

FINAL REPORT

ECOREGIONAL ESTIMATES OF THE NET ECONOMIC VALUE OF OUTDOOR RECREATIONAL ACTIVITIES IN THE UNITED STATES: INDIVIDUAL MODEL RESULTS

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By

Environmental Resources Assessment Group
U.S. Forest Service Research Unit, SE-4901,
and Department of Agricultural and Applied
Economics, University of Georgia

John C. Bergstrom, Principal Investigator²
James M. Bowker, Principal Investigator¹
H. Ken Cordell, Principal Investigator¹

Gajanan Bhat, Graduate Research Assistant²
Donald B.K. English, Cooperator¹
R. Jeff Teasley, Research Coordinator²
Pedro Villegas, Research Technician²

¹ Outdoor Recreation and Wilderness Assessment Group, SE-4901,
Southeastern Forest Experiment Station, Athens, GA.

² Department of Agricultural and Applied Economics, The University of Georgia,
Athens, GA

Introduction

In many areas of the U.S., major portions of local land and water resources are publicly-owned and managed by government agencies. "Stakeholders" concerned with the management of these publicly-owned resources include rural residents in the immediate vicinity of the resources (who, for example, may depend on resource extraction business such as logging and mining) and citizens who live far away from the resources but actively utilize these resources in utility-generating activities (such as on-site recreation). From an economic perspective, efficient management of publicly-owned resources requires information on the economic value of the alternative products and services supported by these resources. This information includes, for instance, net economic values for commercial products such as saw timber and recreational activities such as camping and boating.

The U.S.D.A. Forest Service manages vast tracts of publicly-owned land and water resources across the U.S., especially in the South and the West. The Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), was passed to make resource management by the U.S. Forest Service rational and accountable. The planning has been perceived at two levels: national and local. The national level tasks are Assessment and Program. The Assessment describes the current forest and rangeland situation, and analyzes the environmental, social and economic trends that will likely affect the situation over the next 50 years. Based on the findings of the assessment, the Secretary of Agriculture recommends to the Congress a 50 year RPA program for the Forest Service. The recommended Program is a strategic plan that establishes long term resource management goals. In the planning process, alternative

plans are developed to reflect different emphasis on the various resource management goals and different strategies for meeting societal needs over next 50 years (U.S. Department of Agriculture Forest Service, 1989).

For the 1980 and 1990 RPA efforts, the recreation activity values were based primarily on values reported by previous studies of outdoor recreation demand.

Comprehensive reviews of previous outdoor recreation demand studies are provided by Sorg and Loomis (1984), Bergstrom and Cordell (1991), McCollum et al. (1991), and Walsh, Johnson, and McKean (1988). In some of these studies, the authors reviewed the demand for a single activity provided at a single site. Bergstrom and Cordell (1991) estimated a multi-regional multi-site outdoor recreation demand model for the United States. They used a regional zonal travel cost model (ZTCM) for analyzing the general demand for and value of publicly provided outdoor recreation and assessed the effects of regional variations in population characteristics and recreation opportunities on outdoor recreation demand in the United States.

The primary purpose of this study was to estimate individual activity demand functions for the land and water-based activities across ecoregions of the United States. This report begins by describing travel cost demand, contrasting zonal and individual approaches. Next, the methodology and estimation procedure using individual travel cost model (ITCM) is discussed. The description and source of data are then discussed with an emphasis on the descriptions of the variables used. Results and implications are then highlighted.

General Methodology

There is general agreement among economists that the appropriate measure of the value of outdoor recreation to an individual is consumer's surplus or net economic value (Dwyer, Kelly, and Bowes (1977); Stoll, Loomis, Bergstrom (1987); Rosenthal et al. (1986); U.S. Water Resource Council (1983)). Economists have devised various ways to empirically obtain these surplus measures. In general, the travel cost model (TCM) is one of most the widely used nonmarket valuation techniques, particularly for estimating the value of outdoor recreation activities. This method is based on reported behavior and an assumed complementary relationship between travel consumer's surplus and site consumer's surplus, i.e. where travel and resource demands interact so that when travel prices are high, travel demand is driven toward zero. Originally, the TCM was developed to provide values for recreation sites. Subsequent applications have been directed to predicting changes in recreation behavior, valuing changes in site attributes, and valuing specific recreation activities.

The most frequently used TCM approaches are the zonal (ZTCM) and the individual (ITCM) approach. The empirical procedure for the zonal approach is usually broken into two stages: zonal per capita participation rates are regressed on travel cost and other relevant socioeconomic variables and stage one parameters are then used to derive trip/travel cost functions for each zone. These cost functions may in turn be summed across price intervals to obtain an aggregate or second stage demand function. The aggregate demand function may then be used as the basis for obtaining Marshallian consumer's surplus estimates. A crucial requirement for using ZTCM is to have relatively homogenous populations in each

zone and to know with considerable certainty the amount of visitation at each site. Recent applications of ZTCM include Hellerstein (1991) and Bergstrom and Cordell (1991).

In this study, we use the individual rather than zonal approach. The ITCM is conceptually similar to the ZTCM. However, the travel cost relationships are based solely on individual observations. The unit of observation is an individual's consumption of trips. The ITCM demand curve is derived by estimating the statistical relationship between individual trips and the distance traveled from the place of residence to recreation site. By focusing on individual observations, the ITCM approach allows for more statistically efficient and theoretically consistent analysis of the individual recreation consumption behavior. The ITCM approach has been used in recent literature by a number of economists including Adamowicz et al. (1989), Creel and Loomis (1990), Wilman and Pauls (1987).

Net Economic Value

Three economic measures are typically used to indicate the importance and value of a given activity or resource. These measures include (1) total revenue or total expenditure (2) employment and (3) net economic value or consumer's surplus. Total expenditure is simply the product of market price and quantity. For a recreation activity like camping, an individual with a demand curve as depicted in Figure 1 would take 5 camping trips per year if the cost per trip were \$50. The individual's total expenditure on camping trips would then be \$250 ($5 * \50 or area abde). Individual annual expenditures on camping trips could then be summed across all individuals in a region to determine the total camping expenditures for the region. This information can subsequently be combined with an employment multiplier

from a regional input-output model to determine the amount of employment supported by camping in the region.

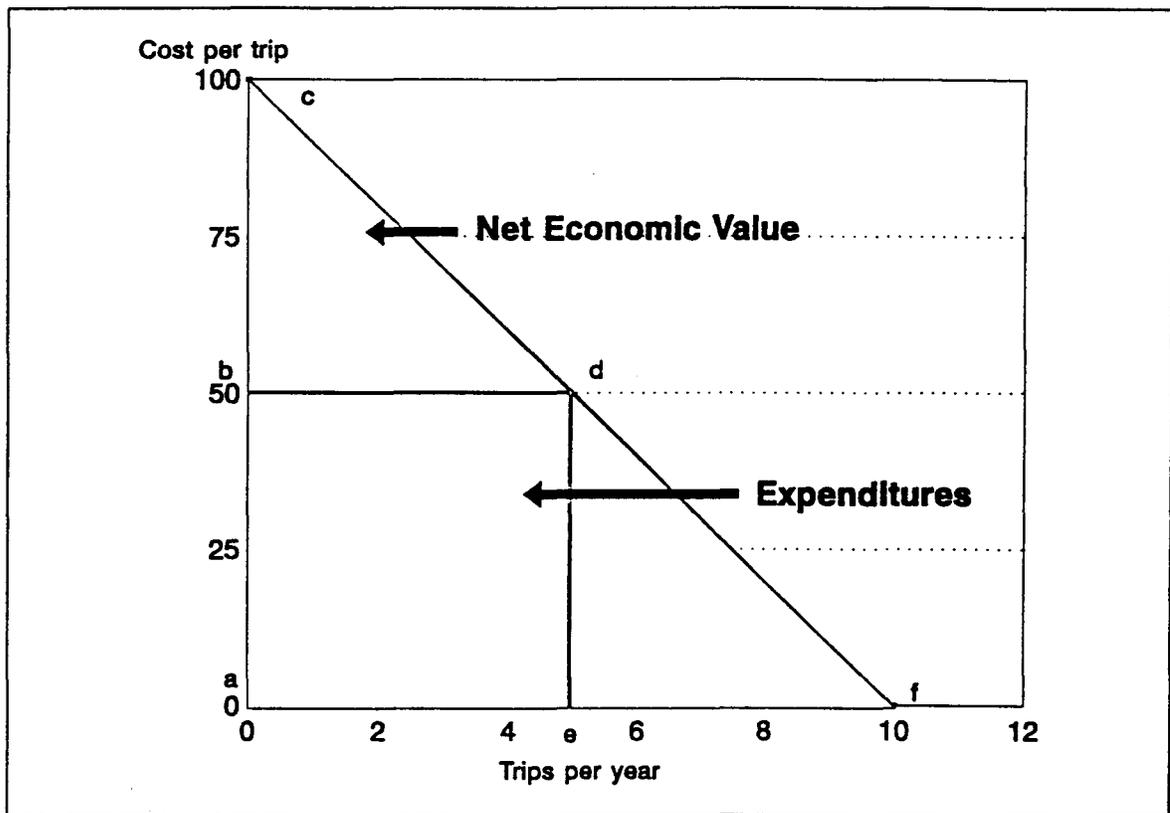


Figure 1

Generally, total expenditures and employment are used by policy makers to assess economic growth and development in a region. For example, consider a long term public investment like a campground in a rural setting. Suppose further that the bulk of the visitation is by nonlocals, one could argue that most of the benefits of the campground accrue to nonlocals and is therefore not a wise public investment. However, nonlocal spending during camping trips in the area may be quite significant resulting in income growth and job creation for locals. If this is the case, the investment has considerable merit.

Net economic value in the above example is a measure of the benefit received by the campers. This value is based on the difference between what a consumer must pay for a good or service and the maximum amount a consumer is willing to pay. For example, the consumer's demand function for camping is depicted as line cdf in Figure 1. At a price of \$50 the consumer will purchase 5 camping trips. The consumer is said to be at an equilibrium point, that is, where willingness to pay is equal to what the consumer must pay to obtain the good. At quantities greater than 5 trips, the price of \$50 exceeds the amount the consumer is willing to pay and further purchases will not take place. At quantities fewer than 5 trips, the consumer is willing to pay more than the price, hence there is a positive net economic value associated with each trip. Summing these values up to the consumer's equilibrium point results in a net economic value or consumer's surplus per year of \$125 ($5 \times (100 - 50) \times 0.5$ or area bcd). Again, this measure reflects the net benefit the individual receives from camping because it is the difference between what the individual would give up to camp less what the individual must give up.

As with expenditures, net economic value can be summed across all campers in a region to obtain an aggregate measure of the net economic value of camping as a main activity in the region. In the case of National Forests, accrual of net economic benefits to locals versus nonlocals is generally less important than consideration of the benefits from a national perspective. These per day net economic values are often multiplied by annual participation to obtain estimates of the contribution to national welfare resulting from demand and use of region's recreational resource base.

In this section of the report, we use existing databases and state of the art methods to assess individual per year and per day net economic values for fourteen different main activities common to outdoor recreation in the United States. It should be noted that by main activity we do not imply it is the only activity, many trips entail multiple complementary activities. However, in most cases, the desire to participate in a main activity is the primary behavioral influence.

Demand Model

The ITCM is often employed as a method to estimate the recreation demand for a whole site which provides many recreation activities to a visitor. However, management at a larger scale often requires more aggregate information about activities across landscapes or ecoregions. In the present study, demand functions are estimated for various activities within a number of ecoregions. The basic conceptual model is specified as:

$$TRIPS_{ij}^{ke} = f (INC_i, TC_{ij}, SUBST_i, Z_i) \quad (1)$$

where $TRIPS_{ij}^{ke}$ represents annual trips by individual i to the site j in ecoregion e for activity k , INC_i is annual household income of individual i , TC_{ij} is the travel cost per trip from individual i 's origin to site j , and $SUBST_i$ is price of a logical substitute, and Z_i is a vector of other socio-demographic variables for individual i . For each individual, definition of a trip depends on the declared main activity.

Ten ecoregions were defined following Bailey's classification scheme (1994). The general boundaries of these ecoregions are shown in Figure 2. Over 300 sites were grouped

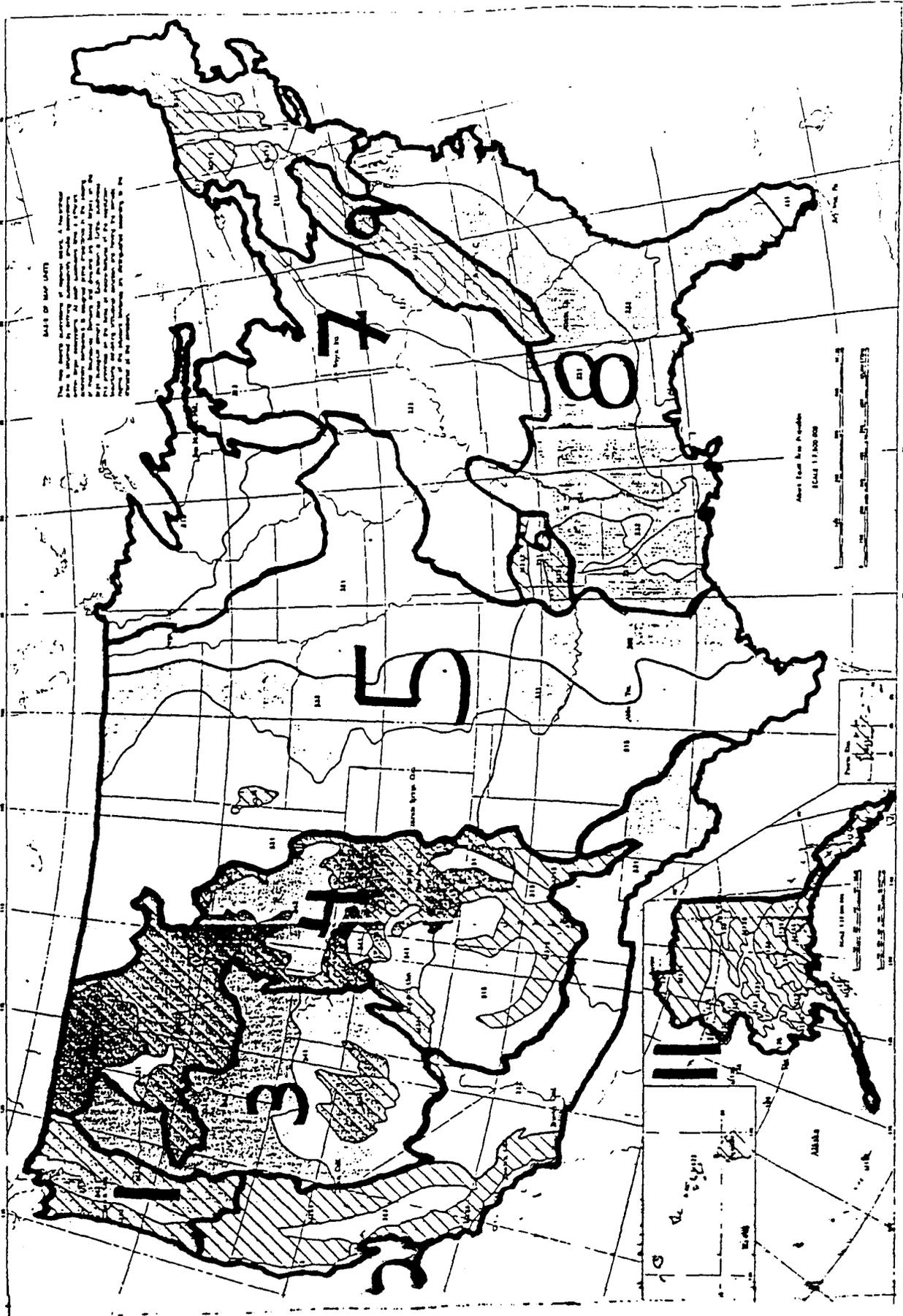


Figure 2 Ecoregions of the United States of America

into specific ecoregions. Each ecoregion contained a maximum of 28 activities. Empirical ITCMs were estimated using truncated count data estimators as described in Creel and Loomis (1990) and Grogger and Carson (1991). These models were chosen because the dependent variable, the number of trips taken over the season or year, is a nonnegative integer. Also, the data were collected onsite excluding nonusers and potential users, so estimators based on truncated count data distributions are appropriate. Creel and Loomis (1990) have found that accounting for truncation at zero of the dependent variable makes a substantial difference in the coefficient estimates, and subsequent benefit estimates, regardless of the choice statistical model.

