Economic Valuation of the National Park Service – Phase 1a Report

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"National parks are the best idea we ever had. Absolutely American, absolutely democratic, they reflect us at our best rather than our worst." Wallace Stegner

Executive Summary

The purpose of this document is to synthesize the information about the National Park Service Units and Programs for us to draw upon in designing a total economic value study including a survey to go out to households nationwide.

The nearly 400 individual National Park Service units are found in nearly every state, and include:

- National Parks
- National Monuments
- National Seashores and National Lakeshores
- National Recreation Areas
- National Trails
- National Battlefields
- National Memorials
- National Historic Sites and National Historic Parks

There are over twenty-four National Park Service Programs, the vast majority of which operate outside of the National Park System units. Many of these programs deal with historic and cultural preservation, while others focus on recreation or conservation. Examples of these programs include:

- Historic and Cultural Programs
    - National Register of Historic Places
    - National Historic Landmarks Program
- Recreation Programs
    - National Trails System Program
    - Land and Water Conservation Fund State Assistance Program
- Programs for the Conservation of Natural Resources
    - National Wild and Scenic Rivers Program

We reviewed more than a dozen economic valuation studies of National Park Service units. Two thirds of these studies only valued visitor use, and nearly all valued only an individual unit. Only one third of these economic valuation studies measured existence or bequest values (passive use values) of the general public. These passive use studies also valued only one unit or a few units in a region.
To our knowledge there has not been to date any comprehensive total economic valuation study of all National Park Service units and programs. Our study is designed to fill this gap.

Acknowledgements

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Contents

I. Introduction

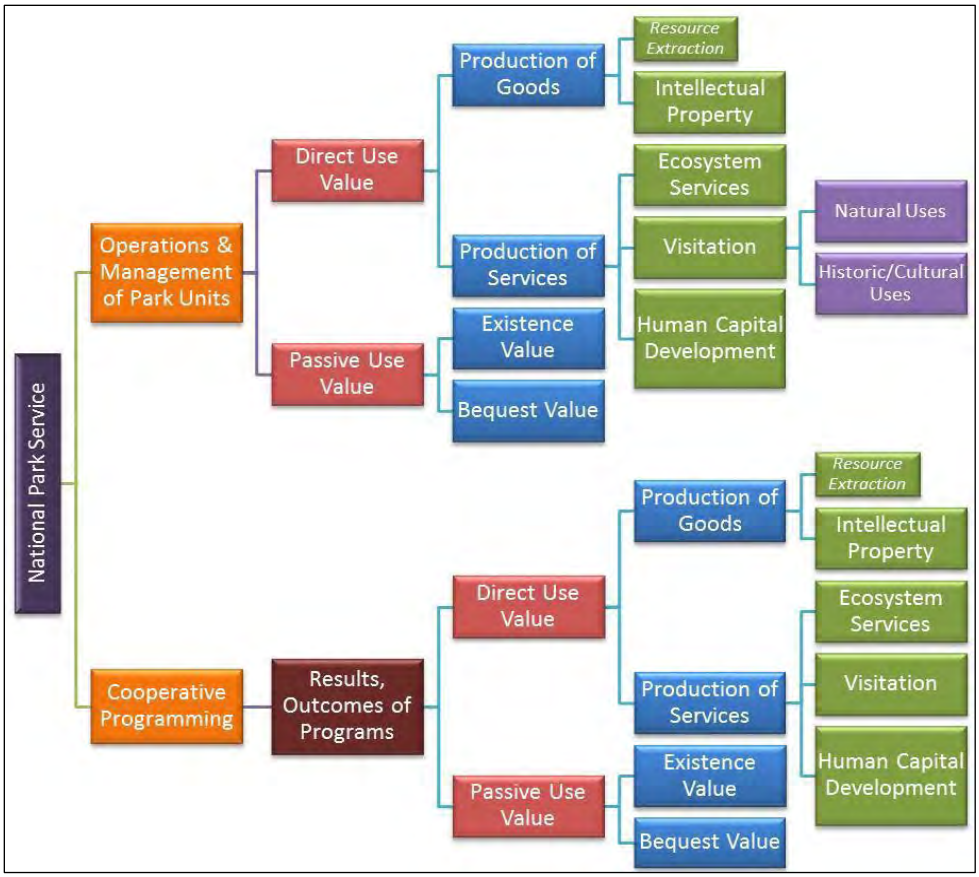
This project will measure the total net economic value of the National Park Service (NPS), including national parks, national monuments, national recreation areas, and other units of the NPS system, plus the National Park Service programs both inside and outside National Park Service units. This project's valuation of the National Park Service's contributions to society, its programs as well as the NPS units, will provide the first system-wide comprehensive valuation.

