WESTERN REGIONAL RESEARCH PUBLICATION

W-133
BENEFITS AND COSTS OF RESOURCES POLICIES AFFECTING PUBLIC AND PRIVATE LAND

12TH INTERIM REPORT
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INTRODUCTION

This volume contains the proceedings of the 1999 W-133 Western Regional Project Technical Meeting on "Benefits and Costs of Resource Policies Affecting Public and Private Land." Some papers from W-133 members and friends who could not attend the meeting are also included. The meeting took place February 24th - 26th at the Starr Pass Lodge in Tucson, Arizona. Approximately 50 participants attended the 1999 meeting, are listed on the following page, and came from as far away as Oslo, Norway.

The W-133 regional research project was rechartered in October, 1997. The current project objectives encourage members to address problems associated with: 1.) Benefits and Costs of Agro-environmental Policies; 2.) Benefits Transfer for Groundwater Quality Programs; 3.) Valuing Ecosystem Managment of Forests and Watersheds; and 4.) Valuing Changes in Recreational Access.

Experiment station members at most national land-grant academic institutions constitute the official W-133 project participants. North Dakota State, North Carolina State, and the University of Kentucky proposed joining the group at this year's meeting. W-133's list of academic and other "Friends" has grown, and the Universities of New Mexico and Colorado were particularly well represented at the 1999 W-133 Technical Meeting. The meeting also benefitted from the expertise and participation of scientists from many state and federal agencies including California Fish and Game, the U.S. Department of Agriculture's Economic Research and Forest Services, the U.S. Department of Interior's Fish and Wildlife Service, and the Bureau of Reclamation. In addition, a number of representatives from the nation's top environmental and resource consulting firms attended, some presenting papers at this year's meeting.

This volume is organized around the goals and objectives of the project, but organizing the papers is difficult because of overlapping themes. The last section includes papers that are very important to the methodological work done by W-133 participants, but do not exactly fit one of the objectives. -- I apologize for the lack of consistent pagination in this volume.

On A Personal Note... Any meeting or conference is successful (and fun!) only because of its participants, so I would first like to thank all the people who came and participated in 1999 - listed below. I also want to thank Jerry Fletcher for all his help at this meeting and prior to it, and John Loomis who passed on his knowledge of how to get a meeting like this to work, and who continues to have the funniest little comments to lighten the meetings up. I especially thank Paul Jakus, who helped me to organize this conference and have a lot of fun during it and afterward. Finally, I want to thank Nicki Wieseke for all her help in preparing this volume, and Billye French for administrative support on conference matters.

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P.S. P.F. and J.C. - As far as I can tell, that darn scorpion is still dead!

THE VALUE OF WATER LEVELS IN WATER-BASED RECREATION: A POOLED REVEALED PREFERENCE/CONTINGENT BEHAVIOR MODEL

by

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THE VALUE OF WATER LEVELS IN WATER-BASED RECREATION: A POOLED REVEALED PREFERENCE/CONTINGENT BEHAVIOR MODEL

Abstract

In this paper we present estimates of the recreation value of preventing a decline in water levels at, and even the total loss of, a large western lake that is drying up. We use a Poisson version of the count data travel cost model; however, in addition to and in combination with revealed preference (RP) data, we employ contingent behavior (CB) responses to hypothetical questions on alternative water levels and number of trips. The panel data model used allows for tests of differences between results using RP and CB data. This particular pooled RP/CB approach has not to our knowledge previously been applied to examine the values of alternative water quantities in water-based recreation.

THE VALUE OF WATER LEVELS IN WATER-BASED RECREATION: A POOLED REVEALED PREFERENCE/CONTINGENT BEHAVIOR MODEL

1. INTRODUCTION

In this paper we use stated preference (SP) data on recreation trips that are responses to hypothetical water level scenarios constructed for survey respondents. We use these data in order to ascertain whether and to what extent water levels matter in the demand for trips to a lake recreation site. These SP or contingent behavior (CB) data supplement revealed preference (RP) data giving actual trips taken during a season. Oddly, though a great deal of recreational economic analysis has focused on water quality issues, far fewer valuation studies have been conducted with the focus being the importance of the quantity of water at a recreation site. Our application is to a Nevada lake, a state where virtually all surface water is of interest because it is so scarce.