The statistical model fitted using the truncated Poisson (TP) is given by

$$P(Y_i = y_i | Y_i > 0) = \frac{\exp(-\lambda_i) \lambda_i^{y_i}}{y_i! [1 - \exp(-\lambda_i)]}, \quad (2)$$

$$y_i = 1, 2, \dots, \quad i = 1, 2, \dots, n$$

For maximum likelihood estimation, the loglikelihood function is:

$$\ln L = \sum_{i=1}^n [-\lambda_i + y_i x_i \beta - \ln(y_i!) - \ln(1 - \exp(-\lambda_i))]. \quad (3)$$

The conditional mean and variance are then,

$$E(y_i | y_i > 0) = \mu_i = \frac{\lambda_i}{1 - \exp(-\lambda_i)}, \quad (4)$$

$$Var(y_i|y_i>0) = \mu_i \left[1 - \frac{\lambda_i}{\exp(\lambda_i) - 1} \right]. \quad (5)$$

Following convention, λ_i is parameterized for estimation as

$$\ln \lambda_i = X_i \beta + u_i \quad (6)$$

where X_i represents the vector of explanatory variables, β is the parameter vector and u_i is random disturbance.

Data

Data for the study were obtained from the Public Area Recreation Visitors Study (PARVS) and the CUSTOMER survey. PARVS and CUSTOMER are ongoing multi-agency efforts to collect data on the use of public areas for outdoor recreation. The major component of these efforts is on-site interviews of recreationists conducted at public recreation areas. The analysis reported in this paper was based on PARVS and CUSTOMER survey data collected at over 350 sites across the continental U.S. between 1985 and 1992. These sites included National Parks, National Forests, National Rivers, U.S. Army Corps of Engineers and Tennessee Valley Authority Reservoirs, and numerous state recreation areas.

In the onsite interviews, respondents were asked to provide information about themselves and their recreation patterns. Data were collected on the respondent's personal and household characteristics, the main activity, origin, trip expenditure, distance and time of travel, and whether the current trip was multipurpose or not. Data were also collected on the respondent's 12 month trip profile. The 12-month trip profile includes information such as

the total number of trips in the last 12 months, the total number of days of recreation, and the list of recreational activities. Origins for the individuals were recorded as both county names and zip codes. Recorded origins included almost 80 percent of all counties in the United States. Counties not represented were primarily sparsely populated counties in the midwest and those comprised mainly of public land located in the West.

In this study, per trip travel cost is defined as a composite of variable operating costs and the opportunity cost of time in travel. The literature is ambiguous as to exact specification of travel costs. In general, most research supports the inclusion of variable operating costs and some measure of the opportunity cost of time in travel. Issues pertaining to the exact value of time in travel and time on site, along with such things as vehicle depreciation, recalled vs. inferred expenses, and complementary spending continue to be the subject of considerable debate and further research and are beyond the scope of this paper. Variable operating costs were computed as the product of origin to site driving distance (computed with ZIPFIPS) and a mileage factor of ten cents. Following others, the opportunity cost of time in travel was calculated as the product of 25 percent of the wage rate and the estimated time in transit (assuming 50 mph average speed) from the origin to the site. Deflation of reported and calculated costs was applied to effectively use the data over 10 years.

The substitute variable price variable (SUBST) was also calculated as a composite of distance and time costs. A substitute site was identified for each individual. The site was determined as the site closest to the individual's origin which offered the opportunity for the same main activity. The calculation of variable mileage and time costs is as above. In

addition, a binary variable (NON) to differentiate local from nonlocal participants was included. This classification was made based on whether the respondent lived within a radius of 100 miles of the site.

Results

The ITCMs were estimated using the maximum likelihood routine for the truncated Poisson models (LIMDEP). The specification of the empirical individual travel cost model is given as follows:

$$\text{Trips}_{ij}^{ke} = f(\text{Intercept}, \text{INC}_i, \text{TC}_{ij}, \text{SUBST}_{ij}, \text{NON}),$$

where, Trip_{sij}^{ke} is the annual number of trips an individual i takes to site j for activity k in ecoregion e , INC_i is household income of the individual per year, TC_{ij} is a composite variable consisting of time and distance and is given as follows:

$$\text{TC} = (\text{roundtrip distance} * 0.10) + (\text{roundtrip distance}/50) * (.25 * \text{INC}/2000).$$

SUBST_{ij} is calculated similarly and is given by:

$$\text{SUBST} = (\text{roundtrip subst. site distance} * 0.10) + (\text{roundtrip subst. site distance}/50) * (.25 * \text{INC}/2000).$$

NON is a dummy variable classifying the recreational visitor as local or nonlocal.

A total of 28 equations across activities and ecoregions were estimated. Some of the land and water-based activities in this study include motorboating and waterskiing, developed and primitive camping, coldwater fishing, sightseeing and pleasure driving, and big game hunting. Because of data limitations, all activities were not necessarily represented across all ecoregions. We included only activities for which ecosystem representation exceeded 100 observations. Also, the data for each estimation are limited to observations not exceeding the

90th percentile of distance travelled to the site. Deflation was applied to effectively use the data over 10 years.

The tables of results for parameter estimates are presented in Technical Appendix I. Two sets of functional forms for demand models were given. The difference between the models was whether or not a dummy variable (NON) is included to classify an observation as local or non local. Estimated demand equations with the NON variable included are shown in Tables 1 - 19 in Technical Appendix I. Tables 20 - 38 in Technical Appendix II show the estimated demand equations not including this variable. Each table consists of parameter estimates with standard errors, likelihood ratio statistics and Chi-square statistics. Chi-square and likelihood ratio statistics indicate that these models strongly explained the recreation demand model fit.

In the case of demand functions which included dummy variable (NON), the travel cost (TC) variable was found to be negative and highly significant in all the ecoregions except for a few activities in the Desert Southwest and the Ozark and Ouchita Mountains. The income (INC) variable was found to be negative in activities such as Developed and Primitive Camping, Day Hiking and Walking, Picnicking, Family Gathering, Pool Swimming, and Outdoor Swimming, whereas it was positive in the rest of the activities. INC is not significant in activities such as Picnicking, Family Gathering, and Nature Study and Photography. The substitute variable (SUBST) was positive in most cases but not significant in the activities like Motorboating and Water Skiing, Nature Study and Photography, Picnicking, Family Gathering, Pool Swimming, and Cold Water Fishing. NON was significant in the majority of the activities and ecoregions. This implies an

autonomous difference in the consumption behavior of local and nonlocal visitors at most of the sites. Given the spatial nature of travel cost models and the need for distance variation, this issue is often overlooked in TCM studies. In general, inclusion of this variable induced price coefficients lower in absolute values indicating a more elastic demand.

The results of the demand models for different activities and ecoregions (Table 20 - 38 in Technical Appendix I) were found to be more or less similar to the corresponding models which included the dummy variable. The travel cost variable was found to be negative and significant except in Cold Water Fishing in the Desert Southwest and the Great Basin Steppe. Income (INC) was found to be positive except in Sightseeing and Pleasure Driving, Family Gathering, Pool Swimming, Outdoor Swimming, Cold Water Fishing, and Fresh Water Fishing. INC was not found significant in Sailing and Other Boating, Off-highway Motor Vehicles, Picnicking, Family Gathering and Cold Water Fishing. The substitute (SUBST) variable was not significant across most of the activities and ecoregions.

Mean net economic value (consumer surplus) per activity day by ecoregion for different activities are given in Tables 1- 6. Three classes of model results are given; separate models for each activity and ecoregion, aggregate models with intercept and slope dummy variables to test for significant difference between the estimates across ecoregions, and aggregate models for each activity across all the ecoregions. Two sets of values are given for each model class: values derived from the model which include NON and values derived from the model which does not include NON dummy variable.

Mean net economic value per trip is calculated as

$$CS = \frac{1}{-\beta_{tc}} \quad (7)$$

where, β_{tc} is the estimated coefficient on travel cost. Consumer's surplus per day is calculated by dividing consumer's surplus per trip by average activity days per trip in each ecoregion.

Table 1a, Table 1b, and Table 1c present the mean net economic values of 20 recreational activity groups per activity day across ecoregions. These are the estimates obtained from individual travel cost methods for each activity in each ecoregion. In these tables, surplus per activity day estimates are given for two models; one without NON considered in the model (denoted as A in the Table) and the other with NON in the model (denoted as B in the Table). Models and surplus are estimated on a per trip basis and then surplus is converted to an activity day basis via median trip length for a given activity and ecoregion.

Table 2a, Table 2b, and Table 2c present the mean net economic values of 20 recreational activity groups per activity day across ecoregions. Table 1 and table 2 differ in that per day net economic values are obtained by converting surplus estimates by mean trip length instead of median trip length.

Table 3a, 3b, and 3c consist of mean net economic value per activity day of various recreational activity groups by ecoregion. These are obtained from aggregate models over all ecoregions with slope and intercept dummy variables included for which these activities are present in the data set. For this purpose, the data from all ecoregions are pooled together for

Table 1a. Mean Net Economic Value per Activity Day by Ecoregion: Separate Model

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-------------------|--------|------------------|---------|--------------------|---------|-----------------|---------|
| | Pacific northwest | | Desert Southwest | | Great Basin Steppe | | Rocky Mountains | |
| | A | B | A | B | A | B | A | B |
| Dev. & Primitive Camping | 88.74* | 86.41* | 127.71* | 170.10* | 21.03 | --- | --- | --- |
| Day Hiking & Walking | 22.95 | 22.43 | N.S. | N.S. | --- | --- | 83.29* | 114.77* |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Boating | --- | --- | --- | --- | --- | --- | N.S. | 91.91 |
| Sightseeing and Pleasure Driving | 56.67* | 92.07* | N.S. | N.S. | --- | --- | N.S. | N.S. |
| Off-Highway motor vehicles | 29.05 | 30.58 | --- | --- | --- | --- | N.S. | N.S. |
| Motorboating and Waterskiing | --- | --- | 103.41 | 452.31* | --- | --- | 159.96 | 154.25 |
| Bicycling | --- | --- | 187.99* | 368.21* | --- | --- | --- | --- |
| Nature Study and Photography | 56.17 | 56.42 | 107.66* | 191.42* | --- | --- | --- | --- |
| Picnicking | 21.16 | 52.63 | 57.25 | 108.14* | --- | --- | 30.1 | 35.23 |
| Family Gathering | 25 | 40.88 | 152.62* | N.S. | --- | --- | 144.79* | 177.75* |
| Pool Swimming | 43.8 | 45.18 | 118.98* | --- | --- | --- | --- | --- |
| Outdoor Swimming | 7.84 | 9.17 | 46.85 | N.S. | --- | --- | --- | --- |
| Downhill Skiing | 19.5 | 19 | --- | --- | --- | --- | --- | --- |
| Coldwater Fishing | --- | --- | 88.01 | 77.91 | 175.3* | 172.44* | 39.11 | 70.4 |
| Freshwater Fishing | --- | --- | 69.79 | N.S. | --- | --- | --- | --- |
| Big Game Hunting | 18.82 | 4.74 | 36.58 | 28.12 | --- | --- | 40.54 | 43.52 |
| Wildlife Observation | 122.63* | N.S. | 67.31 | N.S. | --- | --- | 65.31 | 72.56 |
| Visiting Prehist. sites | --- | --- | N.S. | --- | --- | --- | N.S. | N.S. |
| No Main Activity | 97.36* | N.S. | 57.04 | 78.82 | --- | --- | 72.18 | 90.00* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that estimated price coefficient is negative and not significant.

Table 1b. Mean Net Economic Value per Activity Day by Ecoregion: Separate Model

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-----------------|---------|-----------------|--------|------------------|---------|-----------------------|-------|
| | Midwest Prairie | | Ozark Mountains | | NE & Great Lakes | | Southeast Subtropical | |
| | A | B | A | B | A | B | A | B |
| Dev. and Primitive Camping | --- | --- | 105.55* | 71.26* | 36.29 | 42.20 | 59.80 | 46.62 |
| Day Hiking and Walking | --- | --- | 10.34 | 50.85 | 53.18 | N.S. | --- | --- |
| Whitewater Rafting | --- | --- | -- | --- | --- | --- | --- | --- |
| Sailing & Boating | --- | --- | 14.80 | 24.48 | 43.49 | 70.05 | --- | --- |
| Sightseeing and Pleasure Driving | 27.47 | 19.75 | 20.35 | 34.75 | 135.97* | 158.92* | 98.73 | 85.38 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- | --- | --- | --- | --- |
| Motorboating and Waterskiing | --- | --- | 5.64 | 3.97 | --- | --- | --- | --- |
| Bicycling and Mountain Biking | --- | --- | --- | --- | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- | --- | --- | --- | --- |
| Picnicking | --- | --- | --- | --- | 76.74* | 78.75* | 36.95 | 33.85 |
| Family Gathering | 382.88* | 182.01* | 36.73 | 67.08 | 143.22* | 156.75* | 79.20 | 67.90 |
| Pool Swimming | --- | --- | 102.32 | N.S. | --- | --- | --- | --- |
| Outdoor Swimming | --- | --- | 182.27* | N.S. | --- | --- | --- | --- |
| Coldwater Fishing | --- | --- | --- | --- | --- | --- | --- | --- |
| Warm Freshwater Fishing | 68.01* | 68.35* | 16.36 | 13.89 | --- | --- | --- | --- |
| Big Game Hunting | --- | --- | 9.43 | 4.31 | --- | --- | --- | --- |
| Wildlife Observation | --- | --- | 12.49 | 13.74 | --- | --- | --- | --- |
| Visiting Prehist.Sites | --- | --- | 30.08 | 29.42 | --- | --- | --- | --- |
| No Main Activity | --- | --- | 8.17 | 6.59 | --- | --- | 8.50 | 15.16 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that the estimated price coefficient is negative and not significant.

