit change in the nth variable, *ceteris paribus*, is given by:

$$WTP_n = -\left[\frac{\beta_n}{\beta_{fee}}\right]$$

where β_n is the parameter estimate corresponding to the nth variable in [6], and β_{fee} is the parameter estimate corresponding to the increase in taxes or fees. WTP results are shown on Table 3 for both the trichotomous and ordered model, along with the difference in estimated WTP for each variable. As shown by Table 3, positive WTP is associated with higher quality surface and groundwater; increased areas of undeveloped and state-owned (undeveloped) land; rural development character and zoning that promotes rural character; higher levels of access to state owned land; and higher levels of success in public efforts to repair failing septic systems. Higher WTP levels are also associated with programs in which the funds are "constitutionally guaranteed" to pay for specified watershed management changes.

To assess the similarity of both models from a policy perspective, we test for the equality of estimated willingness-to-pay (WTP) for single unit changes in each of the model variables. The null hypothesis is $WTP^T_n = WTP^S_n$, where WTP^T_n represents estimated willingness to pay for a single unit change in the nth variable of the trichotomous model, and WTP^S_n represents estimated willingness to pay for a single unit change in the nth variable of the strength of preference model. As WTP^T_n and WTP^S_n are estimated in different models (and are assumed to have zero covariance), the test statistic, t^*, is given by:

$$t^* = \frac{[\beta^T_n/\beta^T_{fee}] - [\beta^S_n/\beta^S_{fee}]}{\sqrt{var([\beta^T_n/\beta^T_{fee}]) + var([\beta^S_n/\beta^S_{fee}])}}, \qquad [12]$$

where

$$var(\beta^i_n/\beta^i_{fee}) \cong (1/\beta^2_{fee})^i[var(\beta^i_n) - 2(\beta^i_n/\beta^i_{fee}) \times cov(\beta^i_n, \beta^i_{fee}) + (\beta^i_n/\beta^i_{fee})^2 var(\beta^i_{fee})], \quad i = \{T, S\}$$

TABLE 3
COMPARISON OF ORDERED STRENGTH OF PREFERENCE MODEL WITH TRICHOTOMOUS MODEL: WILLINGNESS-TO-PAY RESULTS

Ordered Preference Model			Trichotomous-Choice Model			WTP Difference	
Variable	WTP for Unit Change ($100)	Std. Error WTP	Variable	WTP for Unit Change ($100)	Std. Error WTP	WTP Difference ($100)	t^* for H_0: $WTP^T_n = WTP^o_n$
swqavech	1.43	0.524	swqavech	1.67	0.674	−0.24	−0.2768
swqminch	0.92	0.343	swqminch	1.12	0.959	−0.20	−0.1980
gwqch	4.71	1.839	gwqch	4.13	1.869	0.58	0.2200
sownch	0.22	0.080	sownch	0.26	0.077	−0.04	−0.3555
undevch	0.12	0.044	undevch	0.12	0.042	0.00	0.0737
purchmod	1.23	0.670	purchmod	1.65	0.725	−0.41	−0.4200
purchful	1.62	0.675	purchful	2.09	0.689	−0.47	−0.4894
dlevch	−1.11	0.306	dlevch	−1.19	0.224	0.08	0.2196
ruralyes	1.33	0.635	ruralyes	1.80	0.682	−0.48	−0.5134
repairs	—	—	repairs	—	—	—	—
success	3.09	0.984	success	4.21	0.876	−1.13	−0.8559
trust	0.58	0.357	trust	0.90	0.404	−0.32	−0.5954
swimch	—	—	swimch	—	—	—	—
riverch	0.07	0.041	riverch	0.09	0.046	−0.02	−0.4069
swqdec	−1.88	0.734	swqdec	−2.01	0.734	0.14	0.1332
fee	—	—	fee	—	—	—	—

Note: WTP is not calculated for the payment vehicle (fee), or for variables that cannot be shown to be significant at the 10% level.

is an approximation of WTP variance for both the strength of preference and the trichotomous model (Svento 1993). Table 3 illustrates the resulting *t*-statistics. In all cases, the null hypothesis $WTP_n^T = WTP_n^S$ cannot be rejected. Similar *t*-tests of individual model parameters (elements of the estimated $\boldsymbol{\beta}$ vector) generate analogous results. These results suggest that, regardless of the existence of focus shift, results of the ordered strength of preference model do not depart radically from those of the standard trichotomous model.