One of Nevada's four terminus lakes, Walker Lake, is an important sport fishing location, but is at serious risk of becoming useless in this regard. The lake's level has declined approximately 140 feet since 1880, though very recent wet years in the region have ended a drought period and apparently slowed the decline. Upstream agricultural uses on the Walker River, which feeds the lake and has its headwaters in California, are usually blamed for the decline. Walker River water is about 140 percent allocated, with this overallocation possible because of return flows. Agriculture is also often currently blamed for the accompanying increase in total dissolved solids (TDS), though this point is debatable, as a newly developed water quality model shows that even if all TDS loading from agriculture were eliminated, TDS would still be a problem at the lake (Humberstone, 1999).

Increasing TDS levels have increased the likelihood that certain species of fish cannot survive in Walker Lake (see Thomas, 1995; Humberstone, 1999). Laboratory experiments suggest that the lake's key species of importance, the Lahontan Cutthroat Trout, cannot survive at TDS levels equal to or greater than 16,000 mg/L (Vinyard and Dickerson, 1998). Recent measurements of TDS at Walker Lake are 13,300 mg/L and it has been suggested that volumes of water at Walker Lake greater than 2.3 million acre feet must be maintained to avoid the 16,000 mg/L critical threshold and maintain the fishery (Humberstone, 1999). Even at the current TDS levels the Lahontan Cutthroat Trout currently must be stocked in order to grow to sizes of interest to sport anglers. In summary, if average annual deficit conditions continue, this will lead to a TDS level at Walker Lake that will exceed 16,000 mg/L in approximately twenty years (Humberstone, 1999).

As a possible way to halt the decline of Walker Lake as well as address other important allocation issues, several parties in Nevada and California have begun discussion of the potential for a regional or state water bank. At the practical level, however, a great deal of water would have to be somehow moved to Walker Lake to bring about a substantial change. Humberstone's forecasting model shows that a 16% reduction in all upstream current diversions is not sufficient to maintain the fishery in all future years, though it remains an issue as to what level of upstream diversions, or alternatively, what existing volume at the lake, would be sufficient.

We estimate a recreation demand model to address these issues, using the popular count data specification for the model (see for example Hellerstein, 1991; Creel and Loomis, 1992; Shonkwiler and Shaw, 1996). In combination with the actual trip (RP) data, however, we use CB data. A panel data model is used to combine these data; each respondent represents a cross sectional unit and with each respondent there is associated an observation of RP data along with multiple-scenario CB observations (in ordinary panel data applications, these would be the time series units).

Several previous studies have estimated recreational use values for water quantity changes (e.g., Creel and Loomis, 1992; Cameron, Shaw and Ragland, 1999; Cameron et al., 1996; Ward et al., 1997; Cordell and Bergstrom, 1993; Fadali and Shaw, 1997). However, the panel data approach that we use to combine RP and CB data, initially developed by Hausman et al. (1984) and subsequently applied to the analysis of recreation behavior by Englin and Cameron (1996), has not previously been used to examine the value of water quantities in recreation. To our knowledge, the use of CB data to examine the impacts of water level changes has only been performed previously by Cameron et al. (1996) and Cameron, Shaw and Ragland (1999). Cordell and Bergstrom's approach is essentially a contingent valuation study of use values for North Carolina reservoirs.

2. THE MODEL

The standard count data model is well-developed in the literature and grounded in consumer theory (Hellerstein and Mendelsohn, 1993). In contrast to multiple-site recreation demand models, the count data model can typically handle only a single site; however, it provides a useful framework for dealing with total seasonal trips and seasonal welfare measures. We use a Poisson specification to model the underlying distribution of trips because this is an appropriate way to accommodate the presence of zero values (thereby allowing the inclusion of nonparticipants) and nonnegative integer values. We apply the model to estimate demand and welfare for recreation at Nevada's Walker Lake.

Travel cost models most often only use data on actual reported trips (RP approach). However. with increasing frequency, modelers are supplementing these data with CB (e.g., Cameron. 1992; Adamowicz, Louviere and Williams, 1994; Cameron et al., 1996: Adamowicz et al., 1997). CB responses are those one would get in response to a question such as: "how many trips would you take to this lake if the water level was 20 percent higher than it was when you visited in June?" CB data of this sort asks about behavior rather than a value or willingness to pay for a good, and it may be that people find responding about a behavior related to use of the public good to be easier than valuing the public good.

There are three chief potential gains from using CB data in combination with RP data. First, CB survey questions can be constructed in order to elicit information about scenarios that lie outside of observed historical values for variables such as water levels, site amenities, and travel costs. Since RP approaches are confined to actual values of the data for such variables, extrapolation of the results to conditions outside of observed reality may be problematic. The use of CB data in combination with RP data addresses this issue.

