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US Park Recreation Values (1968-2003):

A Review of the Literature

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Working Paper in Economics 6/11
September 2006

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Abstract

The results of outdoor recreation consumer surplus studies for national parks, national forests, state parks and state forests in the United States from 1968 through 2003 are compared and analyzed across activity type, locational region, and park designation. The resulting data set includes 1,229 observations, spanning 36 years, 28 types of activities, and 106 locations. All consumer surplus data were converted to 2006 United States dollars per person per day for comparison purposes. It was discovered that activity and park type played a significant role in consumer surplus values. Activities such as mountain biking, windsurfing, and rock-climbing were among the highest valued activities while visiting environmental education centers was the lowest. When comparing park types, it was found that on average, activities at National Parks had higher values than national forests, state parks, or state forests.

This meta-analysis is the most extensive literature review in the history of non-market consumer surplus values for outdoor recreation in the United States ever conducted and should prove beneficial to anyone seeking information on outdoor recreation studies as well as those wishing to conduct a benefit transfer analysis for their own land management area.

Keywords
Consumer surplus values
Non-market valuation
Outdoor recreation
Benefit transfer

JEL Classification
Q26

Acknowledgements

The author would significantly like to thank all people and organizations involved in the five stages of data collection. This includes, but may not be limited to: Cindy Sorg, John Loomis, Richard Walsh, Donna Johnson, John McKean, Doug MacNair, Ram Shrestha, and Randall Rosenberger, the US Forest Service, and Bruce Peacock of the National Park Service.

INTRODUCTION

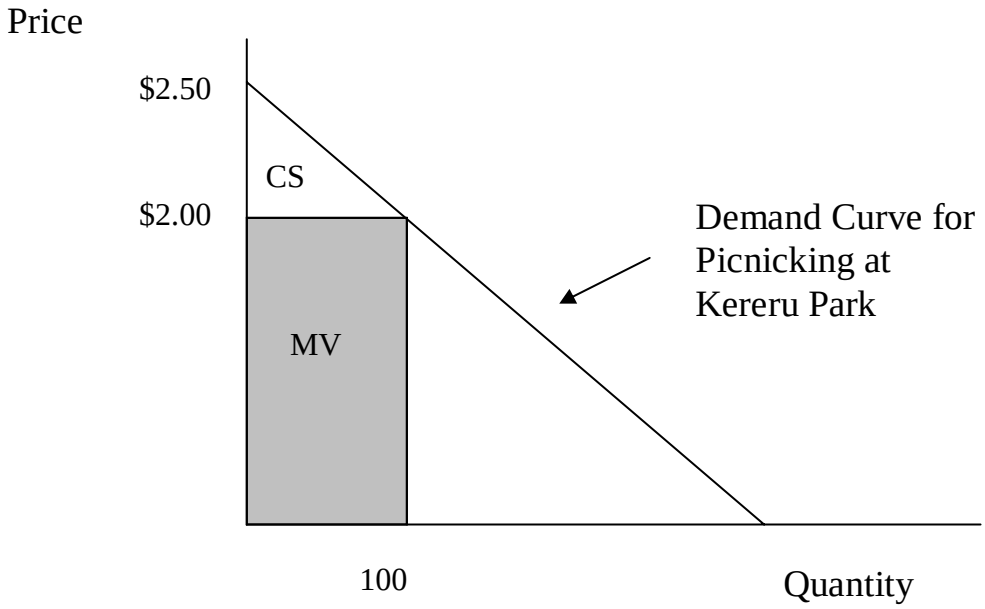
Outdoor activities such as bird watching, picnicking, mountain biking, and hiking are participated in frequently by hundreds of thousands of people every day. In the United States alone, many venues are available for people to engage in these outdoor activities including, but not limited to, city parks, state parks, state forests, national parks and national forests. Since so many people are participating in these activities, there must be a high value for them, but how should these values be calculated?

Prior to the 1950's, economists typically only calculated market values, such as the entrance fee to a park. However, even in the early 1900's, economists believed that only considering market values might not be revealing the true value of non-market goods and services such as participating in an outdoor activity at a park (Clark 1915a, Clark 1915b). To calculate this true value, both market and non-market values must be considered. In the 1950's, techniques to measure non-market values began creation (Trice and Wood, 1958). One currently used technique to estimate the non-market value of participating in outdoor activities at parks is to calculate the consumer surplus value.