V. TESTING FOR FOCUS SHIFT EFFECTS

The strength of preference model estimates a single utility difference function, given by equation [6] above. To test for focus shift effects, the data are divided into three groups corresponding to the "accept" responses, the "reject" responses, and the "neutral" responses. Following [10] and [11], for each set of responses we estimate [6] separately, resulting in:

$$d\hat{v}_a = \hat{\boldsymbol{\beta}}_a(\mathbf{X}^A - \mathbf{X}^B) + \hat{\beta}_{(\text{fee})a}F_A \quad [13a]$$

$$d\hat{v}_n = \hat{\boldsymbol{\beta}}_n(\mathbf{X}^A - \mathbf{X}^B) + \hat{\beta}_{(\text{fee})n}F_A \quad [13n]$$

$$d\hat{v}_r = \hat{\boldsymbol{\beta}}_r(\mathbf{X}^A - \mathbf{X}^B) + \hat{\beta}_{(\text{fee})r}F_A \quad [13r]$$

where the subscripts *a*, *n*, and *r* correspond to "accept," "neutral," and "reject," in effect adding an additional "neutral" category to equations [10] through [11], and estimating strength of preference separately within each trichotomous category. For example, [13a] estimates $d\hat{v}_a$ as it influences the probability of choosing "strongly accept," "moderately accept," or "slightly accept," given that the respondent has already chosen to accept Plan A. Each category of [13] thus represents an independent trichotomous model, denoted the accept model, the neutral model, and the reject model. If data fit the neoclassical strength of preference framework, then the parameter estimates $\hat{\boldsymbol{\beta}}$ and $\hat{\beta}_{(\text{fee})}$ should be identical (or at least similar) in all three models, representing a single, stable preference function. If a focus shift occurs between the accept and reject responses, then we expect significant differences in model results, represented by $(\boldsymbol{\beta}_a, \beta_{(\text{fee})a}) \neq (\boldsymbol{\beta}_r, \beta_{(\text{fee})r})$.

Table 4 illustrates ordered logit results corresponding to [13a], [13n], and [13r]. Although a simple linear specification of *dv* is illustrated, similar results hold for the quadratic and semi-log functional forms. As illustrated by Table 4, the estimated models are not identical, and in fact differ to a substantial degree. While the accept model is significant at the 1% level (χ^2 = 47.134, 16 *df*) and the reject model is significant at the 5% level (χ^2 = 30.192, 16 *df*), the neutral model is insignificant at even the 50% level. As the neutral model appears to have no significant explanatory power, we focus on the accept and reject models.

The most notable difference between the accept and reject models is the difference in individual variable significance, again illustrated by Table 4. According to model results, the strength of an "accept" preference (model [13a]) is determined only by the change in groundwater quality (*gwqch*) and the change in taxes or fees (*fee*) offered by the hypothetical Plan A. Both variables are significant at the 1% level. No other variables are significant in the accept model. The signs of these variables are as one would expect—stronger accept preferences are associated with higher groundwater quality and with lower taxes or fees. The magnitudes of the two significant variables in the "accept" model are greater than those estimated by the original ordered strength of preference model (Table 2). Magnitudes of nonsignificant parameter estimates appear to have no systematic relationship to those of the original model.

According to the reject model (model 13r), the strength of a reject preference is determined by changes in the average watershed development character (*dlevch*) and the change in the number of undeveloped privately owned acres in the watershed (*undevch*). Both variables are significant at the 1% level. Additional variables significant at the 10% level include the change in average surface water quality in the watershed (*swqavech*) and the change in the number of state-protected acres in the watershed (*sownch*).