Table 1c. Mean Net Economic Value per Activity Day by Ecoregion: Separate Model

| Activity Groups | Ecoregion | | | |
|----------------------------------|-----------------------|---------|-------------|---------|
| | Appalachian Mountains | | New England | |
| | A | B | A | B |
| Dev. and Primitive Camping | 29.11 | 34.29 | 29.77 | 43.25 |
| Day Hiking and Walking | 9.09 | 12.82 | 53.72 | 138.04* |
| Whitewater Rafting | 71.86 | 154.30 | 208.71* | 295.25* |
| Sailing & Boating | 36.07 | 39.11 | 56.17 | 124.92* |
| Sightseeing and Pleasure Driving | 71.35* | 75.70* | 20.35 | 34.75 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- |
| Motorboating and Waterskiing | 226.43* | N.S. | --- | --- |
| Bicycling and Mountain Biking | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- |
| Picnicking | 21.94 | 21.64 | --- | --- |
| Family Gathering | 121.22 | --- | 92.57 | 97.12 |
| Pool Swimming | 77.73 | 28.67 | 77.27 | 103.49 |
| Outdoor Swimming | 68.86 | 36.81 | --- | --- |
| Coldwater Fishing | 102.73 | 77.84 | --- | --- |
| Warm Freshwater Fishing | 25.39 | 63.73 | --- | --- |
| Big Game Hunting | 33.35 | 29.30 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- |
| Visiting Prehist.Sites | --- | --- | --- | --- |
| No Main Activity | 86.98* | 107.27* | 71.86 | 70.74 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that estimated price coefficient is negative and not significant.

each activity. Intercept and distance slope dummy variables are created for an ecoregion if that particular ecoregion has the above activity in question in the data set. For example, Developed and Primitive camping is available in 7 ecoregions. Thus, we have 7 slope dummy variables and 7 intercept dummy variables each representing an ecoregion. For Developed and Primitive Camping models and surplus are estimated on a per trip basis and then surplus figures are converted to an activity day basis via mean trip length for a given activity and ecoregion.

Tables 4a, 4b, and 4c consist of mean net economic values per activity day for various recreational activity groups by ecoregion. The difference between Table 3 and Table 4 is that estimates are given from aggregate models over all ecoregions with intercept and price dummy variables included for only those ecoregions for which these activities are significant. For example, Developed and Primitive Camping is present in 7 ecoregions. After estimation of aggregate models with all 7 intercept and distance slope dummy variables, it was found that only ecoregion 1, 3, 4, 6, 7, 8, and 9 slope dummies were significant. Thus, the model underlying Tables 4 consists of only those dummy variables.

Table 5a, 5b, and 5c present confidence intervals for net economic value per activity day by ecoregion. These confidence interval figures correspond to the results of individual models which do not include NON (The A part of Table 1a, 1b, and 1c). Table 6a, 6b, and 6c consist of confidence intervals for net economic value per activity day by ecoregion. These figures correspond to the results given under part B of Table 1a, 1b, and 1c. These confidence intervals (lower and upper bounds) are given for each activity in each ecoregion. They are symmetric, given for 10 % significance level. and are truncated to non negative values.

Table 7 consists of aggregate models which are mean net economic values per activity day of various recreational activity groups across all the ecoregions. These aggregate models have been estimated by pooling data sets over ecoregions for a particular activity.

Net economic value per day estimates indicate the average welfare impacts on individuals of increased outdoor recreation days in the respective activities across ecoregions. These values provide a means for comparing the relative values of outdoor recreation across activities.

Land based activities include Developed and Primitive Camping, Day Hiking and Walking, Sightseeing and Pleasure Driving, Off-highway Motor Vehicles, Bicycling and Mountain Biking, Nature Study and Photography, Picnicking, Family Gathering, Big Game Hunting, Wildlife Observation, Visiting Prehistoric Places, Relaxing and No Main Activity. The values are high for activities such as Developed and Primitive Camping, Picnicking and Family Gathering. The values are higher in most of the activities in the Desert Southwest, the Pacific Northwest Marine, and the Rocky Mountains. The per day estimates are higher in the models which included the dummy variable NON in almost all the activities and ecoregions. Land based activities with moderate per day estimates include Day Hiking and Walking, Sightseeing and Pleasure Driving, Off-highway Motor Vehicles, Bicycling and Mountain Biking, and Wildlife Observation. Activities with lower per day estimates are Big Game Hunting, Visiting Prehistoric Places, and Relaxing and No Main Activity.

Water based activities include White Water Rafting, Motorboating and Water Skiing, Pool Swimming, Outdoor Swimming, Coldwater Fishing, and Freshwater Fishing. The per day estimates are higher for activities such as Whitewater Rafting in Appalachian Mountains,

Table 2a. Mean Net Economic Value per Activity Day by Ecoregion: Separate Model

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-------------------|--------|------------------|---------|--------------------|---------|-----------------|---------|
| | Pacific northwest | | Desert Southwest | | Great Basin Steppe | | Rocky Mountains | |
| | A | B | A | B | A | B | A | B |
| Dev. & Primitive Camping | 58.57* | 57.03* | 127.71* | 170.10* | 16.82 | --- | --- | --- |
| Day Hiking & Walking | 11.48 | 11.22 | N.S. | N.S. | -- | --- | 41.65* | 57.39* |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Boating | --- | --- | --- | --- | --- | --- | N.S. | 91.91 |
| Sightseeing and Pleasure Driving | 28.34* | 46.04* | N.S. | N.S. | --- | --- | N.S. | N.S. |
| Off-Highway motor vehicles | 29.05 | 30.58 | --- | --- | --- | --- | N.S. | N.S. |
| Motorboating and Waterskiing | --- | --- | 77.56 | 339.23* | --- | --- | 159.96 | 154.25 |
| Bicycling | --- | --- | 187.99* | 368.21* | --- | --- | --- | --- |
| Nature Study and Photography | 56.17 | 56.42 | 107.66* | 191.42* | --- | --- | --- | --- |
| Picnicking | 10.58 | 26.32 | 57.25 | 108.14* | --- | --- | 25.08 | 29.36 |
| Family Gathering | 12.50 | 20.44 | 152.62* | N.S. | --- | --- | 120.66* | 148.13* |
| Pool Swimming | 21.90 | 22.59 | 118.98* | --- | --- | --- | --- | --- |
| Outdoor Swimming | 3.92 | 4.59 | 46.85 | N.S. | --- | --- | --- | --- |
| Downhill Skiing | 19.50 | 19.00 | | | | | | |
| Coldwater Fishing | --- | --- | 29.04 | 25.71 | 146.08* | 172.44* | 32.59 | 58.67 |
| Freshwater Fishing | --- | --- | 69.79 | N.S. | --- | --- | --- | --- |
| Big Game Hunting | 18.82 | 4.74 | 24.14 | 18.56 | --- | --- | 40.54 | 43.52 |
| Wildlife Observation | 122.63* | N.S. | 67.31 | N.S. | --- | --- | 52.25 | 58.05 |
| Visiting Prehist. sites | --- | --- | N.S. | --- | --- | --- | N.S. | N.S. |
| No Main Activity | 48.68* | N.S. | 28.52 | 39.41 | --- | --- | 72.18 | 90.00* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that estimated price coefficient is negative and not significant.

Table 2b. Mean Net Economic Value per Activity Day by Ecoregion: Separate Model

| Activity Group | Ecoregion | | | | | | | |
|----------------------------------|-----------------|--------|-----------------|--------|------------------|---------|-----------------------|-------|
| | Midwest Prairie | | Ozark Mountains | | NE & Great Lakes | | Southeast Subtropical | |
| | A | B | A | B | A | B | A | B |
| Dev. and Primitive Camping | --- | --- | 69.66* | 47.03* | 27.22 | 31.65 | 59.80 | 46.62 |
| Day Hiking and Walking | --- | --- | 10.34 | 50.85 | 26.59 | N.S. | --- | --- |
| Whitewater Rafting | --- | --- | -- | --- | --- | --- | --- | --- |
| Sailing & Boating | --- | --- | 14.80 | 24.48 | 28.70 | 46.23 | --- | --- |
| Sightseeing and Pleasure Driving | 27.47 | 19.75 | 20.35 | 34.75 | 135.97* | 158.92* | 98.73 | 85.38 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- | --- | --- | --- | --- |
| Motorboating and Waterskiing | --- | --- | 5.64 | 3.97 | --- | --- | --- | --- |
| Bicycling and Mountain Biking | --- | --- | --- | --- | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- | --- | --- | --- | --- |
| Picnicking | --- | --- | --- | --- | 76.74* | 78.75* | 36.95 | 33.85 |
| Family Gathering | 191.44* | 91.01* | 36.73 | 67.08 | 143.22* | 156.75* | 79.20 | 67.90 |
| Pool Swimming | --- | --- | 102.32 | N.S. | --- | --- | --- | --- |
| Outdoor Swimming | --- | --- | 182.27* | N.S. | --- | --- | --- | --- |
| Coldwater Fishing | --- | --- | --- | --- | --- | --- | --- | --- |
| Warm Freshwater Fishing | 34.01* | 34.18* | 16.36 | 13.89 | --- | --- | --- | --- |
| Big Game Hunting | --- | --- | 9.43 | 4.31 | --- | --- | --- | --- |
| Wildlife Observation | --- | --- | 12.49 | 13.74 | --- | --- | --- | --- |
| Visiting Prehist.Sites | --- | --- | 30.08 | 29.42 | --- | --- | --- | --- |
| Relaxing and No Main Activity | --- | --- | 8.17 | 6.59 | --- | --- | 8.50 | 15.16 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that estimated price coefficient is negative and not significant.

Table 2c. Mean Net Economic Value per Activity Day by Ecoregion: Separate Model

| Activity Groups | Ecoregion | | | |
|----------------------------------|-----------------------|--------|-------------|---------|
| | Appalachian Mountains | | New England | |
| | A | B | A | B |
| Dev. and Primitive Camping | 29.11 | 34.29 | 29.77 | 43.25 |
| Day Hiking and Walking | 9.09 | 12.82 | 26.86 | 69.02* |
| Whitewater Rafting | 71.86 | 154.30 | 104.36* | 147.63* |
| Sailing & Boating | 18.04 | 19.56 | 28.09 | 62.46* |
| Sightseeing and Pleasure Driving | 71.35* | 75.70* | 10.18 | --- |
| Off-Highway Motor Vehicles | --- | --- | --- | --- |
| Motorboating and Waterskiing | 226.43* | N.S. | --- | --- |
| Bicycling and Mountain Biking | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- |
| Picnicking | 21.94 | 21.64 | --- | --- |
| Family Gathering | 121.22 | --- | 92.57 | 97.12 |
| Pool Swimming | 77.73 | 28.67 | 77.27 | 103.49 |
| Outdoor Swimming | 68.86 | 36.81 | --- | --- |
| Coldwater Fishing | 51.37 | 38.92 | --- | --- |
| Warm Freshwater Fishing | 8.38 | 21.03 | --- | --- |
| Big Game Hunting | 33.35 | 29.30 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- |
| Visiting Prehist.Sites | --- | --- | --- | --- |
| Relaxing and No Main Activity | 57.41* | 70.80* | 35.93 | 35.37 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that estimated price coefficient is negative and not significant.

Table 3a. Mean Net Economic Value per Activity Day by Ecoregion: Aggregate Model with Intercept and Slope Dummy Variables

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-------------------|---------|------------------|---------|--------------------|-----|-----------------|----------|
| | Pacific Northwest | | Desert Southwest | | Great Basin Steppe | | Rocky Mountains | |
| | A | B | A | B | A | B | A | B |
| Dev. and Primitive Camping | 78.74* | 82.89* | 191.57* | 133.01* | --- | --- | #340.00* | #331.56* |
| Day Hiking and Walking | 24.29 | 55.07 | --- | --- | --- | --- | --- | 39.33 |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Other Boating | --- | --- | --- | --- | --- | --- | 292.39* | 392.15* |
| Sightseeing and Pleasure Driving | 54.00 | 69.44 | 187.97* | 357.14* | --- | --- | 757.58* | --- |
| Off-Highway Motor Vehicles | 32.35 | 33.64 | 76.27* | 337.38* | --- | --- | 123.27* | 128.80* |
| Motorboating and Waterskiing | --- | --- | 48.45 | 63.31 | --- | --- | 260.42* | #357.14* |
| Bicycling and Mountain Biking | --- | --- | 94.00* | 184.11* | --- | --- | --- | --- |
| Nature Study and Photography | 60.89 | 95.06 | 167.46* | 420.17* | --- | --- | --- | --- |
| Picnicking | --- | --- | 28.16 | 44.83 | --- | --- | --- | --- |
| Family Gathering | --- | --- | 56.16 | 57.33 | --- | --- | 22.85 | 39.16 |
| Pool Swimming | 108.48 | 176.68* | 107.97 | 140.45 | --- | --- | --- | --- |
| Outdoor Swimming | --- | --- | 18.28 | --- | --- | --- | --- | --- |
| Coldwater Fishing | --- | --- | 57.31 | 56.21 | --- | --- | 42.40 | 42.12 |
| Freshwater Fishing | --- | --- | 58.48 | --- | --- | --- | --- | --- |
| Big Game Hunting | 23.02 | 17.62 | --- | --- | --- | --- | 77.28 | 57.47 |
| Wildlife Observation | 83.81 | 110.08 | 43.25 | 69.73 | --- | --- | 70.45 | 100.74 |
| Visiting Prehistoric Sites | --- | --- | 250.01* | 384.62* | --- | --- | 104.17* | 102.04* |
| Relaxing and No Main Activity | 107.87* | 227.88* | 60.79 | 89.38* | --- | --- | 57.56 | 227.85* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

Table 3b. Mean Net Economic Value per Activity Day by Ecoregion: Aggregate Model with Intercept and Slope Dummy Variables