Consumer surplus for outdoor recreation is the residual benefit received by someone participating in an outdoor recreation activity. This can also be thought of as the value of the activity over and above what they have paid for it (CS in Figure 1). As an example, let us assume that we want to determine the consumer surplus value for people picnicking at Kereru Park and that picnicking is the only activity that people can participate in at this park. The cost of entrance to Kereru Park is $2. At this price, 100 people enter the park providing a market value of $200 ($2 x 100). This value is represented by the grey box in Figure 1 labeled MV for market value. However, many of these people were willing-to-pay more than the $2 entrance fee. This extra amount they are willing-to-pay over and above the $2 is their consumer surplus and indicated by the triangle CS in Figure 1. Consumer surplus in this example would be $25 (($2.50-$2.00) x 100 x 1/2). Therefore, the total economic benefit of the park is $225 ($200 + $25).[1]

[1] When using a graph such as this, it is assumed that there is a substitutable good available for the good in question and that the supply curve is represented by an upward sloping line (Costanza *et al*., 1997).

Figure 1. Consumer Surplus for Kereru Park



Consumer surplus values for outdoor recreation activities can be determined by using non-market valuation techniques. Two widely used techniques for estimating consumer surplus values are the contingent valuation method and the travel cost method.

The contingent valuation method is a stated preference method in which a respondent is presented with a hypothetical situation and asked to state what they would do if this hypothetical situation comes to fruition. The contingent valuation method is a widely accepted and utilised non-market valuation method. One of the reasons that contingent valuation is so popular is because it not only measures non-market use values, but also measures non-market non-use values such as existence and bequest values. In an example of using the contingent valuation method, a park that wants to put a new toilet in a campground that currently does not have a toilet could be considered. Once the hypothetical situation is set up, the respondent might be asked a dichotomous choice question such as, "Are willing-to-pay a specific dollar amount for the hypothetical change (in this case, the new toilet)."[2] Once this information is collected from a group of people, the consumer surplus value can be calculated and used to determine demand.

The travel cost method is a revealed preference method in which a person is typically asked to supply information about costs they incur on a trip they had actually taken or are currently

[2] Other questioning methods are available besides dichotomous choice such as open ended and payment card, however, dichotomous choice questions are used more commonly. For more information on methods, refer to Champ et al., 2003 or Carson, 2000.

taking. Recreational use values of environmental amenities are then estimated by using these costs associated with travel to the site. This method is based on the assumption that to consume a non-market good, consumers must use market goods i.e. incur costs. For example, to determine the value of picnicking at Kereru Park, a person that is currently picnicking at the park might be asked what they paid in petrol to get to the park and how much they are paying for accommodation in the area because of this visit. This information also allows for the calculation of consumer surplus values and the demand curve.

As consumer surplus values have been calculated for outdoor recreation activities since the 1960's, the purpose of this study was to collect as many of the previous research studies as possible to build a database that can be used for comparison of consumer surplus values for outdoor recreation. As the data in the table is extensively detailed, comparisons can be made by variables such as activity, park type, and location. This paper presents these results. In addition, the database can be used by public land managers and other outdoor recreation researchers to conduct a benefit transfer study to determine the value of activities at either current or proposed parks which can help them to decide what management decisions to make to the best of their abilities when time and funding is limited and a complete original study is not possible.[3]

DATA COLLECTION

Data were collected from journals, extension bulletins, books, and directly from the authors over a period of twenty years.[4] All sources included United States park recreation consumer surplus values. The resulting data set includes 1229 observations, spanning thirty-six years, twenty-eight types of activities, and 106 locations. All consumer surplus data were converted to 2006 United States dollars per person per day for comparison purposes. It is believed that this collection of data is the most extensive outdoor recreation database on consumer surplus studies to date and encompasses an extremely large proportion (>90%) of the known and available consumer surplus outdoor recreation studies ever studied in the United States.
Sufficient economic data were recovered for twenty-eight types of activity comparisons. Activities included:

[3] For more detail on the benefit transfer process, please refer to Kaval and Loomis, 2003.

[4] Data collection began in 1983 with Cindy Sorg and John Loomis. There were four subsequent significant additions to the dataset following this initial research: 1988 (Richard Walsh, Donna Johnson, and John McKean), 1993 (Doug MacNair), 2001 (Randall Rosenberger and Ram Shrestha), and in 2003 (Pamela Kaval) (Kaval and Loomis, 2003; MacNair, 1993; Rosenberger and Loomis, 2000; Shrestha and Loomis, 2003; Sorg and Loomis, 1984; Walsh et al., 1992).