TABLE 4
COMPARISON OF ACCEPT, NEUTRAL, AND REJECT STRENGTH OF PREFERENCE MODELS: ORDERED LOGIT RESULTS

	Accept Preference Model		Neutral Preference Model		Reject Preference Model		Pooled Model for LR Test: Accept vs. Reject	
Variable	Parameter Estimate	$Pr > \chi^2$	Parameter Estimate	$Pr > \chi^2$	Parameter Estimate	$Pr > \chi^2$	Parameter Estimate	$Pr > \chi^2$
Intercept1	−2.9048	0.0001	−1.0055	0.0373	−0.3573	0.2720	−1.1788	0.0001
Intercept2	−0.4394	0.1507	0.0597	0.9008	1.7050	0.0001	0.6573	0.0018
swqavech	0.0182	0.9123	−0.0545	0.8354	−0.3259*	0.0985	−0.3208**	0.0077
swqminch	−0.0576	0.5813	−0.0835	0.6242	−0.0262	0.8365	−0.1634*	0.0329
gwqch	−2.0366**	0.0093	−0.9541	0.2953	−0.6095	0.3331	−1.3414**	0.0039
sownch	−0.0029	0.9202	0.0327	0.4257	−0.0516*	0.0967	−0.0534**	0.0055
undevch	−0.0161	0.2931	0.0222	0.3727	−0.0501**	0.0032	−0.0389**	0.0003
purchmod	0.1464	0.5931	−0.0305	0.9418	0.0514	0.8533	−0.1492	0.4171
purchful	0.1639	0.5215	0.0561	0.8843	−0.1325	0.6036	−0.2400	0.1592
dlevch	0.1286	0.1971	0.0931	0.4670	0.2528**	0.0051	0.2932**	0.0001
ruralyes	−0.1528	0.5597	0.0558	0.8698	0.3429	0.1707	−0.1208	0.4748
repairs	−0.1573	0.5975	−0.5599	0.2098	−0.0377	0.9229	−0.0334	0.8826
success	−0.2556	0.4109	−0.3005	0.5316	0.5812	0.1837	−0.4022*	0.0867
trust	−0.0675	0.6350	0.3003	0.1489	−0.0616	0.6967	−0.1359	0.1744
swimch	0.062	0.4743	−0.1049	0.4655	0.0214	0.8273	0.0200	0.7466
riverch	−0.0087	0.5987	−0.0048	0.8440	0.0278	0.1666	−0.00275	0.8168
swqdec	0.3453	0.2040	0.1844	0.6762	−0.1142	0.7098	0.3245*	0.0936
fee	0.4868**	0.0001	0.1457	0.2739	−0.0286	0.7645	0.2713**	0.0001
χ^2	47.13 (16)		14.777 (16)		30.19 (16)		171.481 (16)	
Prob. $> \chi^2$	0.0001		0.5411		0.0170		0.0001	
−2LnL	1458.070		705.208		1155.145		2974.361	
N	792		337		651		1443	

Note: An asterisk (*) denotes significance at the 10% level; (**) denotes significance at the 5% level. Number in parenthesis represents the degrees of freedom for each model.

Test Statistic for Likelihood Ratio Test of Equivalence of Accept and Reject Models: (H_0: $\boldsymbol{\beta}_a = \boldsymbol{\beta}_r = \beta$; $\beta_{(fee)a} = \beta_{(fee)r} = \beta$; $\alpha_{0a} = \alpha_{0r} = \alpha_0$): $\chi^2 = 361.146$ (16 df); p = 0.0001

The signs of these variables are as one would expect, and correspond to those of the original ordered strength of preference model. The magnitudes of these statistically significant variables are not statistically distinguishable from those found in the original strength of preference model (cf. Tables 2 and 4). However, the magnitudes of nonsignificant variables have no systematic relationship to estimated magnitudes in the original ordered strength of preference model (Table 2) or those in the "accept" model (Table 4).

Despite limited parallels between the accept model and the original ordered strength of preference model, and between the reject model and the original model, *none* of the variables significant in the accept model are significant in the reject model. Apparent differences between the accept and reject strength of preference models may be tested using an indirect likelihood ratio test (see Elnageeb and Florkowski 1994; Mazzotta and Opaluch 1995). To construct the test statistic, the accept and reject models are vertically "stacked," or pooled into a single ordered trichotomous model, such that the directional effect of the utility difference on strength of preference is preserved. The pooled model forces identical parameter estimates on both the accept and reject models. Results for this model are shown in Table 4. The null hypothesis of no focus shift (no change in parameter estimates between the accept and reject models) is:

$$H_0: \boldsymbol{\beta}_a = \boldsymbol{\beta}_r = \boldsymbol{\beta}; \quad \beta_{(\text{fee})a} = \beta_{(\text{fee})r} = \beta; \quad \alpha_{0a} = \alpha_{0r} = \alpha_0 \qquad [14]$$

representing equality among all model parameters, as assumed by the neoclassical strength of preference model, and imposed by the pooled model. The vectors of α parameters represent the interval cut-point parameters estimated by ordered models (see equations [3] through [5]). The likelihood ratio (LR) test statistic for H_0 is:

$$-2[L(\alpha_0, \boldsymbol{\beta}, \beta_{(\text{fee})}) - \sum_g L(\alpha_{0g}, \boldsymbol{\beta}_g, \beta_{(\text{fee})g})], \qquad [15]$$