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-----------------|---------|-----------------|-------|------------------|---------|-----------------------|---------|
| | Midwest Prairie | | Ozark Mountains | | NE & Great Lakes | | Southeast Subtropical | |
| | A | B | A | B | A | B | A | B |
| Dev. and Primitive Camping | --- | --- | 51.60 | 53.41 | 46.16 | 49.47 | 53.79 | 75.44 |
| Day Hiking and Walking | --- | --- | --- | --- | 63.20 | 335.57* | --- | --- |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Other Boating | --- | --- | --- | --- | 52.74 | 71.68 | --- | --- |
| Sightseeing and Pleasure Driving | 37.62 | 49.75 | 40.85 | 59.52 | 37.20 | 49.02 | 108.93* | 144.93* |
| Off-Highway Motor Vehicles | --- | --- | --- | --- | --- | --- | --- | --- |
| Motorboating and Waterskiing | --- | --- | --- | --- | 47.53 | 79.11 | --- | --- |
| Bicycling and Mountain Biking | --- | --- | --- | --- | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- | --- | --- | 115.77* | 239.23* |
| Picnicking | 221.48* | 317.46* | --- | --- | --- | --- | 105.10* | 147.06* |
| Family Gathering | 352.36* | 674.76* | --- | --- | 128.45 | 210.26* | 146.52* | 226.14* |
| Pool Swimming | 209.64* | 387.60* | --- | --- | 84.39 | 124.48 | --- | --- |
| Outdoor Swimming | --- | --- | --- | --- | --- | --- | 49.62 | 67.75 |
| Coldwater Fishing | --- | --- | --- | --- | 70.37 | 69.91 | --- | --- |
| Warm Freshwater Fishing | --- | --- | 555.55* | --- | 40.16 | --- | 30.30 | --- |
| Big Game Hunting | --- | --- | --- | --- | 37.40 | 23.07 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- | 44.42 | 55.88 | 184.03* | 244.14* |
| Visiting Prehistoric Sites | --- | --- | --- | --- | 45.92 | 41.84 | 33.33 | 33.56 |
| No Main Activity | 288.18* | 418.73* | --- | --- | 133.87* | 263.98* | 176.37* | 286.68* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

Table 3c. Mean Net Economic Value per Activity Day by Ecoregion: Aggregate Model with Intercept and Slope Dummy Variables

| Activity Groups | Ecoregion | | | |
|----------------------------------|----------------|---------|-------------|---------|
| | App. Mountains | | New England | |
| | A | B | A | B |
| Dev. and Primitive Camping | 28.07 | 29.93 | 73.42* | 74.54* |
| Day Hiking and Walking | 25.61 | 60.95 | 65.60 | 185.87* |
| Whitewater Rafting | 118.48* | 212.77* | 158.23* | 520.83* |
| Sailing and Other Boating | 20.47 | 24.63 | --- | --- |
| Sightseeing and Pleasure Driving | 65.53 | 81.83* | 78.98 | 101.21* |
| Off-Highway Motor Vehicles | --- | --- | --- | --- |
| Motorboating and Waterskiing | 39.94 | 67.57 | --- | --- |
| Bicycling and Mountain Biking | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- |
| Picnicking | 175.25* | 208.07* | 224.92* | 246.31* |
| Family Gathering | --- | --- | 213.13* | 323.83* |
| Pool Swimming | --- | --- | 131.93* | 203.25* |
| Outdoor Swimming | 128.21* | 253.81* | 116.90* | 225.28* |
| Coldwater Fishing | 59.63 | 58.91 | --- | --- |
| Warm Freshwater Fishing | 25.25 | --- | --- | --- |
| Big Game Hunting | 40.92 | 29.94 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- |
| No Main Activity | 133.87* | 278.69* | 87.18* | 116.19* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

Table 4a. Mean Net Economic Value per Activity Day by Ecoregion: Aggregate Model with Intercept and Slope Dummy Variables (Selected only significant variables)

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-------------------|---------|------------------|---------|--------------------|-----|-----------------|---------|
| | Pacific Northwest | | Desert Southwest | | Great Basin Steppe | | Rocky Mountains | |
| | A | B | A | B | A | B | A | B |
| Dev. and Primitive Camping | 78.74* | 82.89* | 207.03* | 235.84* | --- | --- | 309.50* | 122.54* |
| Day Hiking and Walking | 24.29 | 55.07 | --- | --- | --- | --- | --- | 39.33 |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Other Boating | --- | --- | --- | --- | --- | --- | 292.39 | 392.15 |
| Sightseeing and Pleasure Driving | 54.00 | 69.44 | 187.97* | 357.14* | --- | --- | 757.58* | --- |
| Off-Highway Motor Vehicles | 32.35 | 33.64 | 76.27* | 337.38* | --- | --- | 123.27* | 128.80* |
| Motorboating and Waterskiing | --- | --- | 48.45 | 63.31 | --- | --- | 304.75* | 357.14* |
| Bicycling and Mountain Biking | --- | --- | 94.00* | 184.11* | --- | --- | --- | --- |
| Nature Study and Photography | 60.89 | 95.06 | 167.46* | 420.17* | --- | --- | --- | --- |
| Picnicking | --- | --- | 28.16 | 44.83 | --- | --- | --- | --- |
| Family Gathering | --- | --- | 56.16 | 57.33 | --- | --- | 22.85 | 39.16 |
| Pool Swimming | 108.48 | 176.68* | 107.97 | 140.45 | --- | --- | --- | --- |
| Outdoor Swimming | --- | --- | 18.28 | --- | --- | --- | --- | --- |
| Coldwater Fishing | --- | --- | 57.31 | 56.21 | --- | --- | 42.40 | 42.12 |
| Warm Freshwater Fishing | --- | --- | 58.48 | --- | --- | --- | --- | --- |
| Big Game Hunting | 23.02 | 17.62 | --- | --- | --- | --- | 77.28 | 57.47 |
| Wildlife Observation | 83.81 | 110.08 | 43.25 | 69.73 | --- | --- | 70.45 | 100.74 |
| Visiting Prehistoric Sites | --- | --- | 250.01* | 384.62* | --- | --- | 104.17* | 102.04* |
| Relaxing and No Main Activity | 107.87* | 227.88* | 60.79 | 89.38* | --- | --- | 57.56 | 227.85* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

Table 4b. Mean Net Economic Value per Activity Day by Ecoregion: Aggregate Model with Intercept and Slope Dummy Variables (Selected only significant variables)

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-----------------|---------|-----------------|-------|------------------|---------|-----------------------|---------|
| | Midwest Prairie | | Ozark Mountains | | NE & Great Lakes | | Southeast Subtropical | |
| | A | B | A | B | A | B | A | B |
| Dev. and Primitive Camping | --- | --- | 51.60 | 53.41 | 46.16 | 49.47 | 53.79 | 75.44 |
| Day Hiking and Walking | --- | --- | --- | --- | 63.20 | 335.57* | --- | --- |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Other Boating | --- | --- | --- | --- | 52.74 | 71.68 | --- | --- |
| Sightseeing and Pleasure Driving | 37.62 | 49.75 | 40.85 | 59.52 | 37.20 | 49.02 | 108.93* | 144.93* |
| Off-Highway Motor Vehicles | --- | --- | --- | --- | -- | --- | --- | --- |
| Motorboating and Waterskiing | --- | --- | --- | --- | 47.53 | 79.11 | --- | --- |
| Bicycling and Mountainbiking | ---- | --- | --- | --- | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- | --- | --- | 115.77* | 239.23* |
| Picnicking | 221.48* | 317.46* | --- | --- | --- | --- | 105.10* | 147.06* |
| Family Gathering | 352.36* | 674.76* | --- | --- | 128.45 | 210.26* | 146.52* | 226.14* |
| Pool Swimming | 209.64* | 387.60* | --- | --- | 84.39 | 124.48 | --- | --- |
| Outdoor Swimming | --- | --- | --- | --- | --- | --- | 49.62 | 67.75 |
| Coldwater Fishing | --- | --- | --- | --- | 70.37 | 69.91 | --- | --- |
| Warm Freshwater Fishing | --- | --- | 555.55* | --- | 40.16 | --- | 30.30 | --- |
| Big Game Hunting | --- | --- | --- | --- | 37.40 | 23.07 | --- | --- |
| Wildlfe Observation | --- | --- | --- | --- | 44.42 | 55.88 | 184.03* | 244.14* |
| Visiting Prehistoric Sites | --- | --- | --- | --- | 45.92 | 41.84 | 33.33 | 33.56 |
| No Main Activity | 288.18* | 418.73* | --- | --- | 133.87* | 263.98* | 176.37* | 286.68* |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.
3. N.S. indicates that estimated price coefficient is negative and not significant.

Table 4c. Mean Net Economic Value per Activity Day by Ecoregion: Aggregate Model with Intercept and Slope Dummy Variables (Selected only significant variables)

| Activity Groups | Ecoregion | | | |
|----------------------------------|----------------|---------|-------------|---------|
| | App. Mountains | | New England | |
| | A | B | A | B |
| Dev. and Primitive Camping | 22.96 | 30.15 | 53.10 | 56.05 |
| Day Hiking and Walking | 25.61 | 60.95 | 65.60 | 185.87* |
| Whitewater Rafting | 118.48* | 212.77* | 158.23* | 520.83* |
| Sailing and Other Boating | 20.47 | 24.63 | --- | --- |
| Sightseeing and Pleasure Driving | 65.53 | 81.83* | 78.98 | 101.21* |
| Off-Highway Motor Vehicles | --- | --- | --- | --- |
| Motorboating and Waterskiing | 47.89 | 62.98 | --- | --- |
| Bicycling and Mountain Biking | --- | -- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- |
| Picnicking | 175.25* | 208.07* | 223.71* | 246.31* |
| Family Gathering | --- | --- | 213.13* | 323.83* |
| Pool Swimming | --- | --- | 131.93* | 203.25* |
| Outdoor Swimming | 128.21* | 253.81* | 116.90* | 225.28* |
| Coldwater Fishing | 59.63 | 58.91 | --- | --- |
| Warm Freshwater Fishing | 25.25 | --- | --- | --- |
| Big Game Hunting | 40.92 | 29.94 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- |
| No Main Activity | 133.87* | 278.69* | 87.18* | 116.19 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

**Table 5a. Confidence Intervals for Net Economic Value per Activity Day by Ecoregion
(Models without Non local Dummy Variables)**

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-------------------|-------------|------------------|-------------|--------------------|-------------|-----------------|-------------|
| | Pacific Northwest | | Desert Southwest | | Great Basin Steppe | | Rocky Mountains | |
| | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound |
| Dev. and Primitive Camping | 77.41 | 100.08 | 112.77 | 142.64 | 13.52 | 28.55 | 313.53 | 1109.57 |
| Day Hiking and Walking | 21.58 | 24.32 | --- | --- | --- | --- | 64.25 | 103.39 |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Boating | --- | --- | --- | --- | --- | --- | --- | --- |
| Sightseeing and Pleasure Driving | 52.89 | 60.45 | 354.15 | 430.98 | --- | --- | 745.57 | 1384.18 |
| Off-Highway Motor Vehicles | 26.85 | 31.24 | 152.88 | 396.62 | --- | --- | 81.37 | 705.33 |
| Motorboating and Waterskiing | --- | --- | 94.14 | 112.67 | --- | --- | 123.53 | 196.38 |
| Bicycling | --- | --- | 162.74 | 213.24 | --- | --- | --- | --- |
| Nature Study and Photography | 45.06 | 67.28 | --- | --- | --- | --- | --- | --- |
| Picnicking | 17.35 | 24.97 | 38.27 | 76.23 | --- | --- | --- | --- |
| Family Gathering | 22.19 | 27.80 | 103.65 | 201.59 | --- | --- | 114.56 | 175.02 |
| Pool Swimming | 32.33 | 55.27 | 104.02 | 133.93 | --- | --- | --- | --- |
| Outdoor Swimming | 6.14 | 9.53 | 42.66 | 51.04 | --- | --- | --- | --- |
| Coldwater Fishing | -- | -- | 66.15 | 109.87 | 0.00 | 449.42 | 34.99 | 43.23 |
| Warm Freshwater Fishing | --- | --- | 62.68 | 76.90 | --- | --- | --- | --- |
| Big Game Hunting | 16.45 | 21.18 | 32.55 | 40.61 | --- | --- | 37.15 | 43.93 |
| Wildlife Observation | 93.50 | 151.76 | 49.34 | 85.28 | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | 0.00 | 2607.41 | --- | --- | 162.79 | 254.51 |
| No Main Activity | 89.16 | 109.55 | 49.88 | 64.20 | --- | --- | 53.37 | 71.07 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

**Table 5b. Confidence Intervals for Net Economic Value per Activity Day by Ecoregion
(Models without Non local Dummy Variables)**

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-----------------|-------------|-----------------|-------------|------------------|-------------|-----------------------|-------------|
| | Midwest Prairie | | Ozark Mountains | | NE & Great Lakes | | Southeast Subtropical | |
| | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound |
| Dev. and Primitive Camping | --- | --- | 72.60 | 138.50 | 34.53 | 38.04 | 54.12 | 65.47 |
| Day Hiking and Walking | --- | --- | --- | --- | 50.64 | 55.72 | --- | --- |
| Whitewater Rafting | --- | -- | --- | --- | --- | --- | --- | --- |
| Sailing and Boating | --- | --- | --- | -- | 39.50 | 47.49 | --- | --- |
| Sightseeing and Pleasure Driving | 25.53 | 29.41 | 126.76 | 142.74 | 129.87 | 142.06 | 92.49 | 104.98 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- | --- | --- | --- | --- |
| Motorboating and Waterskiing | --- | --- | --- | --- | --- | --- | --- | --- |
| Bicycling | --- | --- | --- | --- | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- | ---- | --- | --- | --- |
| Picnicking | --- | --- | --- | --- | 65.47 | 88.01 | 72.50 | 85.90 |
| Family Gathering | 0.00 | 2656.01 | 175.53 | 648.48 | 120.75 | 165.70 | --- | --- |
| Pool Swimming | 211.99 | 553.77 | --- | ---- | 384.56 | 522.33 | --- | --- |
| Outdoor Swimming | --- | --- | ---- | --- | 323.59 | 412.78 | --- | --- |
| Coldwater Fishing | --- | --- | --- | --- | --- | --- | --- | --- |
| Warm Freshwater Fishing | 53.55 | 82.47 | 281.93 | 406.69 | --- | --- | --- | --- |
| Big Game Hunting | --- | --- | --- | --- | --- | --- | --- | --- |
| Wildlfe Observation | --- | --- | --- | --- | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- | --- | --- | --- | --- |
| No Main Activity | 146.38 | 508.17 | ---- | --- | --- | --- | --- | --- |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

**Table 5c. Confidence Intervals for Net Economic Value per Activity Day by Ecoregion
(Models without Non local Dummy Variables)**

| Activity Groups | Ecoregion | | | |
|----------------------------------|----------------|-------------|-------------|-------------|
| | App. Mountains | | New England | |
| | Lower Bound | Upper Bound | Lower Bound | Upper Bound |
| Dev. and Primitive Camping | 26.55 | 31.68 | 21.45 | 38.10 |
| Day Hiking and Walking | 8.32 | 9.85 | 48.49 | 58.95 |
| Whitewater Rafting | 65.16 | 78.55 | 115.85 | 301.57 |
| Sailing and Boating | 32.94 | 39.19 | --- | --- |
| Sightseeing and Pleasure Driving | 67.24 | 75.46 | 46.66 | 65.67 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- |
| Motorboating and Waterskiing | 200.82 | 252.05 | --- | --- |
| Bicycling | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- |
| Picnicking | 18.51 | 25.38 | --- | --- |
| Family Gathering | 83.61 | 158.84 | 79.36 | 105.77 |
| Pool Swimming | 66.09 | 89.36 | 71.49 | 83.06 |
| Outdoor Swimming | 59.91 | 77.81 | --- | --- |
| Coldwater Fishing | 87.29 | 118.16 | --- | --- |
| Warm Freshwater Fishing | 24.38 | 26.41 | --- | --- |
| Big Game Hunting | 28.04 | 38.66 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- |
| No Main Activity | 76.15 | 97.81 | 59.72 | 83.99 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cells indicates that sufficient number of observations are available to estimate surplus.