Camping	Picnicking
Swimming	Sightseeing and Pleasure Driving
Off Road Vehicle Use	Motorboating
Non-Motorized Boating	Hiking
Mounting Biking	Downhill Skiing
Cross Country Skiing	Snowmobiling
Hunting	Fishing
Wildlife Viewing (Not Birds)	Horseback Riding
Rock Climbing	General Recreation (Unspecified)
Waterskiing	Visiting an Arboretum
Going to the Beach	Visiting Aquariums
Scuba Diving	Windsurfing
Birdwatching	Snorkeling
Backpacking	Visiting Environmental Education Centers

Activities typically took place in National Parks, National Forests, and State Parks or State Forests. However, many studies did not specify a park type or included several park types. These studies are simply categorized as "not specified."

Table 1: Region Classifications

North-East	**South-East**	**Intermountain**	**Pacific Coast**	**Alaska**	**Multiple Area Studies**
Minnesota	Texas	Montana	Washington	Alaska	Any combination of 2 or more regions
Iowa	Oklahoma	North Dakota	Oregon		
Missouri	Arkansas	Wyoming	California		
Wisconsin	Louisiana	South Dakota	Hawaii		
Illinois	Mississippi	Nebraska			
Michigan	Tennessee	Colorado			
Indiana	Kentucky	Kansas			
Ohio	Virginia	Arizona			
West Virginia	North Carolina	New Mexico			
Pennsylvania	South Carolina	Idaho			
New York	Georgia	Utah			
Vermont	Florida	Nevada			
New Hampshire	Alabama				
Maine					
Massachusetts					
Rhode Island					
Connecticut					
New Jersey					
Delaware					
Maryland					
Washington DC					

For location comparisons, studies were grouped into six regions: North-East, South-East, Intermountain, Pacific Coast, Alaska, and a category called 'Multiple Area' studies in which a study was conducted in several regions. Regions correlate with US Forest Service Area Designations (USFS, 2006) (Table 1). For a list of the major variables collected in the dataset and their descriptions, please refer to Appendix A.

RESULTS

Data was obtained for 1,229 observations. Data was collected for many variables including consumer surplus values, region, and activity participated in, type of survey (mail, phone, and in-person), location, as well as demographic variables (Appendix A). Demographically, we find that the average income of respondents in 2006 US$ was $57,367 and the average age of respondents was 42. Respondents were educated for approximately 14 years and therefore have attended two years of university. Approximately 30% of respondents were female. Sample sizes of studies varied from a low of 9 to a high of 60,000 with a mean of 1,460 (Table 2).

Table 2. Demographics and Sample Sizes of Studies[5]

	Mean	N	Std. Dev.	Minimum	Maximum
Income (2006 US$)	$57,367	223	$18,793	$13,131	$110,824
Education in Years	14.39	122	1.29	12	16.66
Age	42.07	245	7.52	27	55
Sex (% Female)	0.29	170	0.20	0.02	0.62
Sample Size	1,460	842	4,061	9	60,000

Of these 1,229 observations, the average consumer surplus per person per day in 2006 US$ was found to be $60.50. The minimum consumer surplus value reported was $0.40 and the maximum was $1,131.93 (Table 3). Therefore, on average, people experience a high non-market value when participating in an outdoor recreation activity in a park.

Table 3. Average Consumer Surplus / Person / Day (2006 US$)

Mean	N	Std. Dev.	Minimum	Maximum
$60.50	1229	$96.17	$0.40	$1,131.93

[5] Values for income, education, age, and sex were not reported in all studies. In addition, data for income, education, age, and sex only started being collected extensively in the last addition to the database in 2003. For both these reasons, N values are not as high as they could be for the demographic variables.

Consumer Surplus Comparisons

Looking solely at consumer surplus values overall does not present a full picture. Therefore, consumer surplus values were compared by activities, regions, and park types. Research studies were conducted for twenty-eight different activities and consumer surplus values for these activities ranged from $6.13/person/day (2006 US$) to $997.13/person/day. Overall, windsurfing had the highest consumer surplus value of $997/person/day in 2006 US$. The next highest were mountain biking ($174/person/day) and non-motorized boating ($140/person/day) such as kayaking and canoeing. Other activities over $100/person/day of consumer surplus include backpacking ($131), birdwatching ($120), and rock-climbing ($110). Activities at the low end of consumer surplus values include visiting environmental education centers ($6), horseback riding ($18) and aquarium visits ($29) (Table 4).

