

THESIS

THE TOTAL ECONOMIC VALUE OF THE NATIONAL PARK SERVICE:
A CONTINGENT VALUATION METHOD ANALYSIS

Submitted by

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In partial fulfillment of the requirements

For the degree of Master of Science

Colorado State University

Fort Collins, Colorado

Spring 2014

Master's Committee

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ABSTRACT

THE TOTAL ECONOMIC VALUE OF THE NATIONAL PARK SERVICE: A CONTINGENT VALUATION METHOD ANALYSIS

This thesis estimates the total economic value (TEV) of avoiding up to 40% cuts to the National Park Service (NPS) park lands and NPS programs. TEV is made up of visitor use and nonuse values (existence and bequest values). We use a Contingent Valuation Method (CVM) survey to estimate benefits generated by the NPS, from a nationwide perspective. Thus, in order to estimate the TEV of the NPS, we use the Turnbull estimator and a logit regression to estimate household-level willingness to pay (WTP) from the data collected in the CVM survey. This study, by nature, is a benefit analysis. It uses stated consumer preferences to estimate aggregate WTP. The mail and internet survey had a response rate of 18 percent with a sample size of 317. Depending on model specification we find conservative lower bound annual household WTP estimates for avoiding up to 40% cuts to NPS park lands of \$243.39 and \$194.20 for avoiding up to 40% cuts to NPS programs (both values were estimated using the Turnbull estimator), and upper bound estimates of \$1,015.10 for avoiding up to 40% cuts to NPS park lands and \$430.00 to avoid up to 40% cuts to NPS programs (both values were estimated using a logit model). By summing the above statistics, we find estimated annual household WTP for avoiding up to 40% cuts to the NPS ranging from \$437.59 to \$1,445.10. Applying the lower bound WTP estimate to 18 percent of the households in the United States (as consistent with the survey response rate, in order to treat nonresponses as 'no' votes), we conservatively estimate the annual TEV of avoiding up to 40% cuts to the NPS to be \$9 billion. Using the upper bound household WTP

estimate and applying it to the all households equates to an annual TEV of avoiding up to 40% cuts to the NPS to be \$167 billion.

ACKNOWLEDGEMENTS

I would like to thank Dr. John Loomis of Colorado State University for his leadership and gracious guidance throughout this project. Even though he has been through similar research processes countless times before, he made an effort to ensure I understood the intuition and motivation at each turn. Because of that, this thesis has provided an incredible learning experience for me. Additionally, I am very grateful to Dr. Loomis for the opportunity to be on this project. The experience I have had has been enjoyable and invigorating, creating in me a desire for further academic pursuits. Many thanks are also due to Dr. Michelle Haefele. To say ‘her contributions to this project were appreciated’ would be a vast understatement. Simply put, she was an indispensable member of the research team. I also must thank Professor Linda J. Bilmes of Harvard University for her guidance of and contribution to the survey design process, as well as for the funding for this pilot study. Without her efforts and connections, the size and quality of this project would have been much different. Lastly, I would like to thank my wife, Shannon, whose support has both grounded and encouraged me in the most essential ways.

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CHAPTER 1: PROBLEM STATEMENT

Introduction

The National Park Service (NPS) provides a bundle of public goods to society: not only does the NPS preserve designated lands, it also provides an array of programs designed to assist state and local governments, historic property owners, and nonprofit organizations in the preservation of cultural artifacts, historic buildings, educational programs, etc. However, very few nationwide general public studies have been conducted which estimate the value of NPS. Specifically, no studies have estimated the value of the entire NPS (that is, both lands and programs) at the national level. This study does the latter. A Total Economic Value (TEV) estimate – which is the sum of use and nonuse values (explained in greater detail in Chapter 2) – is essential for policy-makers to be able to make well-informed decisions regarding budgetary apportionment. The estimated nationally aggregated willingness to pay (WTP) for the NPS is necessary information for Congress and other federal decision-makers.

Because the TEV of the NPS includes values not observed in the market, we must use non-market valuation techniques to estimate the TEV. Using the contingent valuation method, we collect household willingness-to-pay data by way of nationwide household surveying. The contingent valuation technique will be discussed in the third chapter.

It should be noted that the data used in this thesis is from a pilot study of a larger forthcoming project (i.e, larger sample size).

Hypotheses

This thesis makes two general hypotheses. The first is that consumers are price-sensitive and are less likely to be willing to pay as the price of the bundle of public goods increases. The second hypothesis is that a consumer's WTP for NPS Parks is distinct from his WTP for NPS Programs.

CHAPTER TWO: VALUING THE NATIONAL PARK SERVICE

Previous Studies

To date, there have been no other studies attempting to estimate the TEV of the NPS. However, there has been one paper that provided the potential framework for estimating the TEV of the NPS (Choi and Marlowe, 2012). In their paper (a Harvard Master's Thesis), Choi and Marlowe offer a detailed mapping of values (use and nonuse) and how the said values flow from the NPS Park units as well as NPS Programs. The schematic helps to portray and uncover the complexities that must be accounted for when estimating the TEV of the NPS. Being the nature of a theoretical framework, there are no empirical data offered by the authors. Similarly, Turner (2012) offers suggestions and guidelines for how contingent choice surveys can be used to help inform national park management. However, the latter does not present any guidance regarding valuing the entire NPS, rather it specifies how stated preferences can be used for management and the individual-park level.

There have been several studies published, though, that do offer empirical data on use benefits of NPS Park Units. Using NPS visitation data collected from 58 national parks, Neher et al. (2013) use the travel cost model in a benefit-transfer framework to estimate an aggregate visitor WTP of \$28.5 billion. Admittedly, their estimate only considers use values, thereby it is not an estimate of TEV. In that vein, no other studies have attempted to estimate the combined use and nonuse values of more than one single NPS Park Unit. Although some NPS Parks use values provide some insight, the estimates do little to aid in the evaluation of our TEV estimate. Additionally, no studies have estimated the value of any of the NPS Programs.

The absence of such studies is a result of the vast scope of the project, not a result of questioning the validity of nonuse use values. This thesis will not defend the legitimacy of nonuse values. A sufficient amount of research has been published advocating the validity and necessity of nonuse use values (Carson, 2000) and the CVM (Haab et al., 2013; Kling et al., 2012).

Components of Total Economic Value Estimates

The TEV of some good is estimated by summing the use and nonuse values of that good. Use values (sometimes referred to as direct use) are the conventional values measured by WTP for an environmental good on/in which to recreate or enjoy firsthand (e.g., hiking, bird-watching, etc.). Nonuse values (sometimes referred to as passive use) – applicable when consumers do not experience the environmental good firsthand – measure consumers' WTP to simply know an environmental good exists and WTP to protect that environmental good for the enjoyment of future generations (existence value and bequest value, respectively; see Freeman (2003) for derivation of nonuse values within a utility theoretic model). Although controversy and speculation surround the legitimacy of nonuse values, the idea of nonuse values has been a part of the environmental economics field for decades (generally attributed to Krutilla, 1967) and has become extremely prevalent in the literature and federal agency economic analysis procedures (U.S. EPA, 2000).

The NPS provides – or preserves and enables – a vast amount of environmental goods and services available to the citizens of the United States. As stated in the Organic Act of 1916, the objective of the NPS is: *To conserve the scenery and the natural and historic objects and wildlife therein and to provide for the enjoyment of same in such manner and by such means as*

will leave them unimpaired for the enjoyment of future generations. Therefore it is imperative that both use values and nonuse values be considered in order to most accurately estimate the TEV of the NPS. Efforts to measure the TEV of the NPS must also account for the value of the programs it provides (e.g., educational, historic preservation, etc.). Fortunately, incorporating additional parameters into the valuation process is within the realm of nonmarket valuation methodology, as will be shown in Chapter 3 when valuation methods for estimating the TEV of a nonmarket good will be discussed. It should be noted that this thesis does not separately quantify ecosystem services of NPS park lands such as carbon sequestration or downstream benefits to water quality. Households may or may not have included these values in their WTP estimates, and we omit including them separately so as not to double count ecosystem service benefits such as these.

Overview of the NPS: Parks and Programs

In order to grasp what is being valued, it is essential to better understand how the NPS is segmented and what goods are provided through those different segments. First – and most obviously – the NPS manages lands that have been congressionally deemed essential to preserve. Such lands are categorized as National Parks, National Monuments, National Recreation Areas, National Seashores, etc. (Please see Appendix A for a list of the different types of NPS lands). Second, the NPS provides programs outside of the land units described immediately above in communities in every state. The programs are designed to do distinct things: preserve local historic buildings, create and/or improve recreation opportunities for communities, offer educational programs to children and adults about historical and cultural topics, etc. (Please see Appendix A for the full list).

The bundle of goods provided differs between the NPS parks and programs, and both the park units and programs provide goods that have use and nonuse values. Because of the distinct goods offered by either NPS component, the two must be valued separately. The two separate estimates (i.e., WTP for NPS Parks and WTP for NPS Programs) added together are the estimated TEV of the NPS. The survey methods employed in the CVM survey to accomplish the latter will be discussed in later chapters.

CHAPTER THREE: NONMARKET VALUATION METHODS

Economic Valuation without Market Prices

When estimating the TEV of a market traded good all one must do is use market prices to estimate the demand and supply schedules and then measure the consumer and producer surplus which is constrained by said schedules. So, the marginal benefits are readily produced by the market price. Finding the value of something that is not traded on the open market, such as the NPS, requires different valuation techniques (i.e., nonmarket valuation). While general ideas will be covered in brevity, the nonmarket valuation technique used for this study – the contingent valuation method (CVM) – will be discussed in detail.

Revealed versus Stated Preference

Nonmarket valuation employs either, or both, revealed and/or stated preference methods. Revealed preference methods rely on consumer purchasing habits to econometrically infer WTP for a nonmarket good. Stated preference methods involve actually asking individuals about how they value the good in question. The technique used in this study, CVM, is a stated preference method. Although revealed preference methods rely on observed behavior, and therefore alleged to be more legitimate (Hausman, 1993), they are limited to estimating only use values. Stated preference methods, however, are able to estimate both use and nonuse values. In order to best estimate nonuse values of the NPS, it is necessary to use a stated preference method.