The values measured will include those of the general public not just visitors to the National Park Service units. The economic values this project will estimate are called "net economic values," which are the values people hold for NPS units and programs that are over and above what they spend to enjoy those lands and programs. These monetized values include both direct use values (which derive from on-site use), passive use values (which are independent of on-site use) and the value of the National Park

Service's role in in cooperative conservation and management efforts, which fall into both categories. . These net economic values reflect how much people are willing to pay in order to enjoy National Park Service units and programs.

Under the supervision of Harvard Kennedy School Professor Linda Bilmes, Harvard graduate students Francis Choi and Tim Marlowe devised a framework for estimating the total economic value of the National Park Service which was awarded the Harvard Environmental Economics Program annual prize for best master's thesis in environmental economics. Choi and Marlowe (2012) include a very useful schematic depicting these values which we have adapted as Figure 1. The values to be measured flow from both the operations and management of NPS units and from NPS programs both inside and outside NPS system units. Both sources of value produce direct use values and passive use values.

Figure 1. Economic Valuation Framework (based on Choi & Marlowe 2012)



Direct use values include the production of goods and services. Goods produced by National Park Service programs and units can include resource extraction (although this activity is prohibited in most National Park Service units) and the production of intellectual property, such as books drawing on experiences in the National Park Service units or photographs of NPS landscapes or buildings. Services include recreation (described by Choi and Marlowe as visitation and divided into "natural use" and "historic/cultural use"), human capital development (e.g. knowledge gained from interpretive and educational programs, outdoor education programs for youth and adults, skills and confidence gained from active outdoor recreation) and ecosystem services (e.g. watershed protection, climate regulation, soil formation, air quality, erosion control, biological diversity, open space).

The concept of passive use value was first articulated by Krutilla in 1967, "…when the existence of a grand scenic wonder or a unique fragile ecosystem is involved, its preservation and continued availability are a significant part of the real income of many individuals." (p. 779) Or put another way, passive use values are the values people have which are "… independent of any present or future use these people might make of those resources." (Freeman 2003, p. 137)

Passive use values include existence value and bequest value. Existence value is the utility or benefit that accrues to an individual from simply knowing that a resource (such as a National Park) exists, even if they never expect to visit or see the or otherwise use the resource. Bequest value is similar, it is the benefit or utility an individual receives from know that a resource will be preserved for future generations to enjoy. These values are measured by what the visitor or household would pay or what is referred to as "willingness to pay." This is the Federally approved measure of value used in benefit cost analyses (U.S. Water Resources Council 1983, U.S. Office of Management and Budget 1992, U.S. Environmental Protection Agency 2000).

National Park Service programs also provide what Choi and Marlowe (2012) refer to as "cooperative services." These are services which are difficult to place a value on but which are nevertheless an important aspect of the total value of the NPS. These include coordination and management of programs or projects which involve several jurisdictions (other federal agencies, state and local governments, non-profit organizations etc.), funding through grants and tax incentives, technical expertise and training and working with numerous other government agencies on a range of conservation, scientific and historical protection efforts. NPS programs also produce value for the

American public through "organization leveraging" defined by Choi and Marlowe (2012) as the "… institutionalized opportunities for protection of natural resources and preservation of historical resources…" which are enabled by the existence of the NPS, noting that, "…The mere existence of the parks themselves make it possible for other conservation and preservation efforts to occur. Sometimes, the National Park Service provides programmatic services to extend their core mission beyond park unit boundaries. At other times, NPS uses the weight of its organizational reputation to accomplish goals with only indirect action." (p. 29).

Some of these values are difficult to fully value using standard economic methods, but we will endeavor to estimate the contribution of this work using case studies to supplement the survey (the case studies to be developed by the Harvard team led by Linda Bilmes in Phase II of the research project).