Five regions plus one category of multiple regions were then analyzed. According to the results, the Southeastern United States had the highest consumer surplus value of $79/person/day (2006 US$) with the Intermountain Area having the second highest of $68/person/day. Lowest were the Northeast ($42/person/day) and Alaska ($47/person/day). Statistical tests show no significant difference between regions.

Further subdividing region by activity provides us with more extensive information. The Alaska Region, while it had high consumer surplus values for fishing ($63), hunting ($67) and wildlife viewing ($50) did not have any of the highest consumer surplus values for any activities compared to other regions.

Some of the states in the Intermountain Region contain some of the highest peaks in the Rocky Mountains such as Montana, Wyoming, and Colorado. Many of these peaks are over 4,000 meters high. Not surprisingly then, this region has the highest consumer surplus values by region for many popular mountain activities such as downhill skiing ($40), mountain biking ($640), off road vehicle use ($44), and snowmobiling ($54). It also had the highest values for non-motorized boating activities such as canoeing[6] and kayaking ($186) as well as picnicking ($104).

[6] Canadian canoes and canoes are the same in this report.

Table 4: Consumer Surplus Values/ Person/ Day in 2006 US$ by Activity and Region

	Overall	Alaska	InterMountain	NorthEast	Pacific Coast	SouthEast	Multiple
Backpacking	$131.38				**$131.38**		
	(6, 57.40)				**(6, 57.40)**		
Birdwatching	$120.02			$110.84		**$125.53**	
	(8, 127.09)			(3, 169.04)		**(5, 117.80)**	
Camping	$37.96		$35.44	$33.79	**$106.53**	$26.33	$12.07
	(48, 40.80)		(21, 31.07)	(10, 20.40)	**(4, 92.65)**	(11, 27.36)	(2, 2.89)
Cross Ctry Ski	$32.03		$30.50	$35.32	**$49.39**		$15.53
	(12, 12.04)		(7, 12.39)	(3, 5.00)	**(1, 0)**		(1, 0)
Downhill Skiing	$34.19		**$40.45**		$25.60		$24.03
	(5, 19.37)		**(3, 24.55)**		(1, 0)		(1, 0)
Fishing	$52.83	$63.28	$50.61	$37.19	$45.29	**$103.82**	$40.91
	(173, 98.43)	(4, 18.81)	(48, 49.22)	(69, 58.34)	(15, 34.32)	**(27, 215.02)**	(10, 35.88)
General Rec	$84.27	$15.15	$67.46	$17.22	**$139.28**	$106.34	$21.27
	(52, 178.85)	(1, 0)	(22, 89.15)	(5, 18.44)	**(10, 260.95)**	(13, 254.34)	(1, 0)
Go to Beach	$40.40			**$43.48**		$34.23	
	(33, 29.69)			**(22, 33.66)**		(11, 19.49)	
Hiking	$31.48	$15.83	$39.34	**$76.75**	$23.72	$61.64	$25.57
	(68, 36.47)	(1, 0)	(7, 21.15)	**(3, 22.68)**	(49, 18.95)	(7, 93.09)	(1, 0)
Horse Riding	$18.49						**$18.49**
	(1, 0)						**(1, 0)**
Hunting	$47.94	$67.04	$49.57	$48.44	$46.44	$36.10	**$69.43**
	(274, 37.59)	(7, 12.99)	(109, 35.74)	(87, 38.43)	(18, 33.48)	(44, 19.34)	**(9, 94.52)**
Motorboating	$60.39		$54.79	$30.30	**$72.22**	$65.03	$35.07
	(32, 48.53)		(7, 70.04)	(3, 44.58)	**(8, 51.97)**	(13, 36.18)	(1, 0)
Mtn. Biking	$173.95		**$640.07**	$41.79	$50.72	$106.40	$21.58
	(32, 299.94)		**(6, 477.15)**	(1, 0)	(16, 11.16)	(8, 59.59)	(1, 0)
Non-MotorBoat	$140.15	$18.53	**$186.69**	$90.16	$117.88	$131.47	$34.72
	(81, 118.42)	(1, 0)	**(22, 170.60)**	(6, 57.34)	(4, 8.52)	(47, 93.24)	(1, 0)
OffRoad Driving	$38.27		**$44.52**		$41.21	$5.35	$24.43
	(10, 24.73)		**(7, 25.65)**		(1, 0)	(1, 0)	(1, 0)
Picnicking	$71.44		**$104.56**	$57.62	$65.56	$37.39	$19.22
	(13, 109.12)		**(5, 171.17)**	(2, 68.58)	(3, 70.13)	(2, 11.63)	(1, 0)
Rockclimbing	$110.02		$51.49	$105.02		**$183.73**	$57.50
	(27, 76.44)		(3, 13.41)	(1, 0)		**(11, 69.57)**	(12, 0.25)
Scuba Diving	$36.67			$24.51	**$53.69**		
	(24, 55.82)			(14, 17.57)	**(10, 83.46)**		
Sightseeing	$53.60	$10.48	$61.46	**$89.90**	$20.69	$65.33	$27.71
	(39, 78.02)	(4, 6.52)	(15, 104.98)	**(3, 107.76)**	(4, 27.60)	(11, 56.30)	(2, 13.44)
Snorkeling	$30.94				**$30.94**		
	(9, 47.03)				**(9, 47.03)**		
Snowmobiling	$54.57		**$54.57**				
	(8, 34.67)		**(8, 34.67)**				
Swimming	$43.57		$30.16	$22.68	$27.85	**$62.19**	$24.04
	(26, 31.97)		(1, 0)	(7, 16.59)	(4, 23.17)	**(13, 33.13)**	(1, 0)
Env. Ed. Center	$6.13			**$6.13**			
	(1, 0)			**(1, 0)**			
Arboretum	$34.55					**$34.55**	
	(1, 0)					**(1, 0)**	
Aquarium	$28.90					**$28.90**	
	(1, 0)					**(1, 0)**	
Waterskiing	$50.04		$58.15	$15.45			**$68.39**
	(4, 25.96)		(2, 18.91)	(1, 0)			**(1, 0)**
View Wildlife	$45.23	$50.36	$40.07	$36.24	**$73.98**	$40.93	$60.01
	(240, 45.06)	(8, 27.41)	(61, 27.08)	(65, 39.00)	**(23, 82.72)**	(54, 24.08)	(29, 66.56)
Windsurfing	**$997.13**					**$997.13**	
	(1, 0)					**(1, 0)**	
Overall	**$60.50**	$46.80	$67.63	$42.07	$54.68	**$79.27**	$51.00
	(1229, 96.17)	(26, 27.97)	(354, 118.77)	(306, 46.54)	(186, 79.93)	**(281, 120.26)**	(76, 55.02)