Second, combining RP and CB data in one model allows one to test for similarities (or differences) in empirical results derived from these two different types of data. This capability is useful in certain applications.

Third, the use of panel data generally allows for higher precision in estimation for a given sample size of respondents (alternatively, sample sizes can be smaller for any given targeted level of precision). These benefits have made the panel data approach popular in other areas of empirical analysis, including the assessment of problems in economic history, the behavior of labor markets, the analysis of energy and water conservation measures, and program/project evaluation. Each of these applications involve cross sectional units (e.g., facilities, households, states, countries) that can display substantial heterogeneity. The use of panel data to study such cross sections allows for higher precision in estimation.

The starting point for the model is the demand for trips to a single recreation site:

$$TRIPS = F(C, X, Z, D) \quad 1$$

where *TRIPS* is the quantity of recreation trips demanded, C is the cost of travel to the site, X is a vector of respondent-specific attributes, Z is a vector of site-specific attributes, and D is a (1,0) indicator variable indicating whether the data for the observation is CB (D=1) or RP (D=0) data.

As mentioned above, the Poisson regression model provides an appropriate specification given the nature of recreation site trip data. The log likelihood function for the Poisson is:

$$\text{Log}\, L(\beta) = \sum_{i=1}^{N}\left[-\lambda_i + TRIPS\beta'\mathbf{x}_i - \ln TRIPS_i!\right] \quad 2$$

where $\lambda_i = \exp(F(C_i, X_i, Z_i, D_i))$.

While the model above yields a welfare measure that is an approximation of the exact Hicksian measure, it has a simple and attractive feature allowing calculation of the consumer's surplus per trip. Assuming γ is the coefficient on the travel cost, for a change in the travel cost to a very large (infinite) travel cost, CS per trip is simply $-1/\gamma$. Total seasonal consumer's surplus is simply the total predicted trips divided by γ. Unfortunately, when using a single-site cross-sectional model, the site characteristics cannot be used to explain the model (as they obviously do not vary for individuals in the data), and therefore there is no direct link to be made between marginal site quality changes (such as the water quantity change of interest here) and estimated welfare impacts.

We use a panel data formulation in which each cross section "i" corresponds to an individual respondent. and for each i there are multiple observations "j" that correspond to the source of data. In our analysis, we have two sources of data: one based on RP data and one based on different CB survey scenarios. The CB scenarios are described briefly in the following section.

Finally, we deal with the potential for overdispersion by reference to White's standard errors, from which inferences can be drawn even in the presence of misspecification (White, 1982). In addition, we note that the Poisson distribution yields unbiased estimates for the parameters even when the distribution is misspecified (Gourerroux, Montfort and Trognon, 1984).

3. DATA AND VARIABLES

Between November 1995 and March 1996, a mail survey questionnaire was sent to a group of recreators who visit several lakes in the region of northwest Nevada. The mail survey was implemented using most of the guidelines suggested by Dillman (1978), but the budget for this project precluded extensive efforts to obtain a return from those who failed to respond. Approximately 44 percent of the questionnaires were returned, after subtracting those surveys which were returned because of bad addresses. Following cleaning of the sample to exclude illogical responses and incomplete or unusable trip data, 679 completed surveys remained. A large proportion of the sample are anglers, and had participated in the annual Walker Lake fishing derby, typically held in the winter.

3.1 Contingent Behavior Scenarios

Economic analysis on this project took place simultaneously with beginning research in the hydrologic and other physical sciences, so the survey design could only incorporate a scant amount of existing scientific information. The main source of scientific information in 1996 was found in Thomas (1995), and records from the U.S. Geological Survey. There were six different versions of the mail survey questionnaire, and key design elements were varied to allow some flexibility. Four of these presented baseline and hypothetical scenarios at Walker Lake, while the other two dealt with other water recreation sites. Each respondent received only one version of the survey. This manuscript deals only with the surveys pertaining to Walker Lake. Each survey version depicted slightly different hypothetical scenarios, with each being a variation on possible water levels. Scenarios were presented using information in text form. Additionally, three of the versions presented to the respondent a pair of computer-enhanced photographs, one with "baseline" actual 1996 conditions and the other with enhanced "new" conditions. After being presented with a scenario which described a water level increase or decrease, respondents were asked whether they would change behavior from their actual number of reported trips for the season because of this different water level. If they stated yes, they were asked whether they would take more or fewer trips, and asked to report how many trips they would take and during which month(s) the trips would be increased or reduced. Only the three scenarios pertaining to Walker Lake water levels were retained for the dataset used in this manuscript. The three scenarios were:

- a text-only high-water scenario which described conditions (lake surface area, level of TDS, condition of sport fish, and number of usable boat ramps) at water levels approximately 20 feet higher than end-of-1996 levels of 3,946.5 feet,
- an identical highwater scenario that included computer generated photos of the higher water level at Walker Lake, and
- a low-water scenario including photos, which described conditions associated with water levels approximately 20 feet lower than 1996 conditions.