II. Description of National Park Service

The U.S. National Park Service, an agency within the Department of the Interior, manages the land units of the National Park Service system and administers several programs which support the mission of the agency.[1]

a. Major Legislation

Throughout its history, the United States has gone through several phases regarding federal public lands (Loomis 2002). Initially the young country went through a period of land acquisition. Notable milestones include the Louisiana Purchase in 1803, the Annexation of Texas in 1845, and the acquisition of other western lands through treaties and wars with Mexico throughout the 1840s and 1850s. Next came a period of land disposal during which the U.S. government gave much of these lands to homesteaders (through the Homestead Act of 1862), to the newly created Western states, and to the railroads. All of this was part of an effort to settle the western part of the country. Eventually concern over abuses and fraud in the land disposal offices along with a desire to preserve the unique natural and scenic resources found on some of these lands led to a period of retention during which most of the current land management agencies were formed.

In 1864 Congress ceded the Yosemite Valley to the state of California to be managed as a public recreation area. This was followed in 1872 by the Yellowstone National Park Act, designating the world's first national park. In 1890 Yosemite was transferred back to the federal government to become a national park as well.

In 1906 Congress passed the American Antiquities Act which authorized the president to set aside (by public proclamation) "national monuments" to preserve historic landmarks, historic and prehistoric structures and other unique objects including those of national scientific interest. The Grand Canyon was designated a national monument by President Theodore Roosevelt in 1908.

The National Park Service Organic Act, passed by Congress in 1916, created the National Park Service as an agency within the U.S. Department of the Interior and conveyed the management of the National Parks to this new agency. The National Park Service was later given management responsibility for national monuments designated under the Antiquities Act in 1933 by President Franklin D. Roosevelt.

Various legislation enables the National Park Service programs and these are mentioned in the section to follow. It is worth noting that one act, the National Historic Preservation Act of 1966, is the authorization for nearly all of the National Park Service cultural and historic preservation programs.

b. Units of the National Park System

The National Park System comprises **National Parks**, along with several other types of units. National Parks are probably the lands with which the majority of Americans are most familiar. These are usually large areas of land and/or water and most contain a variety of resources, and often some outstanding natural or cultural feature of national significance. National Parks are usually large enough to protect most of the park ecosystems from influences outside of the park (Loomis, 2002).

National Monuments, on the other hand, are often designated to protect one or a few specific significant resources or objects. National Monuments are usually smaller in size than National Parks and

[1] **The Mission of the National Park Service:** "The National Park Service preserves unimpaired the natural and cultural resources and values of the National Park System for the enjoyment, education, and inspiration of this and future generations. The National Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world." (http://www.nps.gov/aboutus/mission.htm)

can be designated by the President under the Antiquities Act of 1906 (National Park designation on the other hand, requires an act of Congress (National Park Service 2009)). Many National Monuments were designated to protect resources thought to be at risk in a timely manner while Congress debated the designation of a National Park (Loomis 2002). Several National Parks began as National Monuments which were later expanded (in most cases) to encompass larger areas and additional natural or cultural resources and designated as National Parks by Congress (e.g. Acadia in Maine, Mesa Verde and Great Sand Dunes in Colorado, Joshua Tree in California, Grand Canyon in Arizona).

The designation of **National Preserves** is usually done to protect certain specific resources (similar to National Monuments) while also allowing activities (like hunting or resource extraction) which are not allowed in National Parks or Monuments. **National Reserves** are similar to National Preserves but may be transferred to state or local governments.

Several NPS units are designed to protect specific types of resources: **National Lakeshores** and **National Seashores** protect coastlines and off-shore islands; **National Rivers** and **Wild & Scenic Riverways** preserve the lands bordering natural waterways which have not been altered by man (not dammed or channelized); **National Scenic Trails** protect long-distance footpaths.

Many units of the National Park System protect sites which are significant in American history: **National Historic Sites**, **National Historical Parks**, **National Battlefields** (National Military Parks, National Battlefield Parks, and National Battlefield Sites), **National Historic Trails**, some **National Monuments**, and **International Historic Sites** (which are significant to both the U.S. and Canada). **National Memorials** are sites which are constructed to commemorate important historical events (e. g. the Vietnam War Memorial) or to honor people who have been important in shaping the country's history (e.g. the Lincoln Memorial).

Three types of National Park System units emphasize recreational uses. **National Recreation Areas** originally were lands surrounding reservoirs which were themselves built and managed by other Federal agencies (e.g. the Bureau of Reclamation, Tennessee Valley Authority, U.S. Army Corps of Engineers) and are managed jointly by the National Park Service and the relevant cooperating agency. This designation now includes other (non-reservoir based) recreation areas, including some in urban areas. **National Parkways** are roadways (along with narrow margins of adjacent lands) which allow motorists to travel through scenic areas. **Wolf Trap National Park for the Performing Arts** in Virginia, **Ford's Theater National Historic Site** in Washington, D.C. and **Chamizal National Memorial** in Texas are National Park Service units used for public performances.