where $L(\alpha_0, \boldsymbol{\beta}, \beta_{(\text{fee})})$ represents the log likelihood value for the pooled model, $L(\alpha_{0g}, \boldsymbol{\beta}_g, \beta_{(\text{fee})g})$ is the log of the sub-likelihood function for the gth model, and $g = [a, r]$ represents the accept and reject models. The test statistic is distributed chi-square with $\sum K(g)$-K degrees of freedom, where K is the number of coefficients on attributes in the comparison. Test results are shown in Table 4. The null hypothesis that the coefficients do not change between the accept and reject models can be rejected at the $p = 0.0001$ significance level.[2] Accordingly, we reject the null hypothesis of a single preference function that underlies both the accept and reject models. That is, we reject the neoclassical hypothesis in favor of the focus shift model which allows different functions to determine accept and reject strength of preference.

Although past research has identified specific behavioral patterns that explain focus shift in some instances, there seems to be no dominant response pattern that explains focus shift in the current application. For example, past research has shown that choice asymetries (such as focus shifts) could be caused by "consistency effects" (Tversky, Slovic, and Sattath 1988; Yamagishi 1996). When consistency effects hold, respondents focus on elements that are consistent with their prior choices: respondents focus on positive elements when asked how strongly they accept an option, and focus on negative elements when asked how strongly they reject an option. (Yamagishi 1996). In the current application, the evidence for such effects is ambiguous. For example, the change in development intensity (of the watershed) was a significant determinant of strength of preference in the reject model. Of those packages that were rejected, 58.8% offered constant development intensity (*dlevch*) while 41.2% offered increases in development intensity. Assuming that a *decrease* in development is a *positive* aspect of a management plan (as indicated by focus groups), development character is a *positive* plan element in the majority (58.8%) of reject responses. Were consistency effects to dominate, one would expect an opposite result: that variables significant in the reject model would represent negative plan elements in the majority of cases. Similar counter-examples are found in the accept model: significant variables (changes in groundwater quality and taxes/fees) did not represent unambiguously positive aspects of policy packages that were accepted.

The observed focus shift might also be explained by patterns in the types of plans that were, on average, rejected or accepted. To illustrate an extreme case, imagine that respondents never accepted amendment packages in which groundwater quality declined (as specified by the survey, groundwater could only decline or remain constant, as the current quality of groundwater in the Wood-Pawcatuck region is near-pristine). If this were the case, groundwater quality would be constant in all accept responses, and would therefore likely be an insignificant factor determining the strength of preference for those plans. However, analysis of the accept and reject data sub-sets offers no univariate pattern that explains observed focus shifts. Al-

[2] Analogous results are generated by a similar LR test that allows cut point intercepts (α) to vary between the two models (testing the equivalence of only the slope coefficients), again rejecting the null hypothesis at the $p = 0.0001$ level.

though accepted plans are, on average, different from rejected plans (as one would expect), both accepted and rejected scenarios contain the entire range of values for all significant model variables, including both "improvements" and "declines." In summary, the revealed focus shift cannot be explained as a simple manifestation of survey scenarios represented in the data sub-sets.[3]

VI. IMPLICATIONS

Model results indicate that a statistically significant focus shift occurs between accept and reject responses in the illustrated watershed management application. However, this focus shift does not lead to a statistically significant difference between the strength of preference model and the trichotomous model (Table 2). The combination of results suggests that even though focus shift influences choices *within* each trichotomous category, the statistical influence of this focus shift may be minor in the context of the more important trichotomous accept/neutral/reject decision. That is, a large proportion of the ordered model's explanatory power may be captured solely by the initial trichotomous accept/neutral/reject choice, leading to a relatively small focus shift impact on the overall model. This conclusion is supported by the similarity of the log likelihood chi-square values for the strength of preference and trichotomous models. The practical result is that although the demonstrated focus shift violates a fundamental assumption of the neoclassical model, it has little impact on the policy implications of the full model.