It is clear that the 20 foot increases depicted in the surveys would translate to large increases in volume at the lake (approximately 700,000 acre feet), but this number was chosen based on available physical science information that suggested increases which might prevent fishery loss (Thomas, 1995). These scenarios are perhaps both politically and practically improbable in view of current institutions, but the key point in doing such analysis relates to whether the respondents believed in the scenarios. If the respondents thought the scenarios were plausible, as may people asked to rate a currently unavailable automobile design, their responses can be tested for consistency. If respondents thought the scenarios were implausible, they were given the option of no response.

After eliminating surveys with inconsistent/missing contingent behavior or demographic data, a sample of 236 respondents remained. Each of these respondents contributed two observations to the model (reported actual 1996 trips and contingent trips under the new water level scenario), for a total of 472 observations. Of the 236 respondents, 82 completed surveys involving lower water level contingent scenarios. The remaining 154 respondents completed surveys involving a higher water level scenario. Of the 154 higher water scenario completes, 91 were the version with photos accompanying the text. Of the 236 respondents, 136 said they would not change the number of trips they would take under different hypothetical conditions. 117 of the respondents did not take any trips to Walker Lake originally and 99 of the respondents did not take any trips under the contingent scenarios. Because of the manner in which the original sample was obtained, there are potential biases, including those associated with on-site recruitment (see Shaw 1988). Therefore, we make no attempt to generalize from our sample to a larger random sample of the population of recreators.

3.2 Variables

The dependent variable is number of trips to Walker Lake. The independent variables included in the model consist of travel cost, one site-specific attribute (water level), six respondent-specific characteristics, an indicator variable CB denoting the source of the data point (RP *versus* CB), and an interaction term between CB and travel cost. The independent variables are shown in Table 1.

4. RESULTS

We first discuss the results of the pooled Poisson model (Section 4.1). Then, using those results we develop and present estimates of the value of recreation at Walker Lake, the impact of changes in water level on trips taken, and the influence of water level changes on recreation values (Section 4.2).

4.1 Model Results

Table 2 presents the results of the pooled Poisson models. We estimated the model in two ways:

1. The first specification includes the variables CB and CB*COST (unrestricted model). Inclusion of these variables allows one to test the null hypothesis that the source of data (CB versus RP) is not a statistically significant influence in the model. The results of this model specification are shown in the second column of Table 2.
2. The second specification omits the variables CB and CB*COST (restricted model). Estimation of the model without these variables allows one to determine the influence of their omission on other parameters of interest. The results of this model are shown in the third column of Table 2.

Inspection of Table 2 shows that most results are similar across the two specifications. The estimated coefficient on Walker Lake water level is positive and significant at the .01 level. This means that, *ceteris paribus*, higher water levels are associated with higher numbers of trips to the lake. The estimated coefficient on travel cost is negative, as expected, and statistically significant at the .01 level as well. The gender and age of the respondent both have the expected signs (positive) and are statistically significant. The indicator variable denoting that the respondent is retired has a negative coefficient, perhaps contrary to typical expectations, but is significant at only the .10 level. Size of household, level of respondent's education, and household income are not statistically significant.

While the estimated coefficient of CB is not statistically significant, the coefficient on CB*COST is of marginal statistical significance (at the .10 level for a two-tailed test). At first glance this suggests that the source of data (contingent behavior scenario *versus* actual revealed preference data) may have a marginal influence in the model. Comparison across columns 2 and 3, however, shows that inclusion of the two CB indicator variables has very little (in some cases no) influence on estimated coefficients for the remaining variables. The parameter most affected is that for water level, which falls from .028 to .024 (14% decrease) due to inclusion of the data source indicators. This is a relatively modest alteration.