Most the public parks in the nation's capital are administered by the National Park Service in a region called the **National Capital Region**.

In addition to specific land designation categories, many of the units of the National Park System include lands designated as Wilderness under the National Wilderness Preservation Act of 1964. This designation overlays the system unit and sets aside an area of the NPS unit where wilderness characteristics are preserved and where certain activities such as motorized recreation are prohibited per the requirements of the Wilderness Act.

Table 1 summarizes the units of the National Park Service system. These are grouped into broad categories based on the primary focus of the various types of units. We recognize that this division is less than perfect since most NPS units could be placed into each of these categories to some degree.

Table 1. Summary of National Park Service System Units

Classification	Number	Acreage
Preservation of American history and commemoration of significant events and people	**177**	**302,571**
National Battlefields, National Battlefield Parks, National Battlefield Sites, National Military Parks (e.g. Gettysburg)	25	71,389
National Historical Parks, National Historic Sites, International Historic Site	125	220,643
National Memorials (e.g. the Lincoln Memorial)	27	10,540
Water recreation and protection	**29**	**1,578,011**
National Lakeshores	4	229,132
National Seashore	10	596,589
National Rivers, and National Wild & Scenic Rivers and Riverways	15	752,290
Land recreation and protection	**25**	**4,128,370**
National Parkways (e.g. the Blue Ridge Parkway)	5	179,050
National Recreation Areas	18	3,701,992
National Scenic Trails (e.g. the Appalachian Trail)	2	247,328
Natural and cultural resource preservation and nature-based recreation	**153**	**78,376,688**
National Parks (e.g. Yellowstone, Smokey Mountain)	58	52,126,767
National Monuments	75	2,027,421
National Preserves and National Reserves	20	24,222,500
Other Designations [1]	13	37,246
Totals	**397**	**84,422,886**

[1] Includes the White House, National Mall, Wolf Trap National Park for the Performing Arts, The Washington Monument, and other areas.
Sources: National Park Service, Land Resources Division, Listing of Acreage and Acreage Summary (downloaded 10/04/2012 from National Park Service Stats: https://irma.nps.gov/Stats/Reports/ReportList), additional data are from http://inside.nps.gov/index.cfm?handler=parkunitlist. (downloaded 10/02/2012), The National Parks: Index 2009-2011.

c. Programs of the National Park Service

National Park Service programs endeavor to protect environmental, cultural, historical or recreational resources through activities often conducted outside of the NPS system units, within communities (both local and distant), and frequently in cooperation with state and local governments, other federal agencies non-profit organizations and citizen groups. These programs support community efforts to preserve locally significant historic sites and open spaces and help build community parks, greenways and trails.

For this summary we will describe these programs organized by their primary goal (historical and cultural preservation, recreation, conservation of natural resources), while recognizing that many programs have multiple goals and many have aspects touching on more than one of these primary focus areas.[2]

[2] All program information is from "National Park Service Programs: A Companion Volume to NPS Management Policies" (this is a draft in the process of being finalized, we will update the information as necessary once the document is final), and from the NPS website.

i. Historic and Cultural Preservation Programs

Many of the National Park Service programs are directed at preserving sites of significance in the history of the United States. Some of these programs target specific historical resources while others are more generally directed toward protection of historic and cultural resources.

The National Historic Preservation Act (and its amendments) authorized several NPS programs which facilitate several related historic preservation programs. The **National Heritage Areas Program** protects and promotes the cultural, historical and natural assets regions outside of National Park Service units. This program could also be categorized as a conservation program. Also operating outside of National Park Service units, the **National Historic Landmarks Program** provides technical assistance to private owners of historical sites and helps promote these sites for public education purposes.

The **National Register of Historic Places** and the **Heritage Documentation Programs** serve to identify and record sites of historical significance in order to coordinate and support efforts to preserve these sites. The Heritage Documentation Programs also places special emphasis on sites which are in danger of demolition or loss by neglect.