The Contingent Valuation Method

The CVM has been in use since the early 1960's (Carson, 2011). CVM relies solely on stated preference and has the ability to collect data on use and nonuse values. The CVM approach involves asking people what they would be willing to pay for a hypothetical change in the amount or quality of some good received. The survey acts as a theoretical market in which the respondent makes consumption choices – *stating* her preferences – which are *contingent* on the information provided to her in the survey. The respondent's choices are then analyzed in a manner similar to choices made by consumer in actual markets.

The CVM poses two scenarios to survey respondents, the status quo – or without project – alternative, and the with project alternative. The “with project” alternative is the one in which the change hypothetically occurs. Thus, the term “project” can be thought of as synonymous with “policy”. In the survey the respondent was informed that she would have to pay for the imposed change should she vote ‘yes’. The survey must also discuss the payment vehicle – the means by which payment will be collected. The payment vehicle is often a special tax (i.e., a new tax specifically associated with the proposed project), an increase in taxes (e.g., sales, income, etc.), or an increase in utility bills. Another method – the tax transfer mechanism – will be discussed later in this thesis, as will the special tax payment vehicle.

The CVM survey also must include a WTP question – the way in which the respondent will be asked to vote “No” or “Yes” for the proposed change. The cost associated with the alternative project – used to estimate WTP – can either be open- or close-ended (more often referred to as dichotomous choice). In the open-ended format the respondent is asked to state her maximum WTP:

“How much would you be willing to pay for this project?” \$ _____

Because implausibly high values as well as high rates of non-responses are common with the open-ended question, the dichotomous choice WTP question is the preferred approach (Loomis and Walsh, 1997). With this format, respondents vote “Yes” or “No” to whether they would be WTP a randomly assigned dollar amount (which was earlier chosen by the survey designer) for the proposed project:

“Would you pay \$XX for this project?” Yes or No (circle one)

Also included in the CVM survey is a questionnaire necessary for gathering supplemental demographic data. In order to properly estimate WTP values, it is essential that socioeconomic factors be controlled for, such as (but not limited to) income, age, and education.

The CVM survey used for this study poses a special tax (and, initially, a tax transfer) for the payment vehicle and uses a dichotomous choice WTP question. Further details on the survey used for this study will be offered in the following chapters.

CHAPTER FOUR: MODELS AND EXPECTATIONS

Logit Regression

The response set for the model is binary, where 1 represents a “Yes” vote and 0 represents a “No” vote. The model estimates the likelihood of a “Yes” vote. The logit model provides estimates that remain between a probability of 0 and 1. Thus, in order to estimate the TEV of the NPS, we will use a logit model to estimate the mean WTP from the data collected in the CVM survey; applying the median and mean WTP estimates to and aggregating it over the general population. The latter process will be explained in this chapter.

Theoretically, the demand for the NPS (i.e., the goods and services it provides) will be similar to other markets. That is, as the price associated with the NPS increases, the probability of a “Yes” vote is expected to decrease. In other words, we expect the bid amount coefficient to be negative, as informed by microeconomic theory. Demographic variables are also expected to help explain the variation in a respondent’s likelihood to vote “Yes”, by acting as proxies for individual preferences. The logit model is depicted in equation 4-1:

$$(4-1) \quad \ln \left(\frac{Prob(Yes)}{1-Prob(Yes)} \right) = \beta_0 + \beta_1 * BidAmount + \beta_2 * X_2 + \dots + \beta_k * X_k + e$$

where X is a vector of respondent demographical characteristics.

From equation 4-1, we expect β_1 to be negative. Once the logged odds ratio and its explanatory variables have been estimated, two estimates can be generated to represent consumer surplus: the median WTP and mean WTP.

The mean WTP formula is (Hanemann, 1989):

$$(4-2) \quad \text{Mean WTP} = 1/\beta_1 * \ln(1 + e^{\beta_0 + \sum(\beta_n * X_n)})$$

The median WTP, which estimates WTP at the point where both “Yes” and “No” votes are equally probable, is as follows (Hanemann, 1989):

$$(4-3) \quad \text{Median WTP} = -(\beta_0 + \sum(\beta_n * X_n))/\beta_1$$

where β_n is the vector of coefficients and X_n are the sample means of the respective independent variables.

We expect a negative bid amount coefficient, as would be consistent with the law of demand. That is, as price increases we expect the likelihood of a ‘yes’ vote to decrease.

The mean WTP estimate is appropriate in calculating TEV from an efficiency standpoint, while using the median WTP is representative of a democratic approach (i.e., it is the measurement of where half of the population would vote ‘yes’ and the other half vote ‘no’). Therefore, both mean and median WTP will be reported in Chapter 6, and policy implications will be discussed in Chapter 7.

Turnbull Estimator

Theory implies that as bid amount increases, the proportion of ‘no’ votes will increase, too (i.e., law of demand). With samples where the latter is the case, using an estimator with an assumed distribution – like the logit regression – is useful and appropriate. However, as can

often occur with a survey with many bid amounts and a relatively small sample size, assuming the distribution of the disturbance can impose cumbersome restrictions on the estimation of WTP. The Turnbull Estimator (hereafter referred to as Turnbull), a nonparametric maximum likelihood estimator, is a suitable approach to such situations.

The argument of improper survey design could be made to explain the deviation from the expected distribution. Of course, that could certainly be the case if disciplinary standards and preparatory efforts are neither considered nor followed (Arrow et al., 1993). Assuming survey design is proper, problems with data can also be a cause of model sensitivity through the disturbance term. Namely, a small sample size limits asymptotic “smoothing” of the disturbance. Furthermore, Haab and McConnell (2002) show how having a small sample and many bid amounts can increase the variance as a result of few observations per bid amount. This can result in a situation where the proportion of ‘no’ votes increases from one bid amount to another, thus being inconsistent with the law of demand.

An estimation response to such an issue is the Turnbull (Haab and McConnell, 2002). Succinctly, the Turnbull observes probability mass points and constructs a distribution function from the individual probability density functions, while making the monotonicity restriction

$$(4-5) \quad F_j \leq F_{j+1}, \quad \forall j,$$

where $F_j = \Pr(WTP \leq BidAmount_j)$, that is, the probability of a ‘no’ vote at a given bid amount. If the restriction does not hold, then the estimator sets $F_{j+1} = 0$ and calculates F_{j+2} with the restriction $F_j \leq F_{j+2}$, and so forth. Intuitively, the restriction ensures the law of demand.

The lower bound median WTP is estimated by multiplying each offered price by the probability that WTP falls between that price and the next highest price:

(4-6)

$$E_{LB}(WTP) = \sum_{j=0}^M t_j (F_{j+1} - F_j),$$

where M is the highest bid amount and t_j is bid amount. This estimate, albeit conservative, will be the other reported estimate in this thesis. Refer to Haab and McConnell (2002) for further explanation of the Turnbull's maximum likelihood estimation procedure and its variance-covariance matrix.

Nonparametric by definition, the Turnbull estimates central tendencies of WTP absent of all factors other than bid amount. Therefore, limited information goes into the estimation process. The logit regression, as shown above, can have multiple regressors and therefore offer more insight into the variation of respondents' WTP. Thus, the Turnbull offers robustness in exchange for statistical power, while the logit's tradeoffs are just the opposite. Using both estimators and comparing their WTP estimates will give substantial insight into the TEV of the NPS, and provide a measure of redundancy to the aggregated consumer surplus estimation.

CHAPTER FIVE: DATA GATHERING

Sampling Methodology

The selection process for this survey was quite theoretically elementary by nature. Being a benefit analysis of a public good that is provided to all households across the nation, a general population survey was required. Since the economic value of the NPS includes nonuse values, the specified population in study was the entire U.S. population. For example, an onsite visitor survey or mail-survey using visitor information would generate biased data for the TEV. Thus, a randomized household survey of the general population would be necessary for an unbiased data generation process.

A CVM survey would be a proper tool for gathering such TEV data. A strength of the CVM survey is that all respondents receive perfectly homogenous information from the survey. Furthermore, the randomness of a general population CVM survey is an obvious strength for attempting to generalize the sample to the population.

Survey Creation and Focus Groups

Survey creation began in late summer 2012. The first of 8 focus groups took place in November of 2012, and the final one-on-one interviews took place in September of 2013 (sites included Denver, CO; Fort Collins, CO; San Francisco, CA; and Boston, MA). Over the course of that ten month period the survey design underwent numerous changes. The evolution of the survey and the role focus groups played in the changes made will be briefly discussed.

From an early stage it was decided that a choice experiment (CE) would be used in order to best capture the values of the multiple aspects of both components (i.e., multiple types of NPS

lands and multiple types of NPS programs). Although this thesis does not use the CE to estimate WTP, it played a role in informing the respondents regarding their two options once the CVM question was asked. As such, the CE design will be covered with brevity.

The CE component acted to inform the respondent of the proposed unit-change in either total land (i.e., acreage, miles of shoreline) or total number of programs, as well as the cost of the change. The CE component began with two options – with or without the program – which varied proposed increases over four or five attributes (the attributes being the types of NPS components). For example, a respondent might be asked to choose whether or not they would be WTP \$Y for an X acre increase in NPS Parks, a Z mile increase in NPS shoreline, with no increase in NPS battlefields and no increase in National Parkways. Although the CE changed over the next year, the role it played in educating respondents regarding the CVM question remained unchanged.

Originally, there were two separate surveys: one asking to value NPS Parks and land units and another valuing NPS Programs. The first focus groups had participants look at only one survey (i.e., participants would spend the entire session looking at either the parks survey or the programs survey). Participants reviewing the programs survey often times expressed lack of prior knowledge regarding the existence of NPS programs. Thus, for the pilot survey we decided to include both NPS parks and NPS programs in the same survey. This, also, alleviated concern that participants would not be able to distinguish NPS Parks from NPS Programs. In addition, in order to use funding efficiently and maximize the sampling, both goods were valued in one single survey using two separate CE and two separate CVM questions. The final survey, presented in the Appendix, had two CE's with three options each, varying change in quantities over three and four attributes (parks and programs, respectively).

The first drafts of the survey offered respondents two different coercive payment vehicles: a special tax and tax transfer, each for a specified time-horizon. The special tax, a payment vehicle often used in CVM surveys (Carson, 2012), is a flat-tax paid by each household for the aforementioned period of time. The special tax payment vehicle is convenient because respondents can easily understand both the flat-rate and therefore its effect on their budget, it is believable and consequential (i.e., respondents trust that if the government claims it will tax, then it will indeed tax), and the flat-rate characteristic seems equitable (compared to confusion that might surround a per-unit fee, such as a utility bill, for example).