To explore this issue further, we conducted a Wald test, which provides the appropriate hypothesis test for the influence of the source of data (CB *versus* RP). This test is preferred over a likelihood ratio test because the results do not depend on the validity of the assumed underlying (Poisson) distribution. The null hypothesis is the set of restrictions:

$$H_0: \beta_{CB} = \beta_{CB*Cost} = 0 \qquad 3$$

Under H_0 , the Wald test statistic W has a chi-squared distribution with two degrees of freedom (the number of restrictions). The critical value for the chi-squared distribution ($n = 2$, $P = 0.95$) is $c = 5.99$. For the (unrestricted) regression shown in column 2 of Table 2, $W = 4.492 < 5.99 = c$. Therefore, one cannot reject the null hypothesis that the set of restrictions holds. The indicator variables denoting the source of data (CB *versus* RP) are not significant factors in the model.

4.2 Estimated Values

Table 3 shows estimated values derived from the results of the models. First, we estimated average consumer surplus per trip to Walker Lake, calculated as $-1/\beta_{COST}$. For the unrestricted model, the estimate of per-trip consumer surplus equals $88/trip. The estimate of consumer surplus from the restricted model equals $120/trip.

At first glance, these per-trip values may appear somewhat high. For example, the median value for cold water recreational fishing as reported in Walsh et al. (1990) is approximately $40 per day (1997 dollars). However, it is important to remember that the values estimated by our model are in units of dollars per trip. According to the results of on-site surveys conducted at Walker Lake, the mean trip length is about 3 days (Fadali, Shaw, and Espey, 1998). Multiplying the Walsh et al. per-day value by 3 days yields $120/trip. This is quite close to the values we estimate in this manuscript, in fact equal to the estimate of consumer surplus from the restricted pooled Poisson model.

The second type of result included in Table 3 is our estimate of average annual consumer surplus (per person) from recreational visits to Walker Lake. The estimates range from $485/person/year to about $665/person/year. We do not in this manuscript develop estimates of aggregate annual consumer surplus (i.e., for the entire population of recreators at Walker Lake).

There are two chief reasons for this. First, the mail survey sample on balance is thought to exhibit over-avidity on the part of recreators (Fadali, Shaw, and Espey, 1998). Second, precise estimates of the number of persons who make visits to Walker Lake are not available.

The third row of Table 3 presents estimates of the effect of changes in Walker Lake water level on the number of trips. The results indicate that for a one-foot decline in water level, each recreator would take (on average) between 0.1 and 0.2 fewer trips per year. In the fourth row, we show the consumer surplus losses associated with this decline in trips. Each one-foot drop in water level is estimated to result in a loss on the order of $12 to $18 per person per year.

Another way of examining the effects of water quantity changes relates to changes in the volume of water at Walker Lake, and these can be linked with recent work in the physical sciences relating volume or storage to the critical TDS levels. Using a quadratic relationship between storage and the Lake's elevation, it can be estimated that a volume of 2.3 million acre feet translates to an elevation of about 3,951.33 feet. This elevation was approximately the actual end of year lake level in 1997, as determined from U.S.G.S. records. Recent hydrology modeling suggests that even this elevation and volume are not sufficient to maintain the fishery at Walker Lake.

Our hypothetical scenarios pose an increase of 20 feet in the Lake's water level, which corresponds approximately to the lake's end of year level in 1984. Actual storage at the end of that year was about 3.05 million acre feet. Thomas (1995) estimated that to maintain TDS at the July 1994 level of 13,300 mg/L would require about 33,000 acre feet more than a long term average, and that to reduce TDS from 13,300 to about 10,000 the lake-surface would need to increase by about 20 feet, corresponding to about 700,000 acre feet of water. This 20 foot increase provided the basis for the hypothetical scenario. Others have suggested that Walker Lake needs approximately 50,000 acre feet additional volume to maintain the fishery, but the exact additional volume is not yet known. If we assume that 50,000 more acre feet is adequate, this would imply a sustainable fishery volume of approximately 2.35 million acre. Again using the quadratic relationship, this would translate into about a 1.4 foot increase in the water level at Walker Lake, only slightly more than the marginal "one foot" value reported in Table 3. Using this marginal value as an indicator, the values of roughly $12 to $20 per person for this change in water level are large enough to compensate agriculture to move 50,000 acre feet of water down to the lake, provided the total number of "willing" recreators is sufficient to rent water from other sources. Fadali and Shaw (1998) suggest, using conservative estimates, that this total number is large enough.