*Note: Means are represented followed by (N, std. dev.).

In the Northeast Region, consisting of many of the original 13 US colonies, going to the beach ($43), hiking ($76), sightseeing ($89) and visiting environmental education centers ($6) had the highest consumer surplus values for activities by the regional classification. However, it should be noted that this is the only region that collected data on environmental education centers.

The Pacific Region held the highest consumer surplus values for 28% of the 28 activities. These included water activities such as scuba diving ($53), snorkeling ($30), and motorboating ($72). But there were also high values for camping ($106), cross country skiing ($49), general recreation ($139), and wildlife viewing ($73). The value for backpacking was $131.38; however, this was the only region to record values for backpacking.

In the Southeast, values were highest for birdwatching ($125), fishing ($103), rockclimbing ($183), and swimming ($62). While studies done in multiple areas were highest for hunting ($69) and waterskiing ($68).

Comparison by Park Type

As stated previously, there are four designations of park types that were studied: national parks, national forests, state parks and forests, and those studies that either included multiple park types or did not specify. Results show no significant difference between National Forests ($55/person/day), State Parks and Forests ($53/person/day) and those areas that did not specify ($59/person/day). However, national parks had a significantly higher consumer surplus value ($128/person/day). National Park values were over twice as much as existed for the other park types (Figure 2).

Further subdividing park type by activity provides us with stimulating results (Table 5). In National Forests, no recreation activity seemed to provide the highest consumer surplus value except backpacking ($131) which was not studied in any of the other regions. In National Parks, many outdoor activities were not studied; downhill skiing, off-road driving, hunting and mountain biking. This makes logical sense as most national parks do not allow these activities. Sixty percent of the activities that were studied at National Parks had the highest consumer surplus values including cross country skiing ($43), fishing ($59), general recreation ($341), non-motorized boating ($248), picnicking ($410), and wildlife viewing ($116). Since hunting is not permitted in most national parks,[7] wildlife that would be seen much less frequently outside the park is common inside the park. For example, in Rocky

[7] Grand Teton National Park allows some elk hunting

Mountain National Park in Colorado, elk, mule deer, and moose are commonly seen, while in Yellowstone National Park in Wyoming, Montana, and Idaho, species such as trumpeter swans and bison (sometime called buffalo) are commonly seen. Therefore the high wildlife viewing value makes sense. High numbers of wildlife may also influence other activity values such as non-motorized boating and cross country skiing.