The tax transfer vehicle asks a respondent if she would be willing to reallocate a portion \$Y of her household's fixed taxes in order to fund the project (Bergstrom et al., 2004). Thus, the tax transfer vehicle would not reduce a household's disposable income. In the case of Bergstrom et al. (2004), it was found that WTP with a tax transfer vehicle was greater than WTP with a special tax vehicle. However, the authors did not explicitly state what area of federal government the tax would be taken from. Rather, the respondent was intended to view the tax portfolio as a bundle of all other public goods. In an effort to add consequentiality to the mechanism in the NPS parks and programs surveys, it was stated that the tax would be reallocated from the National Highway System. Although no analysis was done, it was quickly and broadly observed in the focus groups that participants were much more willing to pay a special tax as opposed to taking money away from the National Highway System. Shortly thereafter, the survey was redesigned to pose only the special tax as a payment vehicle.

Originally the survey was designed asking respondents their WTP for an increase in either parks or programs. However, in each focus group participants asked (sometimes with a degree of hostility) why the NPS would consider expanding when the agency was already

showing signs of financial strain. It is important to note the political climate taking place over this time: talk of federal government shutdowns was pervasive in all mainstream news outlets, and no resolution was in sight. So, it was quite reasonable for focus group participants to question the legitimacy of the action proposed by the survey. Further, it seemed as though protest bids would be more inescapable and problematic than what typically might be expected. In an effort to avoid biasness the CEs and CVM questions were redesigned, asking respondents for their WTP to avoid cuts to the NPS. Focus group participants found the latter scenario more believable and comprehensible, especially given the current state of the federal government. Although stated earlier, it is worth repeating how believable the special tax was to participants. That is, focus group participants viewed the payment vehicle being highly consequential, something necessary for robust survey design (Vossler et al., 2012).

As stated above, the final copy of the survey included two CEs, one for parks and one for programs, with three options each. The first option was a large sale of parks (or large cut of programs), the second was a smaller sale of parks (or smaller cut of programs), and the third was no sale of parks (or no cut of programs). The first option was always cost-free while the third was the most expensive. A time-horizon of ten years was used, so the respondent knew how long they would have to pay the tax. The following is an example of the CE:

Figure 5-1. Choice Experiment Example

1. At the bottom of this table, please check the box to indicate which option you would choose:

	Option A Sale of some land in all parks	Option B Smaller land sales in some or all parks	Option C No sale of parks
National Park areas which focus on the preservation of nature and nature-based recreation.			No sale – keep all 79,096,632 acres
National Park areas which focus on the preservation of American history and culture.		No sale – keep all 226 sites	No sale – keep all 226 sites
National Park areas which focus on protecting shorelines and bodies of water.			No sale – keep all 4,818,275 acres
Your household’s annual tax cost for each of the next 10 years:	for Option A: \$0	for Option B: \$150	for Option C: \$400
Select One Option:	Choose Option A <input type="checkbox"/>	Choose Option B <input type="checkbox"/>	Choose Option C <input type="checkbox"/>

The CVM question – which posed the same time-horizon – immediately followed the CE, and asked

If there were only two choices regarding the sale of National Park areas: Option A (selling parts of all types of National Park areas) or Option C (retaining all current National Park areas) as described above where your household would have to pay an annual tax of \$_____ for ten years, would you choose Option C? Yes or No.

So, the middle-of-the-road option was no longer for available for consideration. The respondent was given a dichotomous choice (DC) question involving the option with the most cuts and the option with no cuts (i.e., with or without the program). There were 8 randomly assigned bid amounts: \$115, 150, 200, 250, 300, 350, 400, and \$500. The cuts to the NPS parks and programs that households were asked to value in the various scenarios ranged from 40% to 5%.

The survey has three distinct sections. The first section presents respondents with general information about the NPS. This section includes a set of questions asking the respondent whether or not and why they may feel NPS parks or programs might be important to them. The reasons include protecting the environment, visitation and for future generations. The purpose of this question is to gain insight on the respondents' direct use versus nonuse use values for the NPS. The second section of the survey is the CE and CVM portion. The third section of the survey includes questions about respondents' outdoor activities, use of NPS programs (or visits to NPS units) and standard demographic questions.

Data Gathering

The University of Wyoming Survey and Analysis Center (WYSAC) produced and administered the survey which went out to 1,800 randomly selected households beginning November 20, 2013. The first contact of respondents was a letter briefly introducing the survey and inviting respondents to take the survey online using a link provided which was unique for them. If the survey was completed online, no further contact of the respondent was made. If the survey had not been completed by December 10, 2013 a second letter was sent with a printed survey along with the original online link and an incentive (\$2). Reminder phone calls were made December 19-20, 2013 and a third letter was mailed on December 23.

A total of 317 surveys were returned, giving a response rate of 18%. Of the 317 responses, only 307 respondents answered the parks CVM question and 303 answered the programs CVM question. As one can tell, the administration of the survey took place over the Thanksgiving and Christmas holiday period, an undesirable time to be sampling due to how busy people tend to be during this time of year.

CHAPTER 6: RESULTS

Demographic and General Survey Results

The first thing that must be considered in survey data analysis is whether or not the sample accurately portrays the population being studied. If the sample does accurately portray the study population, then the parameter estimates can defensibly be applied to the population. In the case of this thesis, the parameter estimates will allow us to estimate the TEV of avoiding up to 40% cuts to the NPS. As stated earlier, the study population is the general U.S. population. Therefore, the sample demographics will be compared to U.S. household data (specifically adults 20 and older, since we assume survey respondents are adults). As shown in Table 6-1, the sample retirement (and age) and education statistics differ from the population, both being greater. The sample is slightly older than the population (58 years old and 47, respectively; 37% retired versus 18%), and slightly more educated. The implications of this deviation will be discussed in the following chapters. Gender and household income are very similar. The range in age of survey respondents was 20 to 100 years old.

Table 6-1. Population and Sample Demographics

	Median Age*	Female (%)	Median HH Income**	Bachelor's Degree or more (%)	Retired (%)
United States	47	50.9	\$53,046	29.1	17.8
Survey Sample	58	51.9	\$50,000	37.8	36.6
95% C.I.	[56.6, 60]	[47.5, 58.5]	[35,000, 74,999]	[32.5, 43.2]	[31.3, 41.9]

Sources: U.S. Census Bureau, 2010, Bureau of Labor Statistics, 2012; U.S. Social Security Administration

*Median age of the US population 20 years and older, as would be consistent with heads of household (i.e., survey respondents).

**The lower value of the options provided to the respondent in the survey were used.

Other demographics of interest were whether or not the respondent had visited a National Park within the past 2 years (62% responded yes), and what region (time zone) the respondent lives in. As shown in Table 6-2, the regional distributions are very similar. This indicates that regional preferences will be represented in the estimation.

The NPS reported 274 million recreation visits to NPS lands in 2013 (NPS, 2013). Using the weighted average of the frequency of visits (2.2935 visits per household per year) and the US Census estimates for number of households and people per household, our results would imply 210,746,236 individual visits per year which is consistent with the NPS estimate. Although this is not the population parameter of NPS visitation within the past two years (as comparable to the statistic provided in Table 6-2), it serves as a valuable proxy since the population parameter is unknown.

Table 6-2. Population and Sample Statistics

	National Park Visitation (%)	Population by Time zone (%)			
		East	Central	Mountain	Pacific
United States	-	47	33	5	14
Survey Sample	62.1	50	28	9	12

Sources: U.S. Census Bureau, 2010

Note: The remaining 1% from the U.S. population distribution is representative of Alaska and Hawaii.

Instead of dropping the entire observation, the respondents who did not answer the CVM questions (10 for the parks survey and 14 for the programs survey) were recoded as ‘no’ votes. Treating the nonresponses as ‘no’ votes is a conservative measure that will allow us to use more information (i.e., more observations) for the data analysis.

Survey Result

The initial surveying of 1,800 randomly selected households resulted in 317 responses at the time this thesis was written. As shown in Table 6-3, the percentage of ‘no’ votes does not monotonically increase in price as theory would suggest. Rather, there are three distinct inflection points where the direction of voting changes: \$150, 300, and 400 (depicted in Figure 6-1). This is the type of behavior mentioned by Haab and McConnell (2002), caused by many bid amounts with a relatively small sample resulting in few observations per bid amount. Figure 6-1 illustrates the non-decreasing WTP. Hence, the Turnbull will prove to be a suitable estimator for the NPS Parks WTP estimate.

The unexplained parks response seems curious, though, given the fact that the programs survey response – having used the same bid amounts – had an increasing proportion of ‘no’ responses. As shown in Figure 6-2, the percentage of ‘no’ votes largely increase along with price.