**Table 6a. Confidence Intervals for Net Economic Value per Activity Day by Ecoregion
(Models with Non local Dummy Variables)**

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-------------------|-------------|------------------|-------------|--------------------|-------------|-----------------|-------------|
| | Pacific Northeast | | Desert Southwest | | Great Basin Steppe | | Rocky Mountains | |
| | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound |
| Dev. and Primitive Camping | 86.41 | 119.29 | 142.37 | 197.84 | --- | --- | 288.19 | --- |
| Day Hiking and Walking | 22.43 | 26.10 | --- | --- | --- | --- | 80.84 | 148.70 |
| Whitewater Rafting | --- | --- | --- | --- | --- | --- | --- | --- |
| Sailing and Boating | --- | --- | --- | --- | --- | --- | 41.16 | 142.65 |
| Sightseeing and Pleasure Driving | 81.14 | 103.00 | --- | --- | --- | --- | --- | --- |
| Off-Highway Motor Vehicles | 27.93 | 33.23 | 119.58 | 262.45 | --- | --- | 103.26 | 473.42 |
| Motorboating and Waterskiing | --- | --- | 322.51 | 582.11 | --- | --- | 118.85 | 189.66 |
| Bicycling | --- | --- | 244.96 | 491.46 | --- | --- | --- | --- |
| Nature Study and Photography | 44.75 | 68.10 | --- | --- | --- | --- | --- | --- |
| Picnicking | 26.18 | 79.09 | 32.02 | 184.25 | --- | --- | --- | --- |
| Family Gathering | 23.59 | 58.16 | --- | --- | --- | --- | 133.47 | 222.04 |
| Pool Swimming | 30.14 | 60.22 | --- | --- | --- | --- | --- | --- |
| Outdoor Swimming | 7.73 | 10.61 | 98.37 | 247.76 | --- | --- | --- | --- |
| Coldwater Fishing | --- | --- | 60.37 | 95.45 | --- | --- | 58.90 | 81.89 |
| Warm Freshwater Fishing | --- | --- | 284.32 | 341.49 | --- | --- | --- | --- |
| Big Game Hunting | 4.36 | 5.11 | 25.57 | 30.67 | --- | --- | 39.67 | 47.36 |
| Wildlife Observation | 76.79 | 830.76 | 0.00 | 513.57 | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- | --- | --- | 155.19 | 239.01 |
| No Main Activity | 284.96 | 789.67 | 62.96 | 94.67 | --- | --- | 66.96 | 113.04 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

**Table 6b. Confidence Intervals for Net Economic Value per Activity Day by Ecoregion
(Models with Non local Dummy Variables)**

| Activity Groups | Ecoregion | | | | | | | |
|----------------------------------|-----------------|-------------|-----------------|-------------|------------------|-------------|-----------------------|-------------|
| | Midwest Prairie | | Ozark Mountains | | NE & Great Lakes | | Southeast subtropical | |
| | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound | Lower Bound | Upper Bound |
| Dev. and Primitive Camping | --- | --- | 54.45 | 88.07 | 39.34 | 45.06 | 41.89 | 51.35 |
| Day Hiking and Walking | --- | --- | --- | --- | --- | --- | --- | --- |
| Whitewater Rafting | --- | -- | --- | --- | --- | --- | --- | --- |
| Sailing and boating | --- | --- | --- | -- | 57.98 | 82.11 | --- | --- |
| Sightseeing and Pleasure Driving | 18.30 | 21.23 | 178.64 | 227.99 | 149.33 | 168.51 | 79.03 | 91.73 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- | --- | --- | --- | --- |
| Motorboating and Waterskiing | --- | --- | --- | --- | --- | --- | --- | --- |
| Bicycling | --- | --- | --- | --- | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- | --- | --- | --- | --- |
| Picnicking | --- | --- | --- | --- | 65.72 | 91.75 | 60.97 | 74.83 |
| Family Gathering | ---- | ---- | 74.98 | ---- | 128.03 | 185.48 | --- | --- |
| Pool Swimming | 134.43 | 229.58 | --- | ---- | 480.22 | 758.29 | --- | --- |
| Outdoor Swimming | --- | --- | ---- | --- | 396.34 | 552.58 | --- | --- |
| Coldwater Fishing | --- | --- | --- | --- | --- | --- | --- | --- |
| Warm Freshwater Fishing | 54.13 | 82.57 | 264.10 | 397.47 | --- | --- | --- | --- |
| Big Game Hunting | --- | --- | --- | --- | --- | --- | --- | --- |
| Wildlfe Observation | --- | --- | --- | --- | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- | --- | --- | --- | --- |
| No Main Activity | --- | ---- | --- | --- | --- | --- | --- | --- |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

**Table 6c. Confidence Intervals for Net Economic Value per Activity Day by Ecoregion
(Models with Non local Dummy Variables)**

| Activity Groups | Ecoregion | | | |
|----------------------------------|----------------|-------------|-------------|-------------|
| | App. Mountains | | New England | |
| | Lower Bound | Upper Bound | Lower Bound | Upper Bound |
| Dev. and Primitive Camping | 29.86 | 38.72 | 22.88 | 63.62 |
| Day Hiking and Walking | 11.21 | 14.44 | 110.98 | 165.11 |
| Whitewater Rafting | 125.39 | 184.20 | 126.74 | 463.76 |
| Sailing and boating | 34.26 | 43.95 | --- | --- |
| Sightseeing and Pleasure Driving | 70.20 | 81.19 | 83.12 | 166.72 |
| Off-Highway Motor Vehicles | --- | --- | --- | --- |
| Motorboating and Waterskiing | 457.18 | 789.07 | --- | --- |
| Bicycling | --- | --- | --- | --- |
| Nature Study and Photography | --- | --- | --- | --- |
| Picnicking | 17.20 | 26.08 | --- | --- |
| Family Gathering | --- | --- | 81.85 | 112.38 |
| Pool Swimming | 25.75 | 31.59 | 92.58 | 114.41 |
| Outdoor Swimming | 32.38 | 41.24 | --- | --- |
| Coldwater Fishing | 65.74 | 89.94 | --- | --- |
| Warm Freshwater Fishing | 57.67 | 69.79 | --- | --- |
| Big Game Hunting | 23.66 | 34.94 | --- | --- |
| Wildlife Observation | --- | --- | --- | --- |
| Visiting Prehistoric Sites | --- | --- | --- | --- |
| No Main Activity | 89.96 | 124.57 | 56.99 | 84.49 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

TABLE 7. Results of Reduced Models for Aggregate Activities

| Activities (No. of observations in parentheses) | Model without Nonlocal dummy | | | Model with Nonlocal Dummy | | |
|---|------------------------------|-------------|-------------|---------------------------|-------------|-------------|
| | Surplus (day) | Lower Bound | Upper Bound | Surplus (day) | Lower Bound | Upper Bound |
| Dev. and Primitive Camping (10410) | 22.85 | 22.11 | 23.60 | 27.05 | 25.88 | 30.09 |
| Day Hiking and Walking (2401) | 32.74 | 31.64 | 33.84 | N.S. | --- | --- |
| Whitewater Rafting (240) | 34.41 | 31.20 | 37.62 | 73.53* | 59.32 | 87.74 |
| Sailing and Other Boating (501) | 37.34 | 35.78 | 39.90 | 12.08 | 10.87 | 13.28 |
| Sightseeing and Pleasure Driving (7069) | 86.15* | 83.95 | 88.36 | 162.36* | 154.89 | 169.84 |
| Off Highway Motor Vehicles(555) | 22.55 | 21.13 | 23.98 | 25.85 | 23.73 | 27.97 |
| Motorboating and Waterskiing (2418) | 16.59 | 15.93 | 17.26 | 23.17 | 21.74 | 24.59 |
| Bicycling (179) | 30.03 | 25.96 | 34.11 | 68.42* | 37.71 | 99.12 |
| Nature Study (420) | 26.13 | 22.49 | 29.78 | 35.45 | 28.09 | 42.81 |
| Picnicking (1211) | 56.32 | 50.20 | 62.44 | 84.65* | 80.54 | 88.65 |
| Family Gathering (765) | 112.32* | 100.50 | 124.02 | 102.01* | 90.01 | 114.03 |
| Pool Swimming (2398) | 135.25* | 120.50 | 151.25 | 121.36* | 120.01 | 123.70 |
| Outdoor Swimming (2311) | 154.65* | 150.25 | 158.95 | 69.65* | 60.00 | 79.34 |
| Coldwater Fishing(1750) | 33.55 | 31.00 | 36.10 | 42.69 | 38.43 | 46.94 |
| Warm Freshwater Fishing (2902) | 17.49 | 16.99 | 17.99 | 33.71 | 31.84 | 35.57 |
| Big Game Hunting (1342) | 50.11 | 44.26 | 55.96 | 47.03 | 41.26 | 52.73 |
| Wildlife Observation (787) | 14.98 | 13.86 | 16.09 | 15.65 | 14.12 | 17.18 |
| Visiting Prehistorical Sites (1274) | 43.66 | 36.36 | 50.97 | 42.14 | 35.04 | 49.25 |
| No Main Activities (3557) | 32.19 | 30.78 | 33.62 | 59.68 | 54.97 | 64.38 |

Note:

1. * indicates that the value does not fall into the range of values reported in previous studies.
2. Blank cell indicates that sufficient number of observations are not available to estimate surplus.

motorboating and waterskiing whereas values are moderate for activities such as sailing and other boating, and pool swimming. The estimates are lower in the case of warm freshwater fishing, and outdoor swimming.

The above separate models are found to have better fit as compared to the model class aggregate model with intercept and slope dummy variables. The results of these models are given in tables 3a - 3c above. The per day estimates are similar to the first class of models (separate models) but slightly and consistently higher. The ecoregion intercept and slope dummy variables are found to be significant in most of the cases. These models were attempted to test whether there is any significant difference in the consumer's surplus estimates across ecoregions.

The results of the aggregate models are given in Table 7 above. These models are given for each activity across ecoregions. The per day estimates are higher for activities such as sightseeing and pleasure driving, picnicking, family gathering, moderate for activities such as day hiking and walking, bicycling and mountain biking, big game hunting, and visiting prehistoric sites and lower for activities such as developed and primitive camping, off-highway motor vehicles, wildlife observation, and relaxing and no main activity.

The estimates are higher for activities such as pool swimming, outdoor swimming, moderate for white water rafting, sailing and other boating and cold water fishing, and lower for motorboating and waterskiing, and warm freshwater fishing. The per day estimates are higher for the models which included the NON dummy variable in most cases.

Comparison to Previous Valuation Studies

Walsh, Johnson, and McKean (1988) provide a comprehensive review of previous studies which estimated the net economic value of outdoor recreation activities. Most of the studies reported by Walsh, Johnson, and McKean (1988) used single activity, single site TCM modelling approach. They came up with an average value for each activity. The value estimate in the study by Bergstrom and Cordell (1991) represents the value of an activity to a typical site from a typical community across the United states i.e. an aggregate value estimate of a particular activity.

The present study uses an ecoregional approach wherein a surplus estimate, per trip as well as per day represents the value of an activity from an individual's origin i to a typical site situated in a particular ecoregion. The estimates are given for all the ecoregions where sufficient information was available. The above three value estimates, thus, are fundamentally different. Taking these conceptual differences into consideration, the estimates generated by the present study appear reasonably consistent with previous studies. The final choice of which value estimates to use in a particular policy or management situation depends on the nature of the policy or management question or issue of concern.

Summary and Conclusions

As the popularity of outdoor recreation continues to grow in the country, resource management agencies, legislators, and non-government interest groups are becoming more interested in the demand for and value of outdoor recreation (Bergstrom and Cordell, 1991). In the past, general outdoor recreation values developed on a national basis have been derived mostly from a composite of values from previous, single site demand studies.

A method for deriving ecoregional values of standard outdoor recreation is presented in this report using the data from a particular ecoregion for a specific activity as the unit of estimation. A sample of land and water-based activity value estimation results using a individual travel cost model (ITCM) are presented in this paper. Several important determinants of the demand for outdoor recreation were identified. These include regional differences in the value of recreation, difference in recreation behavior of local visitors as well as nonlocal visitors, and inclusion of time value in the travel cost variable.

Resource management agencies, legislators, and other interested parties will continue to demand information on the general determinants and value of outdoor recreation (Stoll, Loomis and Bergstrom, 1987). The consumer's surplus estimates and the demand equations reported in this paper provide a measure of the social welfare impacts of changes in outdoor recreation consumption. These results provide information which is useful for evaluating recreation policies, programs, and resource management alternatives. Although subject to a number of limitations, the modelling approach presented in this paper is a useful initial attempt to come up with ecoregional values for outdoor recreation. There is, however, a need for further research to improve the method of data sampling and collection and to address some of the modelling problems.

We feel the values reported in this analysis are reasonable given the limited existing data sources, however we also feel that a number of improvements would enhance their reliability and usefulness. Most of the improvements we recommend are focused on improving the data because even the most sophisticated econometric model is limited by the quality of the underlying data.