Figure 2. Average Consumer Surplus / Person / Day (2006 US$) By Park Type

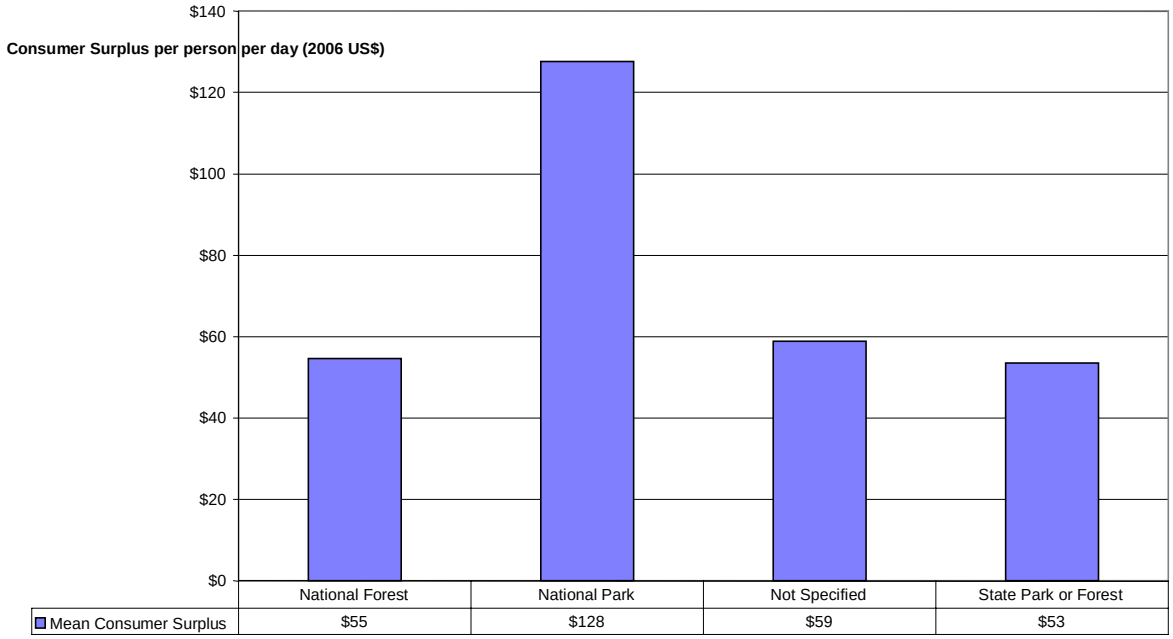


Table 5: Consumer Surplus Values/ Person/ Day in 2006 US$ by Activity and Park type

	Overall	National Forest	National Park	Park Type Not Specified	State Park or State Forest
Backpacking	$131.38	**$131.38**			
	(6, 57.40)	**(6, 57.40)**			
Birdwatching	$120.02			**$120.02**	
	(8, 127.09)			**(8, 127.09)**	
Camping	$37.96	$22.63		**$51.44**	$33.08
	(48, 40.80)	(18, 29.38)		**(23, 48.58)**	(7, 22.60)
Cross Ctry Ski	$32.03	$27.52	**$43.86**	$32.24	
	(12, 12.04)	(3, 12.99)	**(1, 0)**	(8, 12.27)	
Downhill Skiing	$34.19			**$34.19**	
	(5, 19.37)			**(5, 19.37)**	
Fishing	$52.83	$26.32	**$59.05**	$56.34	$33.67
	(173, 98.43)	(15, 17.86)	**(1, 0)**	(150, 104.93)	(7, 33.18)
General Rec	$84.27	$12.63	**$341.75**	$118.99	$32.37
	(52, 178.85)	(15, 6.69)	**(1, 0)**	(31, 218.55)	(5, 30.57)
Go to Beach	$40.40		$36.42	$34.01	**$43.48**
	(33, 29.69)		(1, 0)	(10, 20.53)	**(22, 33.66)**
Hiking	$31.48	$22.10	$25.43	**$57.94**	$34.40