Table 6-3. Parks Survey Responses

Bid Amount	Total Votes	No Vote	Yes Votes	% No Votes
\$ 115	66	24	42	36%
\$ 150	15	3	12	20%
\$ 200	37	10	27	27%
\$ 250	19	8	11	42%
\$ 300	24	11	13	46%
\$ 350	38	15	23	39%
\$ 400	67	20	47	30%
\$ 500	41	16	25	39%

Figure 6-1. Parks Survey Proportion of 'Yes' Votes

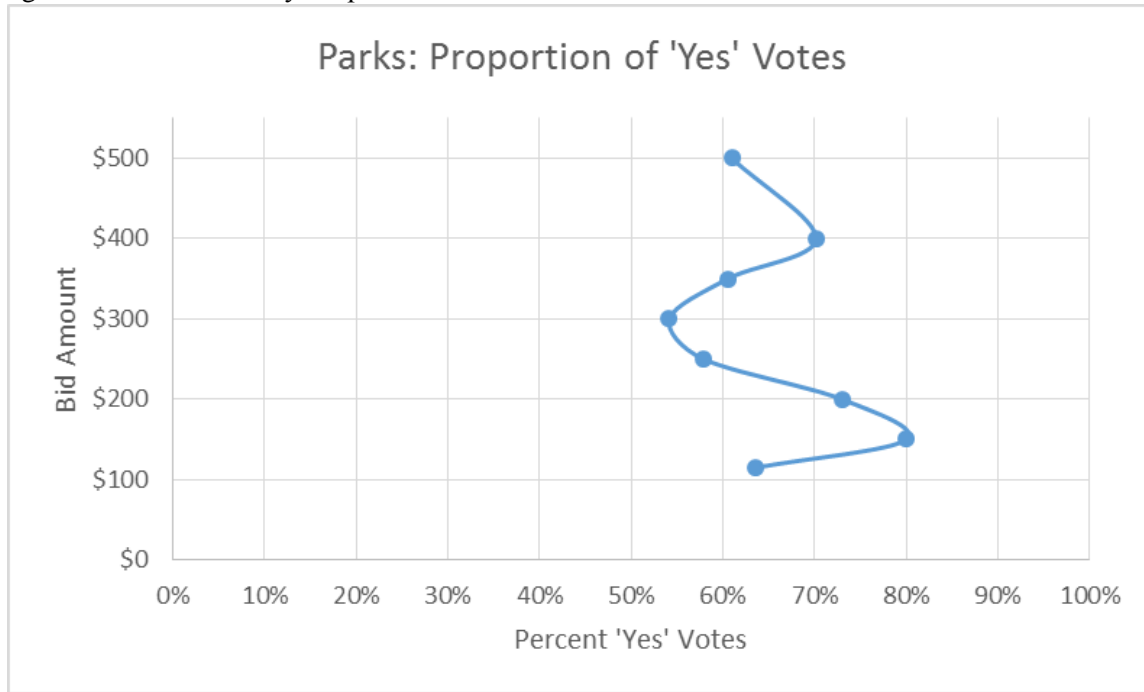
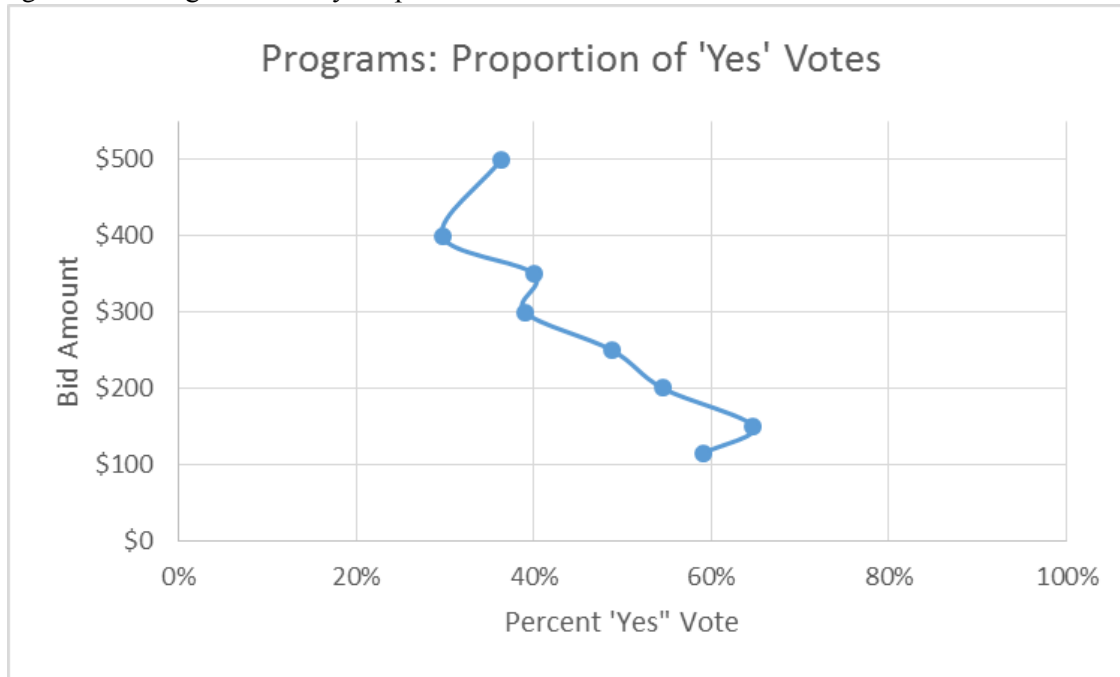


Table 6-4. Programs Survey Responses

Bid Amount	Total Votes	No Vote	Yes Votes	% No Votes
\$ 115	22	9	13	41%
\$ 150	17	6	11	35%
\$ 200	33	15	18	45%
\$ 250	41	21	20	51%
\$ 300	59	36	23	61%
\$ 350	15	9	6	60%
\$ 400	64	45	19	70%
\$ 500	66	42	24	64%

Figure 6-2. Programs Survey Proportion of 'Yes' Votes



Model Results: Turnbull Estimates

Because of the nonparametric properties of the Turnbull, no variables are used to estimate WTP. The measure of central tendency is based solely on the interaction between bid amount and the probability of a 'yes' vote. One option to attempt to observe further variation (and thus explanation) would be to redefine the population and estimate WTP of sub-samples, but such estimates will not be undertaken due to the already small sample size. Given the size of the sample, it would most likely not prove fruitful to toss out any information.

The parks survey estimated lower bound of WTP was \$243.39 per household (refer back to Equation 4-6). As reported in Table 6-5, the p-values of the lower bound WTP estimates for parks and programs are 0.00001. Thus, the model estimate is statistically different from zero (i.e., the 99.999% confidence interval for the lower bound WTP estimate does not include zero). Applied to the general population, that is 115,226,802 households, the estimated consumer

surplus is \$28 billion annually. Estimating consumer surplus over the specified 10-year time-horizon with a 4% discount rate, we get \$235 billion. Although the Turnbull estimate is already a conservative statistic, applying it to the general population at the 18% response rate yields a consumer surplus estimate of \$5 billion. Applied over the same time-horizon at the same discount rate, we estimate a WTP of \$42 billion to avoid up to 40% cuts to the NPS.

The programs survey estimated lower bound of WTP was \$194.20 per household. Applied to the general population, the estimated consumer surplus is \$22 billion annually. Estimating consumer surplus over the specified 10-year time-horizon with a 4% discount rate, we get \$188 billion. Applying the estimate lower bound to the general population at the 18% response rate yields a consumer surplus estimate of \$4 billion. Applied over the same time-horizon at the same discount rate, we estimate a consumer surplus of \$34 billion. Shown in Table 6-5 are the WTP estimates adjusted by the 18% response rate. By using such an adjustment, non-responses are treated as ‘no’ votes. This is a conservative and robust approach to dealing with the non-responses.

Table 6-5. Turnbull Estimates

	$E_{LB}(WTP)$	$Pval(E_{LB})$	Annual CS	C.S. (over 10-yr)
Parks Survey	\$243.39	0.00001	\$28bn	\$235bn
with 18% r.r.	-	-	\$5bn	\$42bn
Programs Survey	\$194.20	0.00001	\$22bn	\$188bn
with 18% r.r.	-	-	\$4bn	\$34bn

Applying the WTP estimates over time (in this case, 10 years) provides additional insight into the TEV estimate. Respondents were made aware in the survey that the special tax would last for 10 years. Assuming the rational consumer budgets her income over time, her WTP

would be reflected in the WTP measure derived from the over-time estimate. A 4 percent discount rate – as used by the US Forest Service and within the range mandated by the Office of Management and Budget – was used to discount WTP over the proposed time-horizon.

Model Results: Logit Regression

The fully specified model for both parks and programs regressions had the vote outcome as the dependent variable and was regressed on the bid amount, the total proposed cuts of each attribute, NPS visitation, and general demographic information. The demographic variables act as control variables for the bid amount as well as potential descriptors of the variation in the ‘yes’/‘no’ vote (i.e., a proxy for preferences). The results from the parks logit regression output are reported in Table 6-6. The bid amount coefficient is negative and significant at the 0.10 level for parks and negative and significant at the 0.0001 level for programs.

The two significant variables other than bid amount in the parks model, NPS visitation (=1 if the respondent reported having visited a National Park within the past two years, =0 otherwise) and household income both have the expected sign. The positive sign on the NP visitation dummy variable implies that having visited a National Park within the past two years increases the likelihood of someone being willing to pay the bid amount stated in the CVM question, at a statistically significant level (0.1%). Similarly, the positive sign of the household income coefficient indicates that an individual is more likely to vote ‘yes’ to the CVM question as her household income increases, at a statistically significant level (1%). The parks model likelihood ratio statistic reports a p-value of 0.0124 (i.e., the probability of observing an outcome of a χ^2 test statistic as extreme or more extreme than the statistic observed if the model is

statistically insignificant), so it does significantly explain the variation in the ‘yes/no’ vote.

Therefore while many of the individual coefficients are insignificant, the likelihood ratio statistic indicates the overall parks model is significantly different from zero at the 5% level.

Table 6-6. Parks Logit Output

	Coef.	s.e.	p-value
Constant	-0.9984113	1.00177	0.319
Bid Amount	-0.002157	0.00122	0.077*
Park Gain	0.000000	0.00000	0.393
History Gain	-0.002189	0.00733	0.765
Water Gain	0.0000001	0.000004	0.802
NP Visit	0.844552	0.25540	0.001***
Environmentalist	0.142171	0.43771	0.745
Less than Bachelor’s (>HS)	0.013852	0.32828	0.966
Bachelor’s Degree	0.002433	0.37934	0.995
Grad Degree	-0.099240	0.38631	0.797
Eastern Time Zone	0.300196	0.29154	0.303
Mountain	-0.097337	0.46908	0.836
Pacific	-0.008155	0.41597	0.984
HH Income	0.183771	0.07145	0.010***
Retire	-0.042041	0.26619	0.875
Male	0.215609	0.25133	0.391
N= 317			
LR Statistic $\sim \chi^2(15) = 29.88$		p-value = 0.0124	

*indicates significances at the 10% level

*** indicates significances at the 1% level

The significant variable other than bid amount in the programs model, NPS visitation has the expected sign and carries the same interpretation as it did above in the parks model. The programs model likelihood ratio statistic reports a p-value of 0.0011 (i.e., the probability of observing an outcome of a χ^2 test statistic as extreme or more extreme than the statistic observed if the model is statistically insignificant), so it does significantly explain the variation in the ‘yes/no’ vote. Thus, while many of the individual coefficients are insignificant the likelihood

ratio statistic indicates the overall programs model is significantly different from zero at the 1% level.