Also under the authorization of the National Historic Preservation Act, several National Park Service programs provide advice, technical assistance and education for historic preservation efforts. **The Federal Preservation Institute** provides consultation to other Federal agencies on historic site preservation. The **Heritage Education Services Program** creates and coordinates educational programs relating to cultural sites both inside National Park Service units and outside of these lands. The **National Center for Preservation Technology and Training** works with several scientific and technological disciplines in a research setting in order to advance methods used to preserve historic sites.

As a means of encouraging preservation, the **Historic Preservation Tax Incentives Program** works with IRS and State Historic Preservation Offices to create incentives for private property owners to rehabilitate historic building using tax credits.

The **American Battlefield Protection Program** directly protects sites outside of NPS units where historically important armed conflicts have occurred and provides assistance in site preservation, management and interpretation as well as raising awareness of the importance of preserving these sites for future generations.

Two programs focus on our coastal historic resources. Through the **Historic Lighthouse Preservation Program**, the National Park Service assists in transferring federally owned historic lighthouses to state and local governments or non-profit organizations willing to undertake their preservation. The **Maritime Heritage Initiative** provides education on the role of maritime affairs in the history of the U.S. and preserves historical maritime sites. Both of these programs operate outside of National Park Service units.

The Underground Railroad consists of many sites along a loosely defined route over many states. The **National Underground Railroad Network to Freedom Program** preserves these sites and other resources associated with the Underground Railroad for educational and historic preservation. This program also coordinates with other Federal agencies, state and local governments and non-profit organizations to manage these sites.

Route 66, stretching from Chicago to Los Angles, is an important part of America's more recent history, and the **Route 66 Corridor Preservation Program**, working outside of National Park Service units, collaborates with private property owners, non-profit organizations, and state and local governments to preserve and maintain significant sites along "the Mother Road."

The **Shared Beringia Heritage Program** endeavors to improve local, national and international understanding of the natural and cultural resources of the Bering Strait and to sustain the cultural vitality of the Native peoples of the region. The **National Native American Graves Protection and Repatriation Act (NAGPRA) Program** provides 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. These two programs operate outside of National Park Service units.

ii. Recreation Programs

Recreation is an important part of the National Park Service mission and several programs facilitate outdoor recreation both inside and outside of National Park Service units. The **Federal Lands to Parks Program** transfers Federal lands to state and local governments to create parks and recreation sites and works to ensure lands remain accessible to the public. This program also promotes stewardship of the resources at sites transferred for recreation.

As a means of protection, the **Hydropower Recreation Assistance Program** works with hydropower facilities to ensure that public interests in recreation and conservation are addressed. In order to preserve natural lands as well as provide more recreation opportunities, the **National Trails System Program** facilitates establishment and operations of national trails both inside and outside of the NPS units (for example through the "Connect Trails to Parks" grant program). The **Rivers, Trails, and Conservation Assistance Program** assists community-led initiatives outside of NPS units to preserve open space and provide recreation opportunities and makes the natural environment easily accessible for all Americans. The National Park Service's **Land and Water Conservation Fund State Assistance Program** works to implement the state side of the LWCF by assisting state and local governments in the planning and development of public outdoor recreation sites.

iii. Programs for the Conservation of Natural Resources

The goals of the **National Wild and Scenic Rivers Program** are to educate the public regarding the recreational, biologic, geologic, historic, and cultural significance of the Country's scenic rivers and to improve communication with other Federal agencies and state and local governments regarding river management. (It should be noted that this program doesn't directly deal with scenic river management, these management responsibilities/guidelines are found under the Wild and Scenic Rivers Act (1968).)

The **National Natural Landmarks Program** provides support for voluntary preservation of sites on private property which have been designated (with landowner permission) as having geological or biological significance.

The **International Affairs Program** assists other nations in developing and managing their own national parks systems, and preservation and conservation initiatives. This program also works with other nations' national park systems in order to achieve shared preservation and conservation initiatives.

Table 2 summarizes the National Park Service Programs described above.