A first step toward improving data sources would be to develop a sampling plan for a region across activities as well as across settings. Much of recreation is composite in nature wherein given settings provide a number of complementary activity opportunities. Moreover, managers can control and alter settings to optimize net economic value. Sampling at activity and setting level also affords the opportunity for cross validation of model results. Ideally the sampling would be intertemporal as well as spatially based.

The second aspect needing improvement is to develop better estimates of visitation. This too will have to be done intertemporally and spatially. Such an effort will be expensive and will likely have to be limited to carefully selected representative sites. Nevertheless, it is essential for improved management of public resources.

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Technical Appendix I

Table 1. Estimated Ecoregion Demand Equation for Developed and Primitive Camping.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--|--------------------------------------|-------------------------|--------------------------|-------------------------|-------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (1300) | .4925 (.7568) | .195e-05 (.551e-06) | -.324e-02 (.314e-03) | .484e-02 (.101e-02) | -.2349 (.720e-01) | 819.3 | 10821 |
| Desert Southwest (1838) | .8905 (.389e-01) | .174e-05 (.244e-06) | -.146e-02 (.145e-03) | .470e-02 (.516e-03) | -.4352 (.563e-01) | 596.0 | 39444 |
| Rocky Mountains (945) | 1.535 (.671e-01) | -.490e-05 (.417e-06) | -.350e-03 (.127e-03) | .587e-03 (.334e-03) | -.922e-03 (.619e-01) | 266.1 | 51444 |
| Ozark & Ouachita Mountains (452) | 1.389 (.1032) | -.312e-05 (.499e-06) | -.350.e-02 (.503e-03) | -.154e-02 (.606e-03) | .9632 (.1062) | 489.4 | 15469 |
| Northeast and Great Lakes (2744) | 1.858 (.227e-01) | -.207e-06 (.228e-06) | -.473e-02 (.195e-03) | .155e-02 (.188e-03) | -.1615 (.259e-01) | 2158 | .101170 |
| Southeast Subtropical, South Florida (1817) | .8602 (.532e-01) | .157e-05 (.409e-06) | -.536e-02 (.330e-03) | .897e-03 (.364e-03) | .3299 (.573e-01) | 845.7 | 17200 |
| Appalachian Mountains (1132) | 1.6479 (.393e-01) | .165e-05 (.409e-06) | -.728e-02 (.572e-03) | -.263e-02 (.123e-02) | -.1948 (.596e-01) | 1260 | 54195 |
| New England, Warm Continental (500) | .1061 (.1581) | .698e-05 (.110e-05) | -.385e-02 (.110e-02) | -.295e-02 (.743e-03) | -.30820 (.1479) | 348.7 | 2138.2 |

Table 2. Estimated Ecoregion Demand Equation for Day Hiking and Walking.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|---|--------------------------------------|-------------------------|-------------------------|-------------------------|-----------------------|------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (259) | 4.1536 (.308e-01) | -.697e-05 (.312e-06) | -.206e-01 (.948e-03) | .221e-01 (.162e-02) | -.1653 (.624e-01) | 4613 | .9426 |
| Desert Southwest (818) | 2.5145 (.239e-01) | -.284e-05 (.190e-06) | .225e-02 (.104e-03) | .877e-02 (.521e-03) | -2.1508 (.669e-01) | 1573 | 31969 |
| Rocky Mountains (423) | 1.7392 (.710e-01) | .405e-05 (.453e-06) | -.435e-02 (.782e-03) | .802e-03 (.131e-02) | -.4368 (.898e-01) | 1630 | 6670.5 |
| Northeast and Great Lakes (365) | 3.7280 (.201e-01) | .192e-05 (.189e-06) | -.806e-03 (.164e-03) | .629e-02 (.457e-03) | -2.3567 (.448e-01) | 8561 | 30794 |
| Appalachian Mountains (131) | 3.4398 (.611e-01) | -.693e-06 (.496e-06) | -.155e-01 (.119e-02) | .143e-01 (.247e-02) | -.8504 (.1099) | 1472 | .6104 |
| New England, Warm Continental (153) | 4.001 (.585e-01) | .282e-05 (.445e-06) | -.241e-02 (.287e-03) | -.181e-01 (.171e-02) | -1.266 (.740e-01) | 2004 | -2033.7 |

Table 3. Estimated Ecoregion Demand Equation for Whitewater Rafting.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|---|--------------------------------------|-------------------------|-------------------------|------------------------|-----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Appalachian Mountains (241) | 3.2789 (.438e-01) | -.436e-05 (.386e-06) | .216e-01 (.254e-03) | .138e-01 (.118e-02) | -1.1009 (.561e-01) | 980.8 | 8033.6 |
| New England, Warm Continental (514) | .7899 (.744e-01) | .152e-05 (.548e-06) | -.169e-02 (.587e-03) | .336e-02 (.102e-02) | -.2386 (.786e-01) | 135.2 | 10890 |

Table 4. Estimated Ecoregion Demand Equation for Sightseeing and Pleasure Driving.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|---|--------------------------------------|-------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (764) | 2.7418 (.456e-01) | -.163e-05 (.434e-06) | -.543e-02 (.391e-03) | -.144e-02 (.757e-03) | -.7512 (.608e-01) | 1938 | .4727 |
| Desert Southwest (1758) | 1.4286 (.393e-01) | .258e-05 (.273e-06) | .103e-02 (.163e-03) | -.750e-03 (.600e-03) | -.7497 (.563e-01) | 823.5 | 22327 |
| Rocky Mountains (1362) | 2.0224 (.582e-01) | -.191e-05 (.342e-06) | .585e-04 (.597e-04) | .964e-03 (.282e-03) | -.7813 (.620e-01) | 276.5 | 57223 |
| Midwest Prairie and Steppe (189) | 3.4631 (.378e-01) | .204e-05 (.418e-06) | -.168e-01 (.767e-03) | .123e-02 (.226e-03) | .7139 (.794e-01) | 1680 | .1468 |
| Ozark & Ouachita Mountains (353) | 2.8223 (.618e-01) | -.179e-05 (.515e-06) | -.491e-02 (.362e-03) | .438e-02 (.622e-03) | -.4766 (.558e-01) | 1925 | 25328 |
| Northeast and Great Lakes (1353) | 3.1044 (.258e-01) | -.710e-06 (.257e-06) | -.629e-02 (.230e-03) | -.627e-02 (.396e-03) | -.2419 (.319e-01) | 5615 | .67609 |
| Southeast Subtropical, South Florida (955) | 2.5473 (.450e-01) | .139e-05 (.378e-06) | -.117e-01 (.529e-03) | -.688e-02 (.947e-03) | .2983 (.619e-01) | 1991 | 42771 |
| Appalachian Mountains (525) | 3.5013 (.308e-01) | -.197e-05 (.366e-06) | -.132e-01 (.583e-03) | -.123e-02 (.808e-03) | -.1114 (.495e-01) | -.200 | .1121 |
| New England and Warm Continental (297) | 2.0825 (.814e-01) | .107e-05 (.830e-06) | -.400e-02 (.814e-03) | -.363e-02 (.179e-02) | -1.3141 (.1812) | 749.4 | 3914.5 |

Table 5. Estimated Ecoregion Demand Equation for Sailing and Other Boating.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|---------------------------------------|--------------------------------------|------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Rocky Mountains (122) | 1.8498 (.1364) | .431e-05 (.108e-05) | -.272e-02 (.912e-03) | -.310e-01 (.292e-02) | 2.2704 (.2286) | 630.5 | 3561.8 |
| Northeast and Great Lakes (208) | 2.7772 (.343e-01) | .857e-06 (.238e-06) | -.475e-02 (.498e-03) | .821e-02 (.703e-03) | -.5038 (.592e-01) | 619.3 | 8599.1 |
| Appalachian Mountains (172) | 2.5413 (.607e-01) | .588e-05 (.470e-06) | -.127e-01 .963e-03 | .559e-02 (.228e-02) | -.1719 (.1038) | 1065 | .2964 |

Table 6. Estimated Ecoregion Demand Equation for Off-Highway Motor Vehicles.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--------------------------------------|--------------------------------------|-------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (338) | 2.8756 (.503e-01) | .362e-05 (.514e-06) | -.653e-02 (.344e-03) | -.212e-02 (.829e-03) | -.1922 (.754e-01) | 1472 | .1759 |
| Desert Southwest (100) | -.6859 (.6751) | .261e-05 (.684e-06) | -.174e-02 (.396e-03) | .511e-02 (.103e-02) | 2.0211 (.6804) | 74.41 | 3147.8 |
| Rocky Mountain (118) | 2.0530 (.1041) | -.925e-06 (.896e-06) | -.115e-02 (.451e-03) | -.234e-04 (.902e-03) | .3642 (.846e-01) | 311.2 | 1143 |

Table 7. Estimated Ecoregion Demand Equation for Motorboating and Waterskiing.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|-----------------------------------|--------------------------------------|------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Desert Southwest (1400) | 2.7663 (.193e-01) | .144e-05 (.124e-06) | -.442e-03 (.771e-04) | -.502e-02 (.242e-03) | -.9571 (.321e-01) | 6270 | 30777 |
| Rocky Mountain (147) | 1.1491 (.1382) | .782e-05 (.750e-06) | -.216e-02 (.301e-03) | -.150e-02 (.516e-03) | .1309 (.1311) | 152.7 | 2267.3 |
| Appalachian Mountains (284) | 3.3522 (.255e-01) | .843e-06 (.205e-06) | -.160e-02 (.259e-03) | .564e-02 (.974e-03) | -.6278 (.406e-01) | 1216 | 19055 |

Table 8. Estimated Ecoregion Demand Equation for Bicycling and Mountain Biking.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|-----------------------------|--------------------------------------|------------------------|-------------------------|-------------------------|-------------------|------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Desert Southwest (180) | 2.9152 (.397e-01) | .125e-05 (.246e-06) | -.271e-02 (.552e-03) | -.550e-02 (.184e-02) | -.8704 (.1590) | 1022 | 13111 |

Table 9. Estimated Ecoregion Demand Equation for Nature Study and Photography.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--------------------------------------|--------------------------------------|------------------------|-------------------------|------------------------|--------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (189) | 1.9238 (.1201) | .313e-06 (.964e-06) | -.886e-02 (.111e-02) | .494e-02 (.352e-02) | -.839e-01 .1217 | 310.6 | .9588 |

Table 10. Estimated Ecoregion Demand Equation for Picnicking.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|---|--------------------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (192) | 1.6172 (.993e-01) | .433e-06 (.892e-06) | -.949e-02 (.290e-02) | .239e-01 (.386e-02) | -2.0036 (.2441) | 455.3 | 15985 |
| Desert Southwest (455) | 1.4988 (.452e-01) | .329e-06 (.401e-06) | .137e-02 (.528e-03) | -.406e-02 (.230e-02) | -1.4897 (.1975) | 221.5 | 11198 |
| Rocky Mountains (329) | .4270 (.1166) | .837e-05 (.619e-06) | -.187e-02 (.284e-03) | .753e-02 (.506e-03) | -.5820 (.1105) | 546.7 | 13019 |
| Midwest Prairie and Steppe (128) | 2.0611 (.777e-01) | -.744e-06 (.916e-06) | .247e-03 (.261e-03) | -.337e-02 (.159e-02) | -.6952 (.1120) | 93.28 | 1546 |
| Ozark & Ouachita Mountains (115) | 3.0265 (.874e-01) | -.537e-05 (.946e-06) | -.348e-03 (.706e-03) | -.614e-02 (.209e-02) | -.6910 (.1149) | 333.5 | 1945.1 |
| Northeast and Great Lakes (566) | 1.7653 (.425e-01) | .142e-05 (.438e-06) | -.635e-02 (.638e-03) | .472e-02 (.959e-03) | -.329e-01 (.544e-01) | 293.6 | 18124 |
| Southeast Subtropical, South Florida (883) | 2.2383 (.312e-01) | .403e-06 (.291e-06) | -.736e-02 (.456e-03) | -.953e-03 (.819e-03) | .1604 (.450e-01) | 882 | 62807 |
| Appalachian Mountains (286) | 2.1381 (.506e-01) | -.433e-05 (.595e-06) | -.115e-01 (.144e-02) | .195e-01 (.222e-02) | .181e-01 (.1062) | 415.6 | 9263.6 |
| New England, Warm Continental (172) | 2.5233 (.607e-01) | -.196e-05 (.548e-06) | -.514e-02 (.491e-03) | .128e-01 (.952e-03) | -.1022 (.668e-01) | 310.8 | 3750.6 |

Table 11. Estimated Ecoregion Demand Equation for Family Gathering.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--|--------------------------------------|-------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (231) | 1.3741 (.1071) | .239e-05 (.839e-06) | -.122e-01 (.314e-02) | .261e-01 (.383e-02) | -1.4902 (.2343) | 582.1 | .1389 |
| Desert Southwest (372) | 1.4503 (.554e-01) | -.124e-06 (.488e-06) | -.308e-02 (.131e-02) | .812e-02 (.502e-02) | -1.0445 (.3065) | 114.2 | 10534 |
| Ozark & Ouachita Mountains (118) | 2.5482 (.806e-01) | -.204e-05 (.877e-06) | -.381e-03 (.623e-03) | -.386e-02 (.216e-02) | -.3630 (.1058) | 254.9 | 2213.8 |
| Northeast and Great Lakes (576) | 1.8298 (.395e-01) | -.103e-05 (.435e-06) | -.318e-02 (.355e-03) | .599e-02 (.885e-03) | -.1024 (.506e-01) | 207.4 | 19833 |
| Appalachian Mountains (305) | 2.5153 (.404e-01) | -.944e-05 (.525e-06) | .125e-03 (.402e-03) | .112e-01 (.177e-02) | -.772 (.854e-01) | 528.7 | 7503.7 |

Table 12. Estimated Ecoregion Demand Equation for Pool Swimming.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--|--------------------------------------|-------------------------|-------------------------|-------------------------|-----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (111) | 2.5362 (.622e-01) | -.111e-04 (.100e-05) | -.544e-01 (.520e-02) | .907e-01 (.646e-02) | -1.2998 (.2089) | 743.5 | .3411 |
| Desert Southwest (222) | 3.6393 (.392e-01) | -.329e-05 (.381e-06) | .231e-02 (.231e-03) | -.162e-01 (.214e-02) | -1.8411 (.681e-01) | 1653 | 8212.9 |
| Midwest Prairie and Steppe (211) | 2.1629 (.444e-01) | .541e-05 (.515e-06) | -.274e-02 (.436e-03) | -.971e-02 (.999e-03) | .8901 (.785e-01) | 231.2 | 7017 |
| Ozark & Ouachita Mountains (181) | 2.0043 (.1126) | -.211e-05 (.494e-06) | -.713e-04 (.488e-03) | -.303e-02 (.114e-02) | .5645 (.1132) | 77.06 | 2687.6 |
| Northeast and Great Lakes (868) | 3.0947 (.180e-01) | -.125e-05 (.215e-06) | -.161e-02 (.220e-03) | -.506e-02 (.459e-03) | -.1439 (.264e-01) | 1206 | 41046 |
| Appalachian Mountains (370) | 2.4121 (.299e-01) | .191e-05 (.351e-06) | -.174e-01 (.108e-02) | .111e-01 (.135e-02) | 1.0746 (.676e-01) | 429 | 19007 |
| New England, Warm Continental (1676) | 2.0056 (.260e-01) | -.622e-06 (.213e-06) | -.483e-02 (.309e-03) | .821e-02 (.536e-03) | -.3479 (.315e-01) | 911.3 | 24713 |