Table 6-7. Programs Logit Output

	Coef.	s.e.	p-value
Constant	-0.5902	1.012624	0.560
Bid Amount	-0.00409	0.00109	0.0001***
History Gain	-0.00060	0.00093	0.514
Recreation Gain	-0.00041	0.00080	0.614
Nature Gain	0.02459	0.01888	0.193
Education Gain	0.0000003	0.0000005	0.592
NP Visit	1.08493	0.27554	0.0001***
Environmentalist	0.19583	0.41080	0.634
Less than Bachelors (>HS)	0.37252	0.33729	0.269
Bachelor's Degree	0.39425	0.39058	0.313
Grad Degree	-0.20749	0.39776	0.602
Eastern Time Zone	0.17199	0.29573	0.561
Mountain	0.07073	0.46900	0.880
Pacific	-0.07390	0.42970	0.863
HH Income	0.03504	0.07068	0.620
Retire	-0.31342	0.27433	0.253
Male	0.03667	0.25290	0.885
N= 317			
LR Statistic $\sim \chi^2(16) = 38.88$		p-value = 0.0011	

*** indicates significances at the 1% level

As depicted in Tables 6-6 and 6-7, neither attained education or retirement status were significant in describing the variation of the respondent's vote. Recall the demographic statistics in Table 6-1 reporting our sample education and retired percentage being higher than the US population. Because of the insignificance of those variables in both the parks and programs models, we can assume that difference between our sample and the population parameters will not matter in terms of estimating household WTP.

The correlation matrices of the independent variables are included in the appendix. There was no correlation between any two variable that was large enough to warrant the removal of a variable.

The mean and median WTP estimates from the logit models are reported in Table 6-8. As shown in that table, the median WTP to avoid up to 40% cuts to NPS park lands is \$497.15 annually per household and the mean WTP for NPS park lands is \$1,015.10 annually per household. The median WTP to avoid up to 40% cuts to NPS programs is \$239.19 annually per household and the mean WTP for NPS programs is \$430.00 annually per household. The Krinsky and Robb 95% confidence intervals (C.I.) for median WTP, also reported in Table 6-8, show that the 95% C.I. for NPS parks median WTP includes the median WTP for NPS programs estimate, while the 95% C.I. for median WTP for NPS programs does not include the NPS parks median WTP estimate.

Table 6-8. Logit Regression: Median and Mean WTP

	Median WTP	Mean WTP
NPS Parks	\$497.15	\$1,015.10
95% C.I.*	[-613.25, 1,792.73]	-
NPS Programs	\$239.19	\$430.00
95% C.I.*	[120.59, 297.69]	-

*Krinsky and Robb confidence intervals calculated in Stata 12.0 SE

Applying the median and mean WTP estimates across the general population and over time, we have WTP estimates for avoiding up to 40% cuts in NPS parks ranging from \$86 billion to \$980 billion and avoiding up to 40% cuts to NPS programs ranging from \$42 billion to \$415 billion. All WTP estimates derived from the logit median and mean WTP are reported in Table 6-9.

Table 6-9. Willingness to Pay (over time-horizon)

	Consumer Surplus	Consumer Surplus at 18% r.r.
Parks Median WTP	\$480bn	\$86bn
Mean WTP	\$980bn	\$176bn
Programs Median WTP	\$231bn	\$42bn
Mean WTP	\$415bn	\$75bn

Using the WTP estimates for the two separate goods (parks and programs), a range for the TEV of the NPS can be estimated. By adding the two lowest estimates of each good we can calculate the lower bound (i.e., summing the Turnbull E_{LB} for the parks and the Turnbull E_{LB} for programs). Similarly, by adding the two largest estimates of each good we calculate the upper bound (i.e., summing the parks logit mean WTP estimate with the programs logit mean WTP estimate). In doing so we find the estimated range of TEV being \$437.59 and \$1,445.10 per household annually to avoid up to 40% cuts to the NPS.

Comparing the WTP estimates between the two models, the Turnbull estimate of WTP for parks is roughly half of the logit model median WTP estimate (\$243 and \$497, respectively), while the Turnbull estimate of WTP for programs is relatively close to the logit model median WTP (\$194 and \$239, respectively).

CHAPTER SEVEN: CONCLUSIONS AND EXTENSIONS

The purpose of this paper was to identify the TEV of the NPS by way of estimating nationwide household WTP to avoid up to 40% cuts in NPS park lands and programs. This goal was attained, as we estimate a WTP of \$438-\$1,445 per household annually, and an annual TEV of avoiding up to 40% cuts to the NPS of \$9 billion to \$167 billion, which is in the realm of the Neher, et al. (2013) estimate of \$28.5 billion in use values. There are a few explanations why our TEV estimate (which includes both use and nonuse values) has a lower bound less than Neher, et al.'s use value estimate. First of all, our lower bound estimate is applied to only 18% of U.S. households (as consistent with the survey response rate) and is, therefore, a conservatively low estimate. Secondly, our estimate uses median WTP measures instead of mean WTP. Finally, our estimate is for up to a 40% cut in NPS park lands and programs. Neher, et al. estimate the value of 100% of the recreation that takes place in National Parks.

From a policy perspective, the median measure is more conservative than the mean, taking a democratic approach to find the central point where half of the public would be in favor of such a tax and half would be opposed. Conversely, from an economic efficiency perspective, the mean WTP estimate would be the appropriate value to use to get total benefits. The TEV estimates reported in this thesis are derived using the median WTP, as it is a more equitable social choice rule for aggregation of WTP across the population (Hanemann, 1989). Furthermore, individual median WTP is more appropriate because in probability models, like the logit, it is less sensitive to distributional misspecification and estimation method (Haab and McConnell, 1998).

Estimating the TEV estimates over a 10-year time-horizon equates to TEV of avoiding up to 40% cuts to the NPS ranging from \$76 billion to \$1.4 trillion. The lower bound estimate of \$76 billion was adjusted using the 18% response rate, thus representing a conservative estimate. These results support the hypothesis that individuals do in fact value the goods provided by the NPS. The average annual NPS operating budget is \$2.9 billion.

Using these figures, we can make more educated policy decisions regarding the use of federal funds and the National Park Service. Specifically, as the federal government continues to seek fiscally responsible ways to manage the nation's wealth, its decision-makers will now be able to consider the way their constituents value the public goods provided by the National Park Service. The figures above demonstrate that the NPS provides goods that are valued by the people it serves, and they are willing to pay to avoid a loss in both protected lands and programs.

Two separate estimators were used to estimate WTP to avoid cuts to two distinct bundles of goods provided by the NPS from data collected through a general population CVM survey. Respondents were asked to value both goods, and having tested for in focus groups and taken measures to ensure consequentiality in the survey design, we can assume no double-counting took place across the two separate CVM questions. However, observing the Krinsky and Robb C.I.s on estimates of median WTP for the two goods shows that the WTP for one good is not distinct from the other. Thus, we fail to reject the null hypothesis that individuals do not value the NPS Parks and NPS Programs differently.

Although the data generated from the parks survey did not exhibit a uniform decrease in the percentage of households willing to pay as the price increased, the logit model estimated a negative bid amount coefficient that was statistically different from zero at the 10% level. In order to obtain a robust estimator, though, we used the Turnbull estimator to smooth out the

distribution of the vote and estimate a conservative WTP statistic. The Turnbull showed that the estimated lower bound estimates were both significantly different from zero, ensuring that WTP was confined to the positive quadrant. For the programs data, the logit model estimated a negative bid amount coefficient that was statistically significant at the 0.01% level. Given the above, we can reject the null hypothesis that the law of demand does not hold. National Park Visitation was statistically significant in both the parks and the programs logit models. Although perhaps expected, this shows that users of the National Parks tend to value parks to a higher degree than their counterparts who do not visit.

The insignificant coefficients on the magnitude of the avoided park-cuts and program-cuts variables indicates that the degree of proposed loss does not have a substantial impact on the probability of a respondent's vote. This could be a data problem, as a larger sample might reveal some convergence toward theoretically consistent parameters. A sample size of 317 would have a very difficult time representing the vast amount of preference sets present in an entire nation. That said, the data seemed to perform well in the fully specified models, taking into account the significant bid amount coefficients.

It should be noted that a limitation to this study was the assumption that only US citizens value the NPS. Observing visitation statistics, it is apparent that the goods provided by the NPS – specifically the NPS parks – are valued by peoples across the globe (Blotkamp et.al, 2009). Being able to account for and include values from the international community would obviously impact the TEV estimates. This is, however, outside of the scope and ability of this project.

All these things considered, this information should prove useful in better understanding the ways in which the citizens of the United States value the goods provided by the National Park Service.

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APPENDIX A: STRUCTURE OF THE NPS

NPS Programs and types of lands

In order to attain efficiency and clarity in the survey, the NPS Programs were represented by four categories: Historic Site Preservation and Management, Recreation Land Management, Nature Conservation, and Education. This appendix lists each of the NPS Programs with their purpose and legislative origin, as well as the different types of NPS lands classifications.

HISTORIC SITE PRESERVATION

1) American Battlefield Protection Program

Goal/Purpose: (1) Preservation of battlefields and sites associated with armed conflicts (2) To encourage and assist in planning for site preservation, management, and interpretation (3) To raise awareness of the importance of preserving these sites for future generations

Inside/Outside: Outside of park

Target: Historic

Legislation: American Battlefield Protection Act

2) Federal Preservation Institute

Goal/Purpose: Provide consultation to other Federal agencies regarding the preservation of historical sites

Inside/Outside: Outside of park

Target: Historic

Legislation: National Historic Preservation Act

3) Heritage Documentation Programs

Goal/Purpose: Create a record of historic sites, especially those that are in danger of demolition or loss by neglect

Inside/Outside: Outside of park

Target: Historic

Legislation: Historic Sites Act; National Historic Preservation Act

4) Heritage Education Services Program

Goal/Purpose: Create and coordinate educational programs relating to cultural sites

Inside/Outside: Both inside and outside of park

Target: Historic, Cultural

Legislation: Historic Sites Act; National Historic Preservation Act

5) Historic Lighthouse Preservation Program

Goal/Purpose: As a means of preservation, assist in transferring federally owned historic light stations to State and local governments and nonprofits

Inside/Outside: Outside of park

Target: Historic

Legislation: National Historic Lighthouse Preservation Act

6) Historic Preservation Tax Incentives Program

Goal/Purpose: As a means of preservation, work with IRS and State Historic Preservation Offices to encourage private property owners to rehabilitate historic building by way of using tax credits

Inside/Outside: Outside of park

Target: Historic

Legislation: Revenue Act of 1978, Sec. 315

7) Maritime Heritage Initiative

Goal/Purpose: (1) Educate the public on the role of maritime affairs in the history of the U.S.