Table 2. Summary of National Park Service Programs

Program Name	Goal/ Purpose	Inside NPS Units	Outside NPS Units	Legislation
Historic and Cultural Preservation Programs				
National Heritage Areas Program	Cultural, Historic		✓	National Historic Preservation Act
National Historic Landmarks Program	Historic		✓	Historic Sites Act; National Historic Preservation Act Amendments of 1980
National Register of Historic Places	Historic, Cultural		✓	National Historic Preservation Act
Heritage Documentation Programs	Historic		✓	Historic Sites Act; National Historic Preservation Act
Federal Preservation Institute	Historic		✓	National Historic Preservation Act
Heritage Education Services Program	Historic, Cultural	✓	✓	Historic Sites Act; National Historic Preservation Act
National Center for Preservation Technology and Training	Historic		✓	National Historic Preservation Act (Title IV)
Historic Preservation Tax Incentives Program	Historic		✓	Revenue Act of 1978, Sec. 315
American Battlefield Protection Program	Historic		✓	American Battlefield Protection Act
Historic Lighthouse Preservation Program	Historic		✓	National Historic Lighthouse Preservation Act
Maritime Heritage Initiative	Historic		✓	National Maritime Heritage Act
National Underground Railroad Network to Freedom Program	Historic, Cultural		✓	National Underground Railroad Network to Freedom Act
Route 66 Corridor Preservation Program	Historic, Cultural		✓	Route 66 Corridor Preservation Act
Shared Beringia Heritage Program	Historic, Cultural		✓	Appropriations Act of 1991
National Native American Graves Protection and Repatriation Act (NAGPRA) Program	Cultural, Historic		✓	Native American Graves Protection and Repatriation Act
Recreation Programs				
Federal Lands to Parks Program	Recreation, Historic, Cultural		✓	Public Law 91-485 Sec. 203(k)(2)
Hydropower Recreation Assistance Program	Recreation, Conservation		✓	Outdoor Recreation Act; Federal Power Act; Wild and Scenic Rivers Act

Program Name	Goal/ Purpose	Inside NPS Units	Outside NPS Units	Legislation
National Trails System Program	Recreation, Historic, Cultural	✓	✓	National Trails System Act
Rivers, Trails, and Conservation Assistance Program	Recreation		✓	Wild and Scenic Rivers Act; National Trails Systems Act; Outdoor Recreation Act
Land and Water Conservation Fund State Assistance Program	Recreation		✓	Land and Water Conservation Fund Act
Programs for the Conservation of Natural Resources				
National Wild and Scenic Rivers Program	Recreation, Improved Management		✓	Wild and Scenic Rivers Act
National Natural Landmarks Program	Education		✓	Historic Sites, Buildings, and Antiquities Act
The International Affairs Program	Conservation, Land Management		✓	Federal laws, conventions, and treaties that provide authority to the Secretary of the Interior

Source: National Park Service Programs: A Companion Volume to NPS Management Policies. (Draft)

d. The National Park Service in Local Communities

The National Park Service programs and units impact every state in the country through grants which aid local projects, historic preservation programs, the creation of local recreation opportunities, the economic impacts of visitation, and through the protection and production of important natural resources that have benefits reaching beyond NPS unit boundaries. Table 3 summarizes several of these impacts (and Tables A2.1 and A2.2 in the appendix provide state by state details).

Table 3. The National Parks Service in Local Communities – National Summary

National Park System Units	397
Visitors to National Park System Units in 2011	279,000,000
Economic significance of National Park System tourism (in 2010) [1]	$31,080,000,000
National Register of Historic Places listings	86,648
Dollars of historic rehabilitation projects stimulated by tax incentives (since 1995)	$41,029,037,364
Hours donated by volunteers (in 2011)	6,459,909
National Heritage Areas	62
National Natural Landmarks	569
National Historic Landmarks	2,486
Land & Water Conservation Fund grants (since 1965) [2]	$3,849,683,468
Acres transferred by Federal Lands to Parks for local parks and recreation (since 1948)	173,050
Historic preservation grants [2]	$1,438,559,577
Community conservation and recreation projects (since 1987)	2,642
World Heritage Sites	23
Places recorded by heritage documentation programs	40,774
Objects in national park museum collections	146,013,571

Table 3. The National Parks Service in Local Communities – National Summary

Threatened and endangered species in national parks	585
Archeological sites in national parks	72,619
Certified Local Governments – preservation partnership between local, state and national governments focused on promoting historic preservation at the grass roots level.	1,808
Teaching with Historic Places lesson plans - uses properties listed in the National Park Service's National Register of Historic Places to enliven history, social studies, geography, civics, and other subjects using a variety of products and activities that help teachers bring historic places into the classroom.	168
Discover Our Shared Heritage travel itineraries – self guided tours to historic places most of which are listed in the National Register of Historic Places.	258

Sources: National Park Service State Summaries: http://www.nps.gov/findapark/index.htm#, National Park Service, Land Resources Division, Listing of Acreage and Acreage Summary (downloaded 10/04/2012 from NPS Stats: https://irma.nps.gov/Stats/Reports/ReportList)

[1] Stynes 2011.