	(68, 36.47)	(45, 11.40)	(5, 14.89)	**(17, 64.46)**	(1, 0)
Horse Riding	$18.49			**$18.49**	
	(1, 0)			**(1, 0)**	
Hunting	$47.94	$37.81		**$49.29**	$23.06
	(274, 37.59)	(23, 29.58)		**(247, 38.25)**	(4, 21.70)
Motorboating	$60.39	$12.74	$31.28	**$67.12**	$4.56
	(32, 48.53)	(1. 0)	(1, 0)	**(28, 48.06)**	(2, 1.00)
Mtn. Biking	$173.95	$145.45		**$179.23**	
	(32, 299.94)	(5, 28.73)		**(27, 327.03)**	
Non-MotorBoat	$140.15	$157.14	**$248.57**	$83.86	
	(81, 118.42)	(33, 98.71)	**(13, 187.32)**	(35, 58.35)	
OffRoad Driving	$38.27	$14.41		$23.66	**$49.54**
	(10, 24.73)	(1, 0)		(3, 17.94)	**(6, 24.03)**
Picnicking	$71.44	$11.51	**$410.31**	$49.54	
	(13, 109.12)	(2, 3.37)	**(1, 0)**	(10, 42.24)	
Rockclimbing	$110.02			$62.93	**$133.57**
	(27, 76.44)			(9, 15.79)	**(18, 84.01)**
Scuba Diving	$36.67			**$36.67**	
	(24, 55.82)			**(24, 55.82)**	
Sightseeing	$53.60	$29.93	$49.04	$47.39	**$105.16**
	(39, 78.02)	(4, 12.15)	(14, 104.28)	(16, 59.16)	**(5, 71.67)**
Snorkeling	$30.94			**$30.94**	
	(9, 47.03)			**(9, 47.03)**	
Snowmobiling	$54.57			**$85.71**	$44.19
	(8, 34.67)			**(2, 58.44)**	(6, 21.97)
Swimming	$43.57	$15.93		**$52.40**	$21.07
	(26, 31.97)	(2, 2.83)		**(19, 32.99)**	(5, 10.13)
Env. Ed. Center	$6.13				**$6.13**
	(1, 0)				**(1, 0)**
Arboretum	$34.55			**$34.55**	
	(1, 0)			**(1, 0)**	
Aquarium	$28.90			**$28.90**	
	(1, 0)			**(1, 0)**	
Waterskiing	$50.04				**$50.04**
	(4, 25.96)				**(4, 25.96)**
View Wildlife	$45.23	$23.85	**$116.95**	$44.55	$27.26
	(240, 45.06)	(13, 21.50)	**(11, 104.42)**	(195, 38.85)	(21, 20.71)
Windsurfing	**$997.13**			**$997.13**	
	(1, 0)			**(1, 0)**	
Overall	**$60.50**	$54.58	**$127.64**	$58.92	$53.49
	(1229, 96.17)	(186, 71.44)	**(49, 155.29)**	(880, 99.23)	(114, 56.90)

*Note: Means are represented followed by (N, std. dev.).

In state parks and state forests, which are many times located closer to people's homes than the more dispersed national forests and national parks, many activities had the highest consumer surplus values overall. These included going to the beach ($43), off-road driving ($49), rockclimbing ($133), and sightseeing ($105). When park type was not specified, or multiple park types were studied, consumer surplus values were high for camping ($51), hiking ($57), hunting ($49), motorboating ($67), and mountain biking ($179).

Discussion and Conclusions

The purpose of this study was to gather data on the consumer surplus values of outdoor recreation activities in the United States and to generate general inferences about outdoor recreation activities in various regions and park types. Overall, this research found that there is a high value for outdoor activities in the United States with activities such as wildlife viewing and mountain biking being the most highly prized. It is good to see activities such as wildlife viewing having a high value because it is an activity that people of all ages can participate in. It can be done while walking on a trail or driving around in a tour bus. Mountain biking, on the other hand, is not for everyone. But mountain bikers highly prize certain trails such as the Slickrock Trail in Moab, Utah, and will travel for miles to get there. Sadly though, activities such as visiting environmental education centers are not valued highly. Perhaps people are getting their environmental education via other means such as television programs like the Crocodile Hunter and therefore they just want to get out and enjoy the outdoor activities? Or maybe they think education should be provided by the governments and therefore believe they are already paying for it in their taxes? Regardless, overall consumer surplus values show outdoor activities to have a positive consumer surplus value.