(2) To preserve historical maritime sites

Inside/Outside: Outside of park

Target: Historic

Legislation: National Maritime Heritage Act

8) National Heritage Areas Program

Goal/Purpose: Preserve the physical and cultural legacy of the U.S. by protecting and promoting the cultural, historical, and natural assets of a region

Inside/Outside: Outside of park

Target: Cultural, Historic

Legislation: National Historic Preservation Act

9) National Historic Landmarks Program

Goal/Purpose: (1) In order to best preserve a historical site, provide technical assistance to owner of the site (2) Promotes sites as educational opportunity for public

Inside/Outside: Outside of park

Target: Historic

Legislation: Historic Sites Act; National Historic Preservation Act Amendments of 1980

10) National Register of Historic Places

Goal/Purpose: In order to preserve sites of historical significance, coordinate and support public and private efforts to identify such sites

Inside/Outside: Outside of park

Target: Historic, Cultural

Legislation: National Historic Preservation Act

11) National Underground Railroad Network to Freedom Program

Goal/Purpose: (1) For educational and historical purposes, preserve sites and other resources associated with the Underground Railroad (2) Coordinate with other Federal agencies, State and local governments, and non-profits to manage operations

Inside/Outside: Outside of park

Target: Historic, Cultural

Legislation: National Underground Railroad Network to Freedom Act

12) Route 66 Corridor Preservation Program

Goal/Purpose: In order to preserve and maintain significant sites, collaborate with private property owners, non-profits, and State and local governments to identify preservation needs

Inside/Outside: Outside of park

Target: Historic, Cultural

Legislation: Route 66 Corridor Preservation Act

13) Shared Beringia Heritage Program

Goal/Purpose: (1) Improve local, national, and international understanding of the natural and cultural resources of the Bering Strait (2) Sustain the cultural vitality of Native peoples in that region

Inside/Outside: Outside of park

Target: Historic, Cultural

Legislation: Appropriations Act of 1991

HISTORIC SITE MANAGEMENT TRAINING

14) National Center for Preservation Technology and Training

Goal/Purpose: Works with several scientific and technological disciplines in a research setting in order to advance methods used to preserve historic sites.

Inside/Outside: Outside of park

Target: Historic

Legislation: National Historic Preservation Act (Title IV)

15) National Native American Graves Protection and Repatriation Act (NAGPRA) Program

Goal/Purpose: In order to preserve and protect, provide funding, training, and consultation for Federal agencies, tribes, and museums regarding lawful and proper handling of Native American human remains and funerary, sacred, and cultural patrimony objects

Inside/Outside: Outside of park

Target: Cultural, Historic

Legislation: Native American Graves Protection and Repatriation Act

RECREATION LANDS

16) Federal Lands to Parks Program

Goal/Purpose: (1) Transfer Federal lands to state and local governments to create parks and recreation sites (2) Ensure lands remain accessible to the public

(3) Promote stewardship of the site's resources

Inside/Outside: Outside of park

Target: Recreation, Historic, Cultural

Legislation: Public Law 91-485 Sec. 203(k)(2)

17) Hydropower Recreation Assistance Program

Goal/Purpose: As a means of protection, work with hydropower facilities to ensure that public interests in recreation and conservation are addressed

Inside/Outside: Outside of Park

Target: Recreation, Conservation

Legislation: Outdoor Recreation Act; Federal Power Act; Wild and Scenic Rivers Act

18) Land and Water Conservation Fund State Assistance Program

Goal/Purpose: In order to preserve and protect, assists States and local governments in the planning and development of public outdoor recreation sites

Inside/Outside: Outside of park

Target: Recreation

Legislation: Land and Water Conservation Fund Act

19) National Trails System Program

Goal/Purpose: In order to preserve natural lands as well as provide more recreation opportunities, facilitate establishment and operations of national trails

Inside/Outside: Both (inside: “Connect Trails to Parks” grant program)

Target: Recreation, Historic, Cultural

Legislation: National Trails System Act

20) National Wild and Scenic Rivers Program

Goal/Purpose: (1) Educate the public regarding the recreational, biologic, geologic, historic, and cultural significance of the Country’s scenic rivers (2) Improve communication with other Federal agencies and State and local governments regarding river management (Note: this program doesn’t directly deal with scenic river management; Management responsibilities/guidelines are found under the Wild and Scenic Rivers Act (1968))

Inside/Outside: Outside of park

Target: Recreation, Improved Management

Legislation: Wild and Scenic Rivers Act

21) Rivers, Trails, and Conservation Assistance Program

Goal/Purpose: (1) Assist community-led initiatives to preserve open space and provide recreation opportunities (2) Make the natural environment easily accessible for all Americans

Inside/Outside: Outside of park

Target: Recreation

Legislation: Wild and Scenic Rivers Act; National Trails Systems Act; Outdoor Recreation Act

CONSERVATION

22) The International Affairs Program

Goals/Purpose: (1) Assist other nations in developing and managing their own national parks systems, preservation and conservation initiatives, etc. (2) Work with other nations’ national park systems in order to achieve shared preservation and conservation initiatives

Inside/Outside: Outside of park

Target: Conservation, Land Management

Legislation: Federal laws, conventions, and treaties that provide authority to the Secretary of the Interior

EDUCATION

23) National Natural Landmarks Program

Goal/Purpose: In order to preserve a natural site that has geological and biological significance, provide support for voluntary preservation of the site

Inside/Outside: Outside of park

Target: Education

Legislation: Historic Sites, Buildings, and Antiquities Act

NPS Lands Classifications

NATURE-BASED

National Parks, National Monuments, National Preserves, National Parkways, National Scenic Trails, National Recreation Areas

HISTORIC- AND CULTURE-BASED

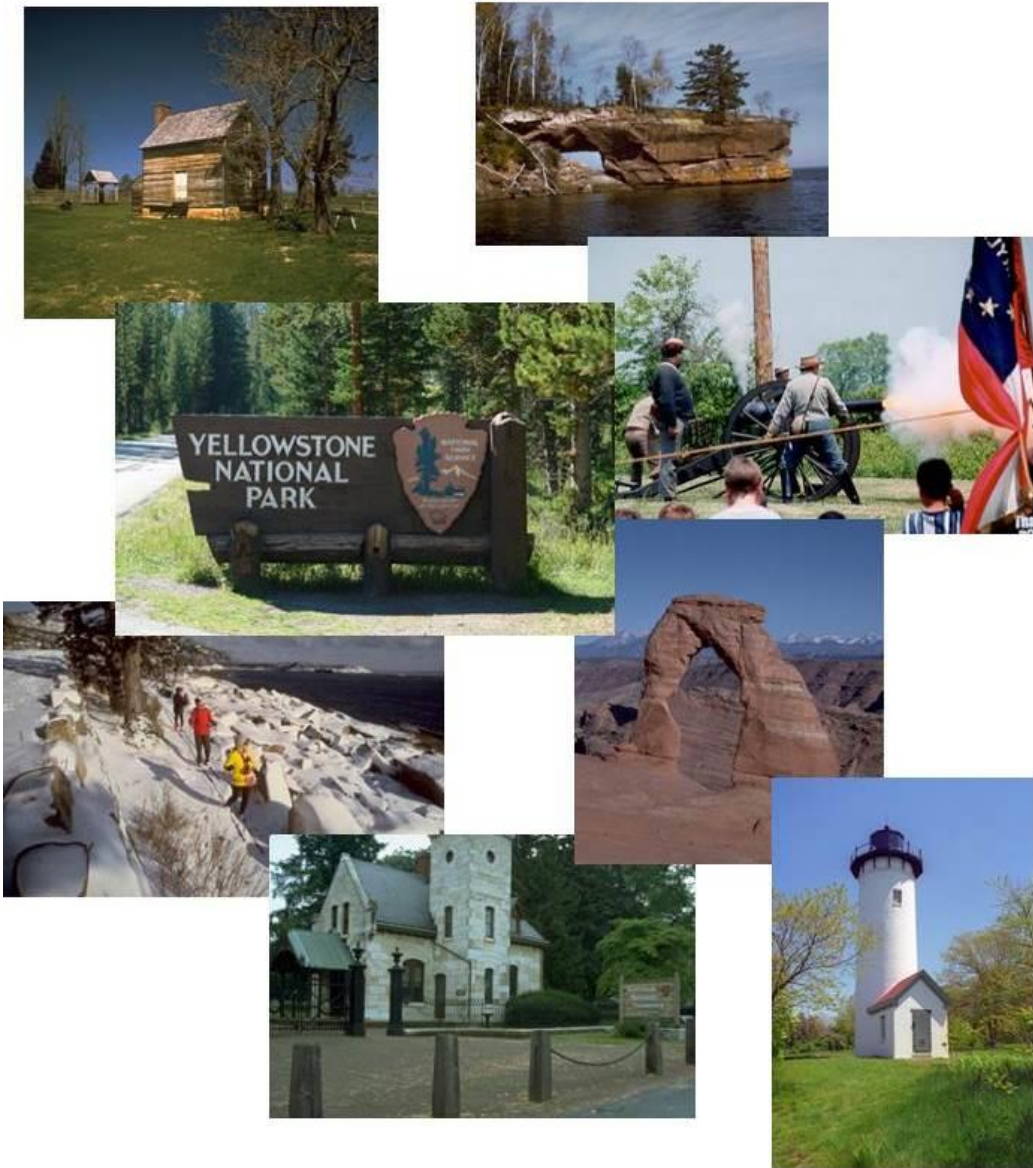
National Historic Sites, National Battlefields, National Memorials, National Monuments

WATER-BASED

National Lakeshores, National Seashores, National Rivers, National Recreation Areas

*National Monuments and Recreation Areas are listed twice, as they each have some distinct land areas that fall into separate categories. However, no double-counting occurred when presenting the information in the survey.

Your National Park Service Lands & Programs: What Do You Think?