[2] These dollar values do not include any NPS appropriations.

One important category of benefits from National Park Service units and programs are sometimes called the services of nature and much of the benefits from these services occur outside of NPS system units as well. Lands which are protected from development (such as NPS system units) help regulate water quality, deliver historic, cultural and spiritual benefits, provide habitat for threatened and endangered species of plants and animals, produce recreation opportunities and many other valuable but un-priced services. Economists have been working to define and estimate values for these services for some time. Bacigalupi (2010) presents a typology which uses a Total Economic Value framework along with one devised by the United Nations and with specific applications for public land management. Other useful definitions are provided by Boyd and Banzhaf (2007, Brown et al. (2006), de Groot et al. (2002) and Fisher et al (2009). Some examples of these services applicable to NPS units and programs are listed in Table 4.

Table 4. Selected Natural Services from National Park Service units and programs

Type of service	Produced by NPS units	Produced by NPS programs	Estimated quantity (if available)
Water	✓	✓	NPS units produce 36.6 billion cu ft./year, 2.1% of U.S. total (Brown et al. 2008)
Threatened & endangered species	✓	✓	
Historic and cultural benefits	✓	✓	
Recreation	✓	✓	

III. National Park Service Economic Values

a. Economic Valuation Methodology

Most of the economic value associated with the National Park Service is what economists call non-market value. There are no formal markets for such things as recreation opportunities, clean air and wildlife habitat so there are no clear "prices" for these goods as there are for market goods like clothing and cars.

Economists must measure the value of non-market goods using techniques which don't rely on market prices. This can be done either indirectly or directly. Indirect measures of non-market values infer the value of the good in question by using other expenditures as an approximation. The travel cost method (TCM) is the indirect valuation technique most relevant for this study. The travel cost method uses the estimated cost of a visit (direct expenses plus the value of travel time) to a recreation site as a proxy for the value of the recreation experience.

Direct methods to measure non-market values are also called stated preference because these techniques involve directly asking survey respondents their willingness to pay or their preferred alternative. Stated preference methods are the only methods which can derive passive use values. These methods can also be employed to estimate use values as is the case with three of the studies described below.

Contingent valuation (CVM) is a method whereby survey respondents are asked to indicate their willingness to pay for a non-market good like a recreation experience or passive use values such as existence value, option value or bequest value.

The choice experiment (CE) method is a stated preference method wherein survey respondents are asked to choose from a set of alternative scenarios which vary in the level or several attributes, one of which is the price or cost associated with each.

b. Past Studies of National Park Service Economic Values

Several studies in the past 30 years have examined the value of units of U.S. National Park system. These comprise a range of attributes, values and methodologies. With two exceptions, we have limited this brief literature review to include only studies which use surveys to estimate economic values for National Park system units. Several studies have examined the economic impact of National Park Service units (jobs, income, tax revenues), (e.g. Hardner and McKenney 2006, Stynes 2011) and while this is an important facet of the value of the National Park Service this study will only address the economic values.

To our knowledge there are no studies which estimate the total economic value of the U.S. National Park Service. Choi and Marlowe (2012) outline a framework for such an analysis which they apply to a case study for Joshua Tree National Park. This proposed methodology uses a variety of existing data and published values to compile a comprehensive value for NPS units which includes direct use value and passive use value from both unit operations and management and National Park Service programs. We expect to use or adapt this value typology for the present study.

Kaval and Loomis (2003) developed a comprehensive meta-analysis of recreation values for myriad activities, which they then apply to units of the U.S. National Park system. This study compiles over 200 research papers, only nine of which directly measure NPS recreation. The estimated average value of National Park Service recreation (derived from over 1,200 measures of value in the 200 papers) was $43 per person per day.

Turning now to studies using surveys to estimate economic values for NPS units we find that most examine recreation or direct use values rather than passive use values. Most of these use the travel cost method and report the net willingness to pay (the total value to the visitor) of a trip to or a day of

recreation at a National Park Service site. Two studies report the number of trips rather than the consumer surplus. Richardson and Loomis (2004) estimate a contingent visitation model to predict the number of trips which visitors to Rocky Mountain National Park would take under several scenarios related to climate change. Parsons et al. (2009) estimate the impact of beach closures at Padre Island National Seashore on trip frequency.