Breaking down the activities by region we find that regions that are far away from the 48 states, such as Alaska, while they have high consumer surplus values, do not have values as high as those areas that are of easier access to a larger portion of the population. In the Pacific Coast, there is a high population and easy access to activities such as scuba diving, snorkeling, and camping. These are therefore the activities of highest value. While in the Northeast, people have easy access to hiking trails and beaches, and therefore these are high values there. In the mountains, mountain activities such as snowmobiling, downhill skiing and mountain biking are valued highly.

Comparing activities by park type played a major role in comparison results. Overall, national park activities were valued more than twice as highly as activities in national forests, state parks, state forests, or other parks. This may be related to the theory that an area being designated as a national park is perceived to be of higher quality than an area that is not a national park (Weiler and Seidl, 2004; Vaske et al., 1980). High consumer surplus values in national parks may also be related to wildlife numbers. National Parks are havens for many wildlife species, especially those that are unwanted outside the park, e.g., bison in Yellowstone are unwanted out of the park as some ranchers believe that bison will transmit the disease brucellosis to their cattle herds; wolves are unwanted by some ranchers outside of the Yellowstone Boundary as they are perceived to kill their cattle and sheep. Perhaps the

experience of cross country skiing, picnicking, canoeing or kayaking is elated when endangered wildlife such as grizzly bears or wolves are seen.

This meta-analysis is the most extensive literature review in the history of non-market valuation of consumer surplus values for outdoor recreation in the United States ever conducted and should prove beneficial to anyone seeking information on outdoor recreation studies as well as those wishing to conduct a benefit transfer analysis to obtain consumer surplus values for their own land management area. I would recommend that future researchers or land managers that are to use this data, use the comparisons of activities by park type or region instead of the pooled version of the data as it provides more detailed information.

Appendix A:

Significant Data Variables and Their Descriptions

*Note: Not all studies provided information for all of the data variables included in the table. However, care was taken for the studies in the last update of the database to contact as many authors when information was missing and obtain as much of the missing information as possible.

Appendix A: Significant Data Variables and Their Descriptions

Variable	What the Variable Represents
Reference	Full Reference of the Citation
Document Type	1=jrnl;2=book;3=proceedings;4=report; 5=thesis; 6=working paper
Consumer Surplus	Consumer Surplus Value converted to per person per day.
Year Collected	Year that data was collected
Value Units	1=Day 2=Trip 3=Year 4=Season
Days per Trip	Average number of days per trip
Region	NE, SE, Intermountain, Pacific Coast, Alaska, Multiple Area
Site Time	Avg on-site time per trip, in hours (Multiple days=12hr/day)
Group Size	Number of people in group
Site Visits	Total number of visits to the Area/Site per year
Surveys Returned	Number of surveys returned
Usable Surveys	Number of usable surveys
Response Rate	Response rate percent
Usable Response Rate	Response rate of usable surveys
Survey Type	Mail survey, phone survey, or in-person survey
Sample Frame	1=On-Site;2=User List;3=General Population; 4=Others;
Valuation Method	0=TCM, 1=CVM, 2=Both, 3=Other
Payment Vehicle	1=TripCost;2=EntranceFee/License;3=AnnualPass; 4=Other
Area Description	General description of area studied
Site Name	Name of Site
Lake	Was the area a lake and if so, name of lake

Estuary	Was the area an estuary?
Ocean	1=Atlantic, 2=Pacific 3=Gulf of Mexico
River	Was the area river based and if so, name of river.
Great Lake	Was the area in the great lakes?
Area Size	Size of recreation area in Acres
National Forest	Was it in a national forest and if so, name of forest.
National Park	Was it in a national park and if so, name of park.
Ntl. Recreation Area	Was it in a natural recreation area and if so name of area.
Wildlife Area	In a Wildlife Refuge or Game Management Area & name?
Wilderness Area	Was it in a Wilderness Area and name of wilderness area
State Park or Forest	Was it in a State Park or State Forest and name
Wildlife Species	BigGame, SmallGame, Waterfowl, Threatened &Endangered, Songbirds, Raptors, Fish, General Wildlife.
Activity Type	Camp, Picnic, Swim, Sightsee & Pleasure Driving, OffRoad Vehicle Use, Motorboating, Non-Motorized Boating, Go to beach, Hiking, Mtn Biking, DownhillSki, Cross CountrySki, Snowmobile, Hunting, Fishing, View Wildlife, HorsebackRide, Rockclimbing, General Rec., Waterskiing, Visit Arboretum, Visit Aquarium, Scuba Diving, Windsurfing, Birdwatch, Snorkel, Backpack, Env. Ed. Center.
Income	Average household income of visitors
Education	Average education of visitors in years
Age	Average age

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