Colorado State University is conducting a survey on public attitudes toward the National Park Service. It is important that we hear from everyone. Your opinion is valuable even if you have not visited any National Parks or participated in any type of National Park programs.

- The first two pages contain some background information.
- The survey questions begin on page 4.

Every state contains one or more of the 402 National Park Service areas.

The National Park Service manages three kinds of areas:



National Park areas that focus on the preservation of nature and nature-based recreation. These include:

- **National Parks** such as Yellowstone (WY, MT, ID) and Acadia (ME)
- some **National Monuments** such as Devils Tower (WY) and Cedar Breaks (UT)
- **National Preserves** such as Big Cypress (FL) and Tallgrass Prairie (KS)
- **National Parkways** such as The Blue Ridge Parkway (NC, VA) and The John D. Rockefeller Memorial Parkway (WY)
- **National Scenic Trails** such as The Appalachian Trail (which runs through 14 states from ME to GA).
- some **National Recreation Areas** such as the Santa Monica Mountains (CA) and Bighorn Canyon (MT, WY)

There are 79 million acres of National Park areas that focus on nature and nature-based recreation.



National Park areas that focus on the preservation of American history and culture or the commemoration and remembrance of significant events and people. These include:

- **National Historic Sites** such as Theodore Roosevelt Birthplace (NY) and The Tuskegee Airmen National Historic Site (AL)
- **National Battlefields** such as Antietam (MD) and Gettysburg (PA)
- **National Memorials** such as The Presidential memorials and the Flight 93 National Memorial (PA)
- some **National Monuments** such as the First State National Monument (DE) and The Statue of Liberty (NY)

There are 226 National Park areas that focus on historic preservation.



National Park areas that focus on protecting shorelines and bodies of water. These include:

- **National Lakeshores** on the Great Lakes such as Apostle Islands (WI) and Sleeping Bear Dunes (MI)
- **National Seashores** such as Padre Island (TX) and Point Reyes (CA)
- **National Rivers** such as The Rio Grande Wild & Scenic River (TX) and The Mississippi National River & Recreation Area (MN)
- some **National Recreation Areas** such as Lake Mead (AZ, NV) and Lake Meredith (TX)

There are 4.8 million acres of National Park areas that focus on protecting shorelines and bodies of water.

The National Park Service also provides many programs outside of the National Parks, in communities in every state.

These programs have several purposes, including:



Preservation of local historic buildings and sites which commemorate American history and culture or significant events and people.

These programs provide assistance to residents and communities wishing to protect local historic sites and buildings outside of the National Parks. This includes:

- Providing grants for historic preservation
- Giving advice on preservation
- Administering tax credits for renovation and preservation of historic sites
- Maintaining the National Register of Historic Places
- Protect sites on the Underground Railroad,
- Protecting lighthouses and historic battlefields which are outside of National Parks

Each year these programs result in the protection of 2,000 historic sites and buildings (outside of National Parks) in communities throughout the country.



Creation and improvement of recreation opportunities for communities.

These programs help communities provide recreation facilities such as community parks, trails and open spaces through:

- Coordination and planning
- Helping to transfer other (non-National Park) federal lands to local communities for recreation areas.

Each year these programs help to transfer 2,700 acres of land to communities for parks, trails, open spaces and other recreational amenities.



Protection of natural environments and features which are important to communities.

The National Park Service works with local communities and landowners to protect local ecological, biological or geological features such as:

- Unusual landscapes
- Rock formations
- Waterfalls
- Geothermal pools

Each year these programs help designate 114 sites in communities.



Educational programs which help children and adults learn about historical, cultural and environmental topic. This includes:

- Producing educational materials for use in classrooms
- Helping bring students to parks and historical sites
- Training teachers to use historic sites and other areas in their lessons
- Training state and local professionals in historic restoration, preservation and renovation.

Each year these programs enable 4.1 million school children to attend educational programs about nature and history.

Please check the box which best describes how you feel about the statements below.

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
1. It is important to me that historic sites are protected for current and future generations whether I visit them or not.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. National Park areas are good places to bring children to learn about nature.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Local governments do not need any help from the National Park Service to protect local historic sites and buildings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I enjoy visiting historic sites and buildings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. The U.S. should sell off some National Parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Local governments should be able to provide trails, parks and open spaces in communities without the help of the National Park Service.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I enjoy using local trails, parks and open spaces in my community and in other places.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. I do not benefit directly from National Parks.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Private businesses could probably do a better job than the federal government at protecting local historic sites and buildings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. It is important to me that trails, parks, and open spaces in communities are protected for current and future generations, whether I use them or not.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. National Parks are important to me because I enjoy visiting them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Strongly disagree **Disagree** **Neither agree nor disagree** **Agree** **Strongly agree**

12. It is important to me that National Parks are preserved for current and future generations whether I visit them or not.

The federal government is running a large deficit and is considering selling some National Park areas (described on page 2) and cutting some National Park Service programs (described on page 3) to save money.

- National Park areas sold to private landowners would no longer have the current level of public access. These lands may be developed for houses, offices, resorts or other developments. They may also be used for timber harvesting, oil and gas development or mining.
- Some land in all National Park areas in every state would potentially be sold.
- Program cuts would potentially apply to all types of programs and would be spread across every state.

One proposal to avoid the sale of National Park areas and cuts to the National Park Service facilitated programs is to set up a special fund dedicated to the National Park Service.

- The dedicated fund would be paid for by an increase in the federal income tax.
- The increase would be paid annually and would last for 10 years.
- All U.S. households would pay the tax.

On the next page you will be asked to decide whether you would choose to raise taxes to avoid selling National Park areas and cutting National Park Service programs.

- Your answers will be used to help the federal government compare the cost of the National Park Service with the benefits to American households. The answers you give could affect the amount of National Park areas and National Park Service programs available in the future and the amount of taxes you pay.
- In making this decision, please take into account your household income, whether you can afford to make the payment shown, and whether National Park areas and National Park Service community programs are worth that much to you.
- Consider everything else you could buy with the money and whether there are other government programs that you might rather see money spent on.

You will be asked two separate questions, one on National Park areas and another on National Park Service facilitated programs. Please consider the combined cost for the two questions when giving your answer.


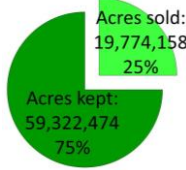
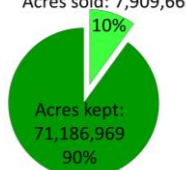






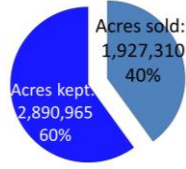
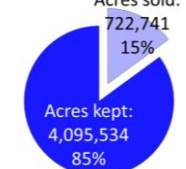

OPTIONS FOR NATIONAL PARK AREAS

Options A and B are proposals to sell some or all of each type of National Park area.

Option C would retain all current National Park areas.

The option chosen by a majority of households will be carried out, and all households will pay the amount specified. There is no right or wrong answer, please choose the option that is best for you.

At the bottom of this table, please check the boxes to indicate your most preferred option and your least preferred option:

	Option A Sale of some land in all parks	Option B Smaller land sales in some or all parks	Option C No sale of parks
 <p>National Park areas that focus on the preservation of nature and nature-based recreation.</p>	 <p>Acres sold: 19,774,158 25%</p> <p>Acres kept: 59,322,474 75%</p>	 <p>Acres sold: 7,909,663 10%</p> <p>Acres kept: 71,186,969 90%</p>	 <p>No sale – keep all 79,096,632 acres</p>
 <p>National Park areas that focus on the preservation of American history and culture.</p>	 <p>Historic sites sold: 57 25%</p> <p>Historic sites kept: 170 75%</p>	 <p>No sale – keep all 226 sites</p>	 <p>No sale – keep all 226 sites</p>
 <p>National Park areas that focus on protecting shorelines and bodies of water.</p>	 <p>Acres sold: 1,927,310 40%</p> <p>Acres kept: 2,890,965 60%</p>	 <p>Acres sold: 722,741 15%</p> <p>Acres kept: 4,095,534 85%</p>	 <p>No sale – keep all 4,818,275 acres</p>
Your household's annual tax cost for each of the next 10 years:	for Option A: \$0	for Option B: \$150	for Option C: \$400
1. Select Your Single <u>Most</u> Preferred Option:	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>	Option C <input type="checkbox"/>
2. Select Your Single <u>Least</u> Preferred Option:	Option A <input type="checkbox"/>	Option B <input type="checkbox"/>	Option C <input type="checkbox"/>

1. If there were only two choices regarding the sale of National Park areas: **Option A** (selling parts of all types of National Park areas) or **Option C** (retaining all current National Park areas) as described above where your household would have to pay an annual tax of \$400 for ten years, would you choose Option C?

Yes

No

2. On a scale from 1 to 10, where 1 is “very uncertain” and 10 is “very certain,” please circle the number that best describes how certain you are that you would actually choose the option you checked in question 3 (above) if you actually had to pay.

Very uncertain					Very certain				
1	2	3	4	5	6	7	8	9	10

3. If you selected Option **B or C** as your most preferred option for question 1 (on page 6), go to Question 6 on the next page. If you selected Option **A** as your most preferred option please tell us why (check the single most important reason).

National Park areas are not worth that much to me.

I can't afford to pay that much.

We need to cut all government spending so we can reduce the federal deficit.

Taxes are too high already.

Only the people who use National Park areas should have to pay for them.

National Park areas should be paid for with existing tax dollars.

Other (please describe):



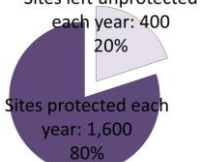


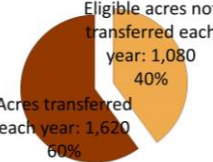
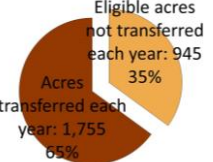


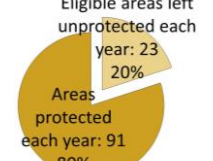
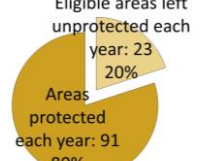


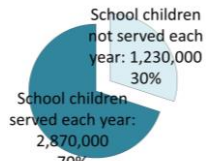
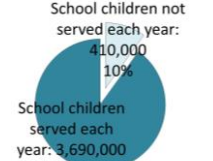

OPTIONS FOR PROGRAMS IN COMMUNITIES

Options D and E are proposals to cut some or all types of programs in local communities.