Two of the studies included here use the travel cost method. Kerkvleit et al. (2002) apply the travel cost method to estimate the economic value of sport fishing in the Greater Yellowstone area (including within Yellowstone National Park). Heberling and Templeton (2009) estimate the value of recreation at Great Sand Dunes National Park in Colorado.

The remaining studies reviewed here use stated preference methods. Leggett et al. (2003) estimate willingness to pay to visit Fort Sumter National Monument in South Carolina, Douglass and Harpman (2004) use the contingent valuation method to assess the value of recreation at Lake Powell and the Glen Canyon National Recreation Area, and Duffield et al. estimate both use and non-use values for National Park System sites within the Colorado River Watershed.

Schulze et al. (1983,1985) use contingent valuation to estimate the value of air quality (visibility) in the National Parks in the Southwest (Grand Canyon NP, Mesa Verde NP and Zion NP). Welsh et al. (1997) estimate the passive use values associated with differing levels of water flow in the Grand Canyon National Park. Turner and Willmarth (2009) use a choice experiment to estimate both use and non-use values for resources within North Cascades National Park. Table 5 (Table A3 provides additional details) summarizes selected characteristics of the original survey studies described above.

Table 5. Summary of Original Studies Looking at National Park Economic Values

Types of Values[1]	70% Use (recreation) 40% passive use
Single unit or multiple units	90% single unit 10 % region (Southwest)
Valuation Method	20 % Travel cost method 50% Contingent valuation method 10% Choice experiment method 20% Other (contingent visitation, reported visitation)
Who was surveyed	60% Visitors 30% Households 10% Individuals
Payment vehicle (means of payment)	30% Travel cost 30% Entrance fee or season pass 20% Taxes 20% Electric rate increase
WTP question format	50% Yes/No format 30% Payment card (respondent selects from multiple dollar amounts) 10% Ranking of options
Survey mode	10% Mail 40% In person 10% Internet 40% Combination (e.g. phone-mail-phone, in person-mail)
Average sample size	1,395
Average response rate	69%

[1]*Some studies used multiple methods or payment vehicles, or examined more than one type of value so percentages may not always sum to 100%*

IV. Preliminary Survey Design

Several decisions are necessary when embarking on an economic valuation research project such as this one. First one must determine which values are going to be measured, how they will be measured, who will be surveyed, and how the survey will be administered. This section discusses the rationale for each of these decisions (for those that have been made) and information needed to evaluate the merits for survey design decisions yet to be made.

a. Economic Values to be Measured

The National Park Service produces both direct use and passive use values and in order to estimate a complete total economic value for the National Park Service both will be measured by this study.

Passive use values for the units of the National Park Service system include existence and bequest values. These NPS system units represents an important asset and part of our cultural and national identity which appears to be important to many Americans. Less obvious are the passive use values associated with National Park Service programs. These are most likely tied to the outcomes of program efforts – such things as the existence value associated with knowing that important historical structures are protected or the bequest value from knowing that future generations will be able to see and learn from protected historical structures.

It is clear that visits to National Park Service system units generate direct use values, but National Park Service programs also produce direct use benefits. These may take the form of visits to local or state historic sites which are aided or enabled by National Park Service programs, NPS educational resources used in classrooms or in local interpretive displays or presentations, or in the benefits associated with historic preservation tax credits or other assistance to private property owners.

b. Methodology and Survey Design

i. Stated Preference Methods

Stated preference methods are the only way to measure passive use values, and are flexible enough to measure direct use values as well. The two main types of stated preference methods are contingent valuation (CVM) and the choice experiments (CE, also sometimes called contingent choice, conjoint method, or stated choice), both briefly described above.

Of these two the choice experiment method is the most appropriate method to apply in this study for several reasons. This method is capable of gathering more information from survey respondents than a CVM study. In a choice experiment researchers can offer respondents more than the “take it or leave it” option of a CVM study, enabling respondents to choose their most preferred from a set of options or alternatives or to rank the options (Freeman 2003). The options contain differing levels of attributes, including a monetary attribute (the “price” of the option).

The exercise presented to survey respondents most closely mimics the act of purchasing a market good, where consumers choose from among several options of a good such as a car, weighing the various models’ attributes in order to determine the most preferred (Louviere et al