Table 13. Estimated Ecoregion Demand Equation for Outdoor Swimming.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--|--------------------------------------|-------------------------|-------------------------|-------------------------|-----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (124) | 3.0402 (.714e-01) | -.100e-04 (.986e-06) | -110e-01 (.223e-02) | .194e-01 (.269e-02) | -383.01 (.1525) | 740.5 | 2391.1 |
| Desert Southwest (210) | 2.6531 (.362e-01) | -.520e-06 (.341e-06) | -.192e-02 (.505e-03) | -.186e-01 (.242e-02) | -1.2044 (.997e-01) | 1690 | 10611 |
| Ozark & Ouachita Mountains (143) | 1.6466 (.1720) | -.215e-05 (.560e-06) | .171e-03 (.508e-03) | -.359e-02 (.132e-02) | .9199 (.1704) | 79.68 | 2259.7 |
| Northeast and Great Lakes (882) | 3.0200 (.176e-01) | -.712e-06 (.212e-06) | -.210e-02 (.211e-03) | -.127e-02 (.524e-03) | -.1589 (.256e-01) | 717.6 | 40710 |
| Appalachian Mountains (363) | 2.2455 (.328e-01) | .172e-05 (.372e-06) | -.135e-01 (.994e-03) | .116e-01 (.133e-02) | .7481 (.753e-01) | 374.8 | 18019 |

Table 14. Estimated Ecoregion Demand Equation for Coldwater Fishing.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--------------------------------------|--------------------------------------|-------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (238) | 2.1268 (.1052) | -.827e-05 (.784e-03) | .109e-02 (.224e-03) | -.413e-02 (.137e-02) | .1641 (.1076) | 183.8 | 4287.9 |
| Desert Southwest (176) | 2.3802 (.688e-01) | .864e-06 (.515e-06) | -.427e-02 (.585e-03) | -.944e-02 (.166e-02) | .7415 (.943e-01) | 265.8 | 20533 |
| Rocky Mountains (727) | 1.7641 (.547e-01) | .648e-05 (.438e-06) | -.355e-02 (.352e-03) | -.416e-03 (.683e-03) | -.8951 (.606e-01) | 114.1 | 15637 |
| Appalachian Mountains (216) | 2.7381 (.426e-01) | -.107e-06 (.437e-06) | -.642e-02 (.606e-03) | -.467e-02 (.104e-02) | .2759 (.658e-01) | 394.8 | 6576.9 |

Table 15. Estimated Ecoregion Demand Equation for Warm Freshwater Fishing.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--|--------------------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Desert Southwest (542) | 3.3572 (.171e-01) | .249e-05 (.129e-06) | -.950e-03 (.172e-03) | -.462e-02 (.287e-03) | -.8837 (.335e-01) | 4926 | 42050 |
| Midwest Prairie and Steppe (222) | 2.5890 (.404e-01) | -.134e-05 (.385e-06) | -.365e-02 (.462e-03) | .589e-02 (.762e-03) | .1682 (.524e-01) | 143.8 | 9350.8 |
| Ozark & Ouachita Mountains (250) | 3.5376 (.230e-01) | -.266e-05 (.264e-06) | -.151e-02 (.185e-03) | .421e-02 (.389e-03) | .214e-01 (.327e-01) | 272.9 | 27547 |
| Appalachian Mountains (803) | 3.7604 (.128e-01) | -.173e-05 (.153e-06) | -.522e-02 (.302e-03) | .361e-02 (.715e-03) | -1.0246 (.279e-01) | 7763 | 54985 |

Table 16. Estimated Ecoregion Demand Equation for Big Game Hunting.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--------------------------------------|--------------------------------------|------------------------|-------------------------|-------------------------|----------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (148) | 3.3274 (.951e-01) | .251e-05 (.924e-06) | -.351e-01 (.169e-02) | -.197e-01 (.237e-02) | 4.0205 (.1281) | 1463 | .3111 |
| Desert Southwest (94) | -.4304 (.6697) | .700e-05 (.822e-06) | -.118e-01 (.652e-03) | .126e-02 (.963e-03) | 3.9534 (.6717) | 584.3 | 2860.4 |
| Rocky Mountains (485) | 2.9451 (.336e-01) | .137e-05 (.240e-06) | -.459e-02 (.247e-03) | .234e-02 (.444e-03) | -.2396 (.395e-01) | 1720 | 27868 |
| Appalachian Mountains (127) | 1.7690 (.1064) | .638e-05 (.843e-06) | -.682e-02 (.798e-03) | -.994e-02 (.395e-03) | .2448 (.1560) | 201.6 | 2972.8 |

Table 17. Estimated Ecoregion Demand Equation for Wildlife Observation and Photography.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--------------------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|--------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (187) | 2.0161 (.1245) | -.683e-05 (.117e-05) | -.110e-02 (.556e-03) | .119e-01 (.262e-02) | -1.4552 (.1669) | 216.5 | 926.18 |
| Desert Southwest (122) | 2.2294 (.1078) | -.738e-05 (.193e-05) | -.207e-02 *.143e-02) | .887e-02 (.447e-02) | -1.5673 (.3435) | 165.4 | 392.8 |

Table 18. Estimated Ecoregion Demand Equation for Visiting Historical, Prehistorical, and Educational Sites.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|-----------------------------|--------------------------------------|-------------------------|-------------------------|------------------------|-------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Desert Southwest (173) | -.7745 (.8333) | -.426e-05 (.841e-05) | .158e-02 (.277e-02) | .556e-03 (.632e-02) | -.5025 (1.076) | 42.75 | 96.677 |
| Rocky Mountains (210) | -1.0467 (.6921) | .283e-05 (.135e-05) | -.507e-02 (.655e-03) | .395e-02 (.170e-02) | 2.0337 (.6944) | 236.5 | 5678.1 |

Table 19. Estimated Ecoregion Demand Equation for Relaxing and No Main Activity.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | | LRS | χ^2 |
|--|--------------------------------------|-------------------------|-------------------------|-------------------------|------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | NON | | |
| Pacific Northwest Marine (504) | 2.5024 (.408e-01) | -.230e-05 (.359e-06) | -.930e-03 (.265e-03) | .664e-02 (.142e-02) | -1.0619 (.537e-01) | 812.7 | 18729 |
| Desert Southwest (318) | 2.5824 (.550e-01) | -.131e-05 (.518e-06) | -.634e-02 (.775e-03) | -.386e-03 (.167e-02) | -.3884 (.848e-01) | 450 | 3798.7 |
| Rocky Mountains (428) | 1.6708 (.783e-01) | .511e-05 (.566e-06) | -.277e-02 (.432e-03) | -.121e-02 (.984e-03) | -.3688 (.788e-01) | 1275 | 3630.1 |
| Midwest Prairie and Steppe (226) | 3.3376 (.527e-01) | -.534e-05 (.561e-06) | -.109e-03 (.242e-03) | .172e-02 (.882e-03) | -.8321 (.780e-01) | 1137 | 9259.5 |
| Appalachian Mountains (374) | 2.7530 (.315e-01) | .307e-05 (.259e-06) | -.233e-02 (.228e-03) | -.129e-01 (.133e-02) | .1917 (.394e-01) | 874.5 | 21977 |
| New England and Warm Continental (590) | 2.2836 (.509e-01) | -.239e-05 (.422e-06) | -.471e-02 (.556e-03) | .599e-02 (.112e-02) | .160e-01 (.620e-01) | 2621 | 6034.4 |

Technical Appendix II

Table 20. Estimated Ecoregion Demand Equation for Developed and Primitive Camping.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|---|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (1300) | .3770 (.6837e-01) | .2429e-05 (.5318e-06) | -.3755e-02 (.2917e-03) | .4318e-02 (.1004e-02) | 808.7 | 11511 |
| Desert Southwest (1838) | .7453 (.3598e-01) | .2384e-05 (.2372e-06) | -.1957e-02 (1392e-03) | .2993e-02 (.4895e-03) | 538.6 | 37950 |
| Great Basin Steppe (188) | 1.1085 (.2514) | .6891e-05 (.1648e-05) | -.6790e-02 (.1475e-02) | .4883e-05 (.3339e-02) | 163.4 | 349.18 |
| Rocky Mountains (945) | 1.5340 (.4115e-01) | -.4906e-05 (.4147e-06) | -.3513e-03 (.1195e-03) | .5880e-03 (.3305e-03) | 266.1 | 51442 |
| Ozark & Ouachita Mountains (452) | 2.1557 (.4580e-01) | -.4380e-05 (.4957e-06) | -.2368e-02 (.4495e-03) | -.1105e-02 (.5644e-03) | 383.4 | 16956. |
| Northeast and Great Lakes (2744) | 1.8125 (.2177e-01) | -.4119e-07 (.2275e-06) | -.5510e-02 (.1622e-03) | .1645e-02 (.1885e-03) | 2120 | .1189 |
| Southeast Subtropical, South Florida (1817) | 1.0114 (.4473e-01) | .9819e-06 (.3980e-06) | -.4180e-02 (.2413e-03) | .8789e-03 (.3581e-03) | 812.2 | 17190 |
| Appalachian Mountains (1132) | 1.6203 (.3878e-01) | .2051e-05 (.3930e-06) | -.8585e-02 (.4595e-03) | -.3021e-02 (.1252e-02) | 1249 | .14994 |
| New England, Warm Continental (500) | .2386e-01 (.1556) | .7618e-05 (.1086e-05) | -.5596e-02 (.9512e-03) | -.2894e-02 (.7450e-03) | 344.5 | 3800.8 |

Table 21. Estimated Ecoregion Demand Equation for Day Hiking and Walking.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|---|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (259) | 4.1687 (.3045e-01) | -.6604e-05 (.2832e-06) | -.2178e-01 (.7914e-03) | .2126e-01 (.1634e-02) | 4603 | .41514 |
| Desert Southwest (818) | 2.3044 (.2491e-01) | -.8227e-06 (.1760e-06) | -.5614e-03 (.9274e-04) | -.5459e-03 (.4988e-03) | 106.5 | 43351 |
| Rocky Mountains (423) | 1.6017 (.6717e-01) | .4774e-05 (.4179e-06) | -.5964e-02 (.8464e-03) | -.2287e-03 (.1480e-02) | 1606 | 7307.6 |
| Northeast and Great Lakes (365) | 3.6139 (.2153e-01) | .5368e-05 (.1859e-06) | -.9401e-02 (.2730e-03) | -.1513e-02 (.5300e-03) | 4785 | .13582 |
| Appalachian Mountains (131) | 3.4306 (.6377e-01) | .5637e-06 (.4806e-06) | -.2199e-01 (.1130e-02) | .9384e-02 (.2734e-02) | 1410 | .29856 |
| New England, Warm Continental (153) | 3.9635 (.5898e-01) | .3611e-05 (.4386e-06) | -.6204e-02 (.3670e-03) | -.2423e-01 (.1665e-02) | 1678 | 27209 |

Table 22. Estimated Ecoregion Demand Equation for Whitewater Rafting.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|---|--------------------------------------|---------------------------|---------------------------|--------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Appalachian Mountains (241) | 2.8446 (.4222e-01) | -.4034e-05 (.3806e-06) | -.4638e-02 (.2626e-03) | .1357e-01 (.1175e-02) | 604.3 | 11244 |
| New England, Warm Continental (514) | .6975 (.6976e-01) | .1992e-05 (.5281e-06) | -.2395e-02 (.6479e-03) | .2607e-03 (.1020e-02) | 126 | 11345 |

Table 23. Estimated Ecoregion Demand Equation for Sightseeing and Pleasure Driving.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (764) | 2.5733 (.4606e-01) | -.1001e-05 (.4366e-06) | -.8821e-02 (.3578e-03) | -.1267e-03 (.7539e-03) | 1779 | .1185 |
| Desert Southwest (1758) | 1.2296 (.3811e-01) | .3361e-05 (.2670e-06) | -.2547e-02 (.1515e-03) | -.1733e-02 (.6100e-03) | 639.4 | 23033 |
| Rocky Mountains (1362) | 1.4073 (.3751e-01) | -.8468e-06 (.3253e-06) | -.3130e-03 (.5706e-04) | -.5252e-04 (.2675e-03) | 134.8 | 54719 |
| Midwest Prairie and Steppe (189) | 3.5703 (.3432e-01) | .4804e-06 (.3793e-06) | -.1213e-01 (.5207e-03) | .2249e-02 (.1916e-03) | 1603 | .50749 |
| Ozark & Ouachita Mountains (353) | 2.6273 (.5731e-01) | -.1498e-05 .5034e-06 | -.7421e-02 (.2675e-03) | .5594e-02 (.5941e-03) | 1855 | 26211 |
| Northeast and Great Lakes (1353) | 3.0348 (.2458e-01) | -.1131e-06 (.2451e-06) | -.7354e-02 (.2005e-03) | -.6819e-02 (.3937e-03) | 5558 | .41135 |
| Southeast Subtropical, South Florida (955) | 2.5824 (.4369e-01) | .6548e-06 (.3477e-06) | -.1012e-01 (.3896e-03) | -.5473e-02 (.8973e-03) | 1968 | 34505 |
| Appalachian Mountains (525) | 3.4887 (.3065e-01) | -.1728e-05 (.3504e-06) | -.1401e-01 (.4905e-03) | -.1552e-02 (.8084e-03) | -.200 | .42532 |
| New England and Warm Continental (297) | 2.0381 (.8102e-01) | .2062e-05 (.7839e-06) | -.8901e-02 (.9156e-03) | -.6960e-02 (.1932e-02) | 689.3 | .27885 |

Table 24. Estimated Ecoregion Demand Equation for Sailing and Other Boating.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|------------------------------------|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Rocky Mountains (122) | 2.3848 (.1056) | -.1037e-05 (.9475e-06) | .1247e-02 (.4603e-03) | -.1370e-01 (.2028e-02) | 507.5 | 1509 |
| Northeast and Great Lakes (208) | 2.7272 (.3448e-01) | .1592e-05 (.2248e-06) | -.7663e-02 (.4280e-03) | .8030e-02 (.7081e-03) | 547.2 | 8798.6 |
| Appalachian Mountains (172) | 2.5248 (.6045e-01) | .6168e-05 (.4402e-05) | -.1386e-01 (.7294e-03) | .4847e-02 (.2245e-02) | 1062 | .75886 |