Option F would keep all current programs in local communities.

The option chosen by a majority of households will be carried out, and all households will pay the amount specified. There is no right or wrong answer, please choose the option that is best for you.

At the bottom of this table, please check the boxes to indicate your most preferred option and your least preferred option:

	Option D Cuts to all programs	Option E Cuts to some programs	Option F No cuts to programs
 Additional local historic sites and buildings outside of National Parks protected each year.			
 Additional non-National Park acres transferred to communities for recreation each year.			
 Natural areas which are important to communities protected each year.			
 Number of school children who attend educational programs produced by the National Park Service each year.			
Your household's annual tax cost for each of the next 10 years	for Option D: \$0	for Option E: \$60	for Option F: \$100
1. Select Your Single <u>Most</u> Preferred Option:	Option D <input type="checkbox"/>	Option E <input type="checkbox"/>	Option F <input type="checkbox"/>
2. Select Your Single <u>Least</u> Preferred Option:	Option D <input type="checkbox"/>	Option E <input type="checkbox"/>	Option F <input type="checkbox"/>

4. If there were only two choices regarding cutting National Park Service programs: **Option D** (the reduction of all National Park Service programs) or **Option F** (retain all current National Park Service programs) as described above where your household would have to pay an annual tax of \$100 for ten years, would you choose Option F?

Yes No

5. On a scale from 1 to 10, where 1 is “very uncertain” and 10 is “very certain,” please circle the number that best describes how certain you are that you would actually choose the option you checked in question 8 (above) if you actually had to pay.

Very uncertain					Very certain				
1	2	3	4	5	6	7	8	9	10

6. If you selected Option **E or F** as your most preferred option for question 6 (on page 8) go to Question 11. If you selected Option **D** as your most preferred option please tell us why (check the single most important reason).

- National Park Service programs are not worth that much to me.
- I can't afford to pay that much.
- We need to cut all government spending so we can reduce the federal deficit.
- Taxes are too high already.
- Only the people who use National Park Service programs should have to pay for them.
- National Park Service programs should be paid for with existing tax dollars.
- Other (please describe): _____

7. How certain are you that your answers would be used by the federal government to decide whether to sell National Park areas and/or to cut National Park Service programs?

Very certain Certain Neither certain nor uncertain Uncertain Very uncertain

8. How certain are you that you would actually have to pay the tax increase to avoid the sale of National Park areas and/or the cuts to National Park Service Programs?

Very certain Certain Neither certain nor uncertain Uncertain Very uncertain

Next, we would like to know about you and your recreational activities. Your answers to these questions will only be used to see how well our survey sample represents the American public as a whole. Your answers are confidential. You will not be identified in any way.

1. In the last 2 years have you participated in any outdoor activities anywhere, not just in the National Parks? (Check all that apply.)

- | | |
|---|---|
| <input type="checkbox"/> Visited a beach, a lake or a reservoir | <input type="checkbox"/> Gone hiking |
| <input type="checkbox"/> Watched birds or other wildlife | <input type="checkbox"/> Gone camping |
| <input type="checkbox"/> Visited local historic sites | <input type="checkbox"/> Visited local open spaces, trails or parks |
| <input type="checkbox"/> Visited local natural areas where ecological or geological amenities are featured. | <input type="checkbox"/> Participated in local natural or historical education programs |
| <input type="checkbox"/> Other outdoor activities (please describe) _____ | |




2. In total, how often did you do all of the activities you checked above in the last 2 years?

- 1 to 3 times 4 to 5 times 6 to 9 times 10 to 19 times 20 or more times

3. Have you visited any of National Park areas anywhere in the U.S. in the past 2 years?

- Yes No → If No please skip Questions 4 and 5.

4. Which types of National Park areas you have visited in the last 2 years (check all that apply):

- | | | |
|---|---|--------------------------|
|  | National Park areas that focus on the preservation of nature and nature-based recreation.
(National Parks, some National Monuments, National Preserves, National Parkways, National Scenic Trails, and some National Recreation Areas) | <input type="checkbox"/> |
|  | National Park areas that focus on the preservation of American history and culture or the commemoration and remembrance of significant events and people.
(National Historic Sites, National Battlefields, National Memorials, and some National Monuments) | <input type="checkbox"/> |
|  | National Park areas that focus on protecting shorelines and bodies of water.
(National Lakeshores on the Great Lakes, National Seashores, National Rivers, and some National Recreation Areas) | <input type="checkbox"/> |

5. In total, how often did you visit any type of National Park area in the last 2 years?

- 1 to 3 times 4 to 5 times 6 to 9 times 10 or more times

6. Do you belong to any local, state or national organizations whose main purpose is to protect National Parks or other federal public lands? Moved up from below (was question 10) so all below have new numbers

Yes No

7. What is your zip code? _____

8. Are you:

Male Female

9. What year were you born? _____

10. Are you retired?

Yes No

11. What is the highest level of school you have completed

Some high school High school graduate or GED Some college or technical school (but no degree)

Associate's degree or bachelor's degree Professional degree Master's or doctoral degree

12. Here is a list of racial categories. Please select one or more which best describes your race:

American Indian or Alaska Native Native Hawaiian or other Pacific Islander Asian

Black or African American White Other _____

13. Are you Hispanic or Latino?

Yes No

14. Next we'd like to ask you about your household income. Your answer will be kept strictly confidential, and only used for comparing groups of people. Which of the following income categories best describes your household's total income in 2012, before taxes?

- | | | |
|--|--|--|
| <input type="checkbox"/> Less than \$15,000 | <input type="checkbox"/> \$15,000 up to \$24,999 | <input type="checkbox"/> \$25,000 up to \$34,999 |
| <input type="checkbox"/> \$35,000 up to \$49,999 | <input type="checkbox"/> \$50,000 up to \$74,999 | <input type="checkbox"/> \$75,000 up to \$99,999 |
| <input type="checkbox"/> \$100,000 up to \$149,999 | <input type="checkbox"/> \$150,000 up to \$199,999 | <input type="checkbox"/> \$200,000 or more |

15. What is the total number of people who contribute the household income noted above?
_____ (number)

16. How many children under the age of 18 are in your household? _____ (number)

APPENDIX C: CORRELATION MATRICES

NPS Parks Model Variables

	ParkBidA	ParkGain	HistGain	WaterGain	NPVis	Enviro	LessBach	Bach	GradEd	East	Mountain	Pacific	HHI	Age	Retire	Male
ParkBidAmt	1.00															
ParkGain	0.58	1.00														
HistGain	0.07	0.10	1.00													
WaterGain	-0.41	-0.19	0.19	1.00												
NPVis	0.11	0.13	0.02	-0.04	1.00											
Enviro	0.02	0.06	-0.02	-0.10	0.17	1.00										
LessBach	0.03	0.01	0.09	0.05	0.07	0.02	1.00									
Bach	-0.08	-0.12	-0.09	0.08	-0.06	0.01	-0.36	1.00								
GradEd	0.06	0.07	-0.01	-0.10	0.05	0.03	-0.42	-0.25	1.00							
East	-0.16	-0.06	0.07	0.06	0.03	0.01	0.08	0.09	-0.03	1.00						
Mountain	0.02	0.02	0.01	0.05	0.07	-0.03	-0.03	0.01	-0.03	-0.33	1.00					
Pacific	0.02	0.00	-0.03	-0.03	0.09	0.07	-0.03	0.04	0.02	-0.36	-0.12	1.00				
HHI	0.09	0.05	-0.02	-0.06	0.15	0.04	0.18	-0.27	0.31	-0.06	0.03	0.00	1.00			
Age	-0.02	-0.05	0.07	-0.04	-0.08	0.07	-0.09	0.16	-0.11	0.14	-0.07	-0.09	-0.14	1.00		
Retire	-0.03	-0.04	-0.05	-0.04	-0.09	0.06	-0.10	0.16	-0.12	0.10	-0.12	-0.04	-0.30	0.68	1.00	
Male	0.10	0.02	0.05	-0.05	0.00	0.00	0.05	-0.07	0.07	-0.05	-0.02	-0.01	0.17	0.14	0.08	1.00

NPS Programs Model Variables

	ProgBidAmt	HPgain	RecGain	NatGain	EdGain	NPVis	Enviro	LessBach	Bach	GradEd	East	Mountain	Pacific	HHI	Age	Retire	Male
ProgBidAmt	1.00																
HPgain	0.12	1.00															
RecGain	-0.23	-0.14	1.00														
NatGain	0.17	0.13	0.38	1.00													
EdGain	0.20	0.55	-0.11	0.22	1.00												
NPVis	0.06	0.15	-0.13	-0.09	0.00	1.00											
Enviro	-0.04	0.14	0.12	0.08	-0.02	0.17	1.00										
LessBach	0.05	0.04	-0.05	-0.07	-0.03	0.07	0.02	1.00									
Bach	0.05	-0.13	-0.02	-0.04	-0.06	-0.06	0.01	-0.36	1.00								
GradEd	0.01	0.06	0.08	0.08	0.03	0.05	0.03	-0.42	-0.25	1.00							
East	0.02	0.04	0.02	-0.01	0.01	0.03	0.01	0.08	0.09	-0.03	1.00						
Mountain	-0.03	-0.06	-0.07	0.05	-0.09	0.07	-0.03	-0.03	0.01	-0.03	-0.33	1.00					
Pacific	0.06	0.06	0.02	0.04	0.12	0.09	0.07	-0.03	0.04	0.02	-0.36	-0.12	1.00				
HHI	0.00	0.05	0.06	0.07	-0.02	0.15	0.04	0.18	-0.27	0.31	-0.06	0.03	0.00	1.00			
Age	-0.08	-0.05	0.10	-0.05	-0.04	-0.08	0.07	-0.09	0.16	-0.11	0.14	-0.07	-0.09	-0.14	1.00		
Retire	-0.06	-0.03	0.10	0.03	0.01	-0.09	0.06	-0.10	0.16	-0.12	0.10	-0.12	-0.04	-0.30	0.68	1.00	
Male	0.00	-0.07	0.03	-0.07	-0.12	0.00	0.00	0.05	-0.07	0.07	-0.05	-0.02	-0.01	0.17	0.14	0.08	1.00