These results do not imply that focus shift will lack policy significance in all potential applications, nor do they imply that focus shift is universal in strength of preference models. It is possible that the existence, degree, and relevance of focus shift will depend critically on the content and structure of the survey instrument. For example, focus shift may be more prevalent in more complex survey instruments, in cases where respondents have a high degree of emotional involvement with the subject matter, or in cases where respondents have more (or less) prior understanding of the subject matter. Future research might address the influence of survey design on the incidence and severity of focus shift. For example, note that focus shift (as defined in this manuscript) may be avoided by structuring survey questions such that there is no explicit distinction between accept and reject contexts (e.g., Swallow, Opaluch, and Weaver 1997). Accordingly, a survey might be structured such that respondents choose between two potential policy options (Plan A vs. Plan B), and then choose their strength of preference for the preferred option over the non-preferred option. In this case, respondents would always choose their strength of preference for a *preferred* option, and a focus shift between accept and reject contexts could not occur. However, respondents might still use different preference weights to determine strength of preference in different regions of the preference scale (e.g., the "strongly prefer" region vs. the "slightly prefer" region).

Although the revealed focus shift has little direct policy relevance in the present application, the revealed focus shift nonetheless complicates the simple, utility theoretic explanation of strength of preference responses. Despite extensive survey design to ensure that respondents could grasp survey scenarios, it appears that our respondents did not exhibit full neoclassical optimization when furnishing strength of preference responses. This suggests that the ordered strength of preference model misspecified respondents' behavior, thereby diminishing the claim that the model approximated "true" underlying preferences. It also raises questions concerning the ability of estimated WTP to approximate welfare change, as postulated by neoclassical theory (Common, Reid, and Blamey 1997). In some cases, additional information provided by strength of preference elicitation (Swallow, Opaluch, and Weaver 1997) may justify the use of an ordered

[3] Note that as a result of the split in the original data set, Addelman's factorial design (Addelman and Kempthorn 1961) no longer applies to survey scenarios comprising the "accept" and "reject" data sub-sets. Note also that the three data sub-sets are derived from respondents' initial trichotomous choices, and therefore may not include the entire set of survey scenarios present in the original data set.

strength of preference model, even in the presence of focus shift. However, given the above results, researchers may wish to exercise caution when applying such models to strength of preference data.

Aside from simply raising questions concerning the neoclassical explanation of respondent choice, the observed focus shift may illustrate non-neoclassical characteristics of respondent behavior that may assist CVM researchers in survey design. For example, in the current application, increases in taxes and fees only affected strength of preference for accepted plans. A potential explanation is that when rejecting a plan based on environmental degradation (as in many of our "reject" responses) respondents may de-emphasize the payment vehicle, placing greater weight on the environmental losses to determine strength of preference. This is a similar behavioral pattern to that which leads to well known differences between WTP and willingness to accept (WTA) in open-ended CVM (Hanemann 1991). When asked to "accept" environmental damage, respondents tend to place relatively little weight on hypothetical monetary gains (often asking for very large payments to offset the hypothetical environmental loss). However, when asked to pay for environmental improvements, money is given a much greater weight relative to environmental gains. Hanemann (1991) and Shogren et al. (1994) explain such differences based on limited substitutability between money and environmental quality, suggesting that future research may yet uncover a potential neoclassical interpretation of these results. Further information concerning such response patterns may aid CVM researchers in designing surveys that encourage respondents to consider the substitution of money (representing ordinary market goods) and environmental attributes more consistently over the entire range of possible outcomes.

The revealed focus shift may also suggest "ambivalence" on the part of respondents (Opaluch and Segerson 1989), particularly given the lack of statistical significance manifested by the "neutral model." That is, the neutral region may represent an ambivalence region, or a region in which individuals have non-scalar preferences based on different, fundamentally non-comparable objective functions (Opaluch and Segerson 1989).[4] Unlike indifference, which represents true neutrality in decision making, ambivalence occurs when individuals are incapable of making precise trade-offs between different program attributes (Opaluch and Segerson 1989). In cases of ambivalence, individuals may abandon neoclassical balancing in favor of alternate decision heuristics, such as lexicographic decision making or other choice simplification strategies (Mazzotta and Opaluch 1995).

Finally, the observed focus shift may indicate that respondents applied different, well-defined preference structures to determine strength of preference for accept and reject responses. If this is the case, researchers might develop models based on switching regressions, as suggested by Mazzotta and Opaluch (1995). Other options include nested approaches, in which the strength of preference choice is nested within the accept versus reject decision. If researchers can identify the source of revealed asymmetries, the resulting information may improve economists' ability to estimate valid public preference models for environmental programs, and to infer underlying preferences in cases where neoclassical maximization is not evenly applied.