5. CONCLUSIONS AND POSSIBILITIES FOR FURTHER RESEARCH

Some hydrologists have suggested that if the 1987 to 1994 drought at Walker Lake had existed for just another two years, the lake would have been unable to recover for future use. At best it is currently a fragile ecosystem. As stated in the introduction, it is possible that a water bank will be created for this region, though national, state and local politics will undoubtedly play the deciding role. On the positive side, water banks may in fact be most beneficial during drought periods (Loomis, 1992). Part of the success for the bank depends on whether a market exists for the water, with one possibility being the demand that recreators have for increases in water supplies at one or more recreational sites. As shown in Fadali and Shaw (1998), in principle, the demand for water from a bank exists to some extent; their results using only RP data indicate that value per acre foot on the part of recreators may be high enough to bid away agricultural water on a rental basis.

These results are supported here, where the SP data from the same study are used for the first time. An advantage over the Fadali and Shaw (1998) study is that we are able to focus more carefully on values for marginal water level changes at Walker Lake.

As in this study, economic analysis often must be performed ahead of physical science analysis because of the funding and timing of research projects, even though having the best physical science results often improves the quality of economic analysis. This suggests that it is wise to build an economic model flexible enough to incorporate better scientific data and measurements as they become available. Using the storage-elevation relationship discussed above, we can flexibly translate water level changes to volume changes, identifying the critical water level change needed. Our model then allows one to recover the value for additional water for a variety of water levels considered. We demonstrate that under our assumptions an increase in Walker Lake's level of about 1.4 feet may be sufficient to maintain the fishery, and it seems certain that a 20 foot increase would do so. A key science finding yet to come is a more precise identification of the critical volume of water for sustaining the Walker Lake fishery. If more water is needed to avoid the TDS level critical for sport fish species, our model can be used to examine that situation.

As noted above, obtaining large increases in volume at Walker Lake may not be possible given the current political climate, existing institutions, and withdrawals from the system. Future study of the Walker River Basin needs to better address the exact volume needed to avoid the 16,000 mg/L TDS level over the years to come, and the role of uncertain factors such as global climate change and the incidence of extreme precipitation events. Finally, there needs to be much more research on the willingness to sell on the part of agricultural users in the Basin, and other factors that could lead to actual development of a water bank.

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Table 1: Variables	
Variable Name	**Variable Definition**
WATER	Water level at Walker Lake, in feet
GENDER	Indicator variable denoting respondent gender (= 1 if male; otherwise 0)
AGE	Age of the respondent in years
HOUSEHOLD	Number of persons in respondent's household
EDUCATION	Years of education of respondent
INCOME	Annual household income (including interest, dividend, and retirement income)
COST	Travel cost, including opportunity cost of time
RETIRED	Indicator variable denoting respondent is retired (= 1 if retired; otherwise 0)
CB	Indicator variable denoting whether the observation is from CB or RP data (= 1 if from CB data; otherwise 0)
CB * COST	Interaction term composed of CB * COST

Table 2: Results of Pooled Poisson Models[1]		
Variable	With CB Indicator Variable and CB*Cost Interaction Term	Without CB Indicator Variable and CB*Cost Interaction Term
Constant	-92.55*** (23.43)	-108.92*** (26.48)
WATER	0.024*** (0.006)	0.028*** (0.007)
GENDER	0.529** (0.269)	0.526** (0.267)
AGE	0.036*** (0.007)	0.036*** (0.007)
HOUSEHOLD	0.102 (0.104)	-0.101 (0.103)
EDUCATION	-0.151 (0.095)	-0.150 (0.095)
INCOME	$-6*10^{-6}$ $(4*10^{-6})$	$-6*10^{-6}$ $(4*10^{-6})$
COST	-0.011*** (0.003)	-0.008*** (0.002)
RETIRED	-0.498* (0.279)	-0.501* (0.281)
CB	-0.239 (0.400)	Not included
CB* COST	0.005* (0.003)	Not included
Log Likelihood	-2725	-2755

1 White's standard errors are shown in parentheses.
* Denotes statistical significance at the .10 level for a two-tailed test.
** Denotes statistical significance at the .05 level.
*** Denotes statistical significance at the .01 level.

Table 3: Consumer Surplus and Changes in Trips		
Estimate	**With CB Indicator Variable and CB*Cost Interaction Term**	**Without CB Indicator Variable and CB*Cost Interaction Term**
Average Per-Trip Consumer Surplus	$88	$120
Average Annual Consumer Surplus	$485	$664
d(TRIPS)/d(WATER) at Mean Predicted Value of TRIPS	0.132 trips annually per person per change in water level (feet)	0.154 trips annually per person per change in water level (feet)
Values per Trip due to Water Level Change	$11.60 annually per person per change in water level (feet)	$18.54 annually per person per change in water level (feet)