Table 25. Estimated Ecoregion Demand Equation for Off-Highway Motor Vehicles.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------------|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (338) | 2.8184 (.4553e-01) | .4237e-05 (.4518e-06) | -.6884e-02 (.3158e-03) | -.3518e-02 (.6231e-03) | 1466 | .4986 |
| Desert Southwest (100) | 1.1760 (.1163) | .1814e-05 (.6198e-06) | -.1213e-02 (.3271e-03) | .5797e-02 (.9803e-03) | 53.54 | 3290.9 |
| Rocky Mountain (118) | 2.1984 (.9489e-01) | -.3617e-06 (.8580e-06) | -.8474e-03 (.4086e-03) | .1689e-03 (.8523e-03) | 291.9 | 1161.1 |

Table 26. Estimated Ecoregion Demand Equation for Motorboating and Waterskiing.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--------------------------------|--------------------------------------|--------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Desert Southwest (1400) | 2.5583 (.1902e-01) | .2529e-05 (.1196e-06) | -.1934e-02 (.1053e-03) | -.8059e-02 (.2685e-03) | 5391 | .63338 |
| Rocky Mountain (147) | 1.2436 (.9927e-01) | .7814e-05 (.7553e-06) | -.2083e-02 (.2885e-03) | -.1435e-02 (.5088e-03) | 151.7 | 2285.5 |
| Appalachian Mountains (284) | 3.2943 (.2546e-01) | .1436e-05 (.2018e-06) | -.4416e-03 (.3038e-03) | -.9559e-03 (.1038e-02) | 984.9 | 22265 |

Table 27. Estimated Ecoregion Demand Equation for Bicycling and Mountain Biking.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------|--------------------------------------|--------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Desert Southwest (180) | 2.9453 (.3949e-01) | .1728e-05 (.2333e-06) | -.5319e-02 (.4344e-03) | -.8444e-02 (.1729e-02) | 990.5 | .58691 |

Table 28. Estimated Ecoregion Demand Equation for Nature Study and Photography.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------------|--------------------------------------|--------------------------|---------------------------|--------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (189) | 1.8732 (.1126) | .5219e-06 (.9110e-06) | -.8901e-02 (.1070e-02) | .4872e-02 (.3639e-02) | 309.1 | .24719 |

Table 29. Estimated Ecoregion Demand Equation for Picnicking.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (192) | 1.6754 (.9888e-01) | .4728e-05 (.7631e-06) | -.2362e-01 (.2583e-02) | .1851e-01 (.3650e-02) | 356.8 | .12811 |
| Desert Southwest (455) | 1.5438 (.4886e-01) | .1527e-05 (.3796e-06) | -.2184e-02 (.4260e-03) | -.1198e-01 (.2406e-02) | 153.6 | 11855 |
| Rocky Mountains (329) | -.1202e-01 (.8970e-01) | .9054e-05 (.6203e-06) | -.2302e-02 (.2921e-03) | .6971e-02 (.5138e-03) | 520.8 | 15190 |
| Midwest Prairie and Steppe (128) | 1.9104 (.7737e-01) | -.2032e-06 (.8742e-06) | -.3965e-03 (.2668e-03) | -.8058e-02 (.1451e-02) | 51.59 | 1652.1 |
| Ozark & Ouachita Mountains (115) | 2.7127 (.7583e-01) | -.2692e-05 (.7927e-06) | -.2427e-02 (.8468e-03) | -.9303e-02 (.2155e-02) | 297.8 | 2060.7 |
| Northeast and Great Lakes (566) | 1.7567 (.4017e-01) | .1514e-05 (.4152e-06) | -.6515e-02 (.5817e-03) | .0465e-02 (.9541e-03) | 293.3 | 18034 |
| Southeast Subtropical, South Florida (883) | 2.2593 (.3054e-01) | .8255e-07 (.2774e-06) | -.6312e-02 (.3247e-03) | -.6258e-03 (.8096e-03) | 869.3 | 61930 |
| Appalachian Mountains (286) | 2.1377 (.5058e-01) | -.4379e-05 (.5415e-06) | -.1139e-01 (.1083e-02) | .1963e-01 (.2164e-02) | 415.6 | 9191.2 |
| New England, Warm Continental (172) | 2.4851 (.5588e-01) | -.1767e-05 (.5334e-06) | -.5401e-02 (.4685e-03) | .1278e-01 (.9505e-03) | 308.4 | 3748.7 |

Table 30. Estimated Ecoregion Demand Equation for Family Gathering.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (231) | 1.5224 (.1005) | .5600e-05 (.7303e-06) | -.1999e-01 (.1364e-02) | .1479e-01 (.2921e-02) | 511.4 | .19022 |
| Desert Southwest (372) | 1.5250 (.6143e-01) | .7048e-06 (.4757e-06) | -.5822e-02 (.1173e-02) | .1211e-02 (.5314e-02) | 101.7 | 10938 |
| Ozark & Ouachita Mountains (118) | 2.4164 (.7350e-01) | -.5493e-06 (.7430e-06) | -.1496e-02 (.8381e-03) | -.6262e-02 (.2202e-02) | 243.3 | 2265.6 |
| Northeast and Great Lakes (576) | 1.8030 (.3759e-01) | -.7997e-06 (.4194e-06) | -.3490e-02 (.3329e-03) | .5621e-02 (.8783e-03) | 203.3 | 20054 |
| Appalachian Mountains (305) | 2.5077 (.4156e-01) | -.8296e-05 (.5047e-06) | -.2062e-02 (.3890e-03) | .3115e-02 (.1581e-02) | 441.8 | 7737.4 |

Table 31. Estimated Ecoregion Demand Equation for Pool Swimming.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | x ² |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (111) | 2.5226 (.6849e-01) | -.7046e-05 (.7429e-06) | -.6376e-01 (.8370e-02) | .8562e-01 (.1013e-01) | 697.8 | .44213 |
| Desert Southwest (222) | 3.2361 (.3660e-01) | -.2048e-05 (.3453e-06) | -.2801e-02 (.2140e-03) | -.1128e-01 (.1217e-02) | 737.6 | 20664 |
| Midwest Prairie and Steppe (211) | 2.2844 (.4116e-01) | .3235e-05 (.4711e-06) | -.1305e-02 (.3543e-03) | -.2646e-02 (.7388e-03) | 106.8 | 7087.3 |
| Ozark & Ouachita Mountains (181) | 2.4907 (.4969e-01) | -.2574e-05 (.4951e-06) | .5632e-03 (.4532e-03) | -.3180e-02 (.1142e-02) | 48.26 | 2757.8 |
| Northeast and Great Lakes (868) | 3.0708 (.1770e-01) | -.9256e-06 (.2072e-06) | -.2205e-02 (.2037e-03) | -.5750e-02 (.4463e-03) | 1176 | 21146 |
| Appalachian Mountains (370) | 2.4480 (.2844e-01) | .2097e-06 (.3298e-06) | -.6432e-02 (.5854e-03) | .9718e-03 (.1178e-02) | 171.5 | 19977 |
| New England, Warm Continental (1676) | 1.9354 (.2569e-01) | .9123e-08 (.2098e-06) | -.6470e-02 (.2945e-03) | .6974e-02 (.5228e-03) | 790.7 | 31858 |

Table 32. Estimated Ecoregion Demand Equation for Outdoor Swimming.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (124) | 3.0425 (.7100e-01) | -.9904e-05 (.8751e-06) | -.1141e-01 (.1817e-02) | .1925e-01 (.2577e-02) | 740.4 | 2496.8 |
| Desert Southwest (210) | 3.6898 (.3275e-01) | -.1720e-06 (.3016e-06) | -.7113e-02 (.3868e-03) | -.1655e-01 (.1704e-02) | 1501 | 11003 |
| Ozark & Ouachita Mountains (143) | 2.5023 (.5475e-01) | -.2551e-05 (.5666e-06) | .8650e-03 (.4739e-03) | -.4317e-02 (.1310e-02) | 39.97 | 2326.5 |
| Northeast and Great Lakes (882) | 2.9975 (.1746e-01) | -.3406e-06 (.2035e-06) | -.2716e-02 (.2000e-03) | -.2310e-02 (.5023e-03) | 679.4 | 40811 |
| Appalachian Mountains (363) | 2.2580 (.3189e-01) | .8161e-06 (.3567e-06) | -.7260e-02 (.5736e-03) | .1111e-01 (.1242e-02) | 275.1 | 19651 |

Table 33. Estimated Ecoregion Demand Equation for Coldwater Fishing.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------------|--------------------------------------|---------------------------|---------------------------|---------------------------|--------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (238) | 2.2502 (.6488e-01) | -.8418e-05 (.7774e-06) | .1205e-02 (.2130e-03) | -.4122e-02 (.1376e-02) | 181.4 | 4376.2 |
| Desert Southwest (176) | 2.5688 (.6009e-01) | -.9684e-06 (.4677e-06) | -.3787e-02 (.5718e-03) | -.1701e-02 (.1231e-02) | 201.6 | 21581 |
| Great Basin Steppe (165) | .4636 (.2075) | .6486e-05 (.1087e-05) | -.8150e-03 (.7749e-03) | -.8990e-02 (.2585e-02) | 110.3 | 626.22 |
| Rocky Mountains (727) | 1.4234 (.5339e-01) | .7447e-05 (.4353e-06) | -.6391e-02 (.4090e-03) | -.2231e-02 (.7482e-03) | 935.69 | 23586 |
| Appalachian Mountains (216) | 2.7850 (.4036e-01) | -.5381e-06 (.4221e-06) | -.4867e-02 (.4446e-03) | -.3691e-02 (.9792e-03) | 377.2 | 6559.8 |

Table 34. Estimated Ecoregion Demand Equation for Warm Freshwater Fishing.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Desert Southwest (542) | 3.2483 (.1740e-01) | .3135e-05 (.1253e-06) | -.3582e-02 (.2219e-03) | .6064e-02 (.3373e-03) | 4151 | 39812 |
| Midwest Prairie and Steppe (222) | 2.6453 (.3593e-01) | -.1669e-05 (.3716e-06) | -.3675e-02 (.4750e-03) | .6776e-02 (.7283e-03) | 133.4 | 9490.9 |
| Ozark & Ouachita Mountains (250) | 3.5473 (.1754e-01) | -.2753e-05 (.2242e-06) | -.1452e-02 (.1599e-03) | .4248e-02 (.3832e-03) | 272.5 | 27532 |
| Appalachian Mountains (803) | 3.7465 (.1313e-01) | -.5191e-07 (.1491e-06) | -.1312e-01 (.3189e-03) | -.5742e-04 (.8064e-03) | 6374 | .74832 |

Table 35. Estimated Ecoregion Demand Equation for Big Game Hunting.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------------|--------------------------------------|---------------------------|---------------------------|--------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (148) | 2.8715 (.7596e-01) | -.3766e-05 (.8289e-06) | -.8855e-02 (.6767e-03) | .1827e-02 (.2248e-02) | 574.9 | 13345 |
| Desert Southwest (94) | 2.9326 (.8653e-01) | .4396e-05 (.7967e-06) | -.9111e-02 (.6100e-03) | .3631e-02 (.9058e-03) | 380.8 | 3196.7 |
| Rocky Mountains (485) | 2.8370 (.2929e-01) | .1700e-05 (.2351e-06) | -.4932e-02 (.2505e-03) | .1497e-02 (.4398e-03) | 1684 | 28130 |
| Appalachian Mountains (127) | 1.8044 (.1024) | .6002e-05 (.7950e-06) | -.5996e-02 (.5800e-03) | .7542e-02 (.3641e-02) | 199.1 | 3036.8 |

Table 36. Estimated Ecoregion Demand Equation for Wildlife Observation and Photography.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------------|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (187) | 1.5163 (.1224) | -.3608e-05 (.1107e-05) | -.4077e-02 (.5887e-03) | .6378e-02 (.2397e-02) | 135.7 | 2621 |
| Desert Southwest (122) | 2.2047 (.1159) | -.3322e-05 (.1676e-05) | -.7427e-02 (.1206e-02) | -.3104e-02 (.3586e-02) | 144.6 | 601.56 |

Table 37. Estimated Ecoregion Demand Equation for Visiting Historical, Prehistorical, and Educational Sites.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|-----------------------------|--------------------------------------|---------------------------|---------------------------|--------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Desert Southwest (173) | -.9770 (.7615) | -.4300e-05 (.8585e-05) | .1128e-02 (.2704e-02) | .2406e-03 (.6122e-03) | 42.53 | 92.642 |
| Rocky Mountains (210) | .7379 (.1665) | .2903e-05 (.1377e-05) | -.4792e-02 (.6403e-03) | .5316e-02 (.1573e-02) | 216.4 | 5619.8 |

Table 38. Estimated Ecoregion Demand Equation for Relaxing and No Main Activity.

| Ecoregions (Sample Size) | Parameter Estimates (Standard Error) | | | | LRS | χ^2 |
|--|--------------------------------------|---------------------------|---------------------------|---------------------------|-------|----------|
| | Intercept | INC | TC | SUBST | | |
| Pacific Northwest Marine (504) | 2.3732 (.4316e-01) | -.3867e-06 (.3628e-06) | -.5135e-02 (.3910e-03) | .2766e-02 (.1559e-02) | 399 | 42152 |
| Desert Southwest (318) | 2.5193 (.5442e-01) | -.8820e-06 (.5052e-06) | -.8765e-02 (.6687e-03) | .6342e-04 (.1661e-02) | 428.5 | 3912.5 |
| Rocky Mountains (428) | 1.4825 (.6968e-01) | .5939e-05 (.5403e-06) | -.3463e-02 (.4436e-03) | -.2747e-02 (.9819e-03) | 1253 | 3853.3 |
| Midwest Prairie and Steppe (226) | 3.0154 (.4708e-01) | -.2706e-05 (.4757e-06) | -.7638e-03 (.2567e-03) | -.4485e-02 (.6332e-03) | 1020 | 9012 |
| Appalachian Mountains (374) | 2.7394 (.3152e-01) | .3100e-05 (.2589e-06) | -.2874e-02 (.2176e-03) | -.1485e-01 (.1283e-02) | 850.9 | 22109 |
| New England and Warm Continental (590) | 2.2889 (.4645e-01) | -.2423e-05 (.4036e-06) | -.4638e-02 (.4761e-03) | .5995e-02 (.1120e-02) | 2621 | 6044.4 |