VII. CONCLUSION

This paper analyzes ordered strength of preference model responses for evidence of focus shift effects, and discusses implications for CVM research. Model results indicate the presence of focus shift effects, and reject the use of a single utility function to determine strength of preference responses. Respondents appear to use different criteria to assess

[4] The insignificance of the "neutral" model may also indicate that those choosing the trichotomous neutral category were in fact expressing "true" neutrality or indifference, and that within this category strength of preference did not apply. If the neutral response did in fact indicate true indifference, then the choice of strength of preference *within* the neutral category may have been based on essentially random or unpredictable factors.

their strength of preferences for accepted and rejected watershed management plans, while the model used to describe strength of preference for neutral responses cannot be shown statistically significant.

Despite evidence of non-neoclassical focus shifts in the ordered strength of preference model, ordered model results closely approximate trichotomous-model (accept/neutral/reject) results. Both models provide WTP results that appear "reasonable." This suggests that non-neoclassical focus shift behavior need not lead to unreasonable results. However, the existence of such effects calls into question the formal neoclassical link between survey responses and underlying welfare. Future research may address means to estimate underlying preferences and welfare in cases where focus shifts and/or other decision heuristics dominate survey responses. Research may also identify means to minimize such behavior, and encourage respondents to apply neoclassical optimization to the full range of hypothetical survey scenarios.

APPENDIX

TABLE 1

ELEMENTS OF HYPOTHETICAL WATERSHED MANAGEMENT PLANS

Program Area	Variable Name	Scale and Current Conditions	Unit of Measurement
Water Quality	Average Surface Water Quality in Watershed (SWQAVECH)	Measured on ten-level water quality ladder. Current Conditions = Level 8	Water quality ladder scale points
	(SWQDEC)	Dummy variable identifying plans in which SWQAVECH < 0	Dummy: 1 if SWQAVECH < 0, 0 if SWQAVECH ≥ 0
	Minimum Surface Water Quality in Watershed (SWQMINCH)	Measured on ten-level water quality ladder. Current Conditions = Level 5	Water quality ladder scale points
	Average Ground Water Quality in Watershed (GWQCH)	Measured on ten-level water quality ladder. Current Conditions = Level 9.5	Water quality ladder scale points
Open Space Preservation	Acres of Developed Land in Watershed	Current Conditions = 18,000 acres out of 155,500 total acres	n/a
	Acres of Privately Owned Undeveloped Land in Watershed (UNDEVCH)	Current Conditions = 120,000 acres out of 155,500 total acres	Acres × 10^{-3}
	Acres of State-Owned Land in Watershed (SOWNCH)	Current Conditions = 17,500 acres out of 155,500 total acres	Acres × 10^{-3}
	Accessibility of New Purchases of State Owned Land	Applies if State-Owned Acres increase	
		Levels:	
	(PURCHFUL)	Fully Accessible	Dummy: 1 = yes; 0 = no
	(PURCHMOD)	Moderately Accessible	Dummy: 1 = yes; 0 = no

TABLE A1 *Continued*

Program Area	Variable Name	Scale and Current Conditions	Unit of Measurement
Development	Development Character Level (DLEVCH)	Measured on ten-level Development Character Scale. Current Conditions = Level 1	Development character scale points
	Zoning Emphasis (RURALYES)	Zoning either "emphasizes preserving rural character" or no zoning statement.	Dummy: 1 = zoning emphasizes rural character; 0 = no mention of zoning
Freshwater Public Access Sites	Swimming Access Sites (SWIMCH)	Number of sites in watershed. Current Conditions = 4	Increase over current level
	River Access Sites (RIVERCH)	Number of sites in watershed. Current Conditions = 12	Increase over current level
	Pond Access Sites (PONDCH)	Number of sites in watershed. Current Conditions = 12	Increase over current level
Septic Systems and Sewers	Inspections and Repairs (REPAIRS)	"no inspections and repairs" or "inspections, with repairs paid for by homeowners" at a rate of 20%, 50%, or 100%. Current Conditions = No Program	Percent of septic system repairs paid for by owner (0% also implies the absence of an inspection program)
	Success Rate of Septic System Repairs (SUCCESS)	Either 50% of failing systems are repaired or 99% of failing systems are repaired	Percent of failing septic systems repaired (0% implies no inspections and repairs)
Finances	Trust (TRUST)	Funds are either "constitutionally guaranteed to pay for these changes," or no statement is made concerning a guarantee	Dummy: 1 = guarantee; 0 = no guarantee
	Changes in Taxes and Fees (FEE)	Additional taxes and fees required by proposed program. Ranges from Save $90 to Pay $225	Hundreds of dollars

Note: Additional information is provided by Smith et al. (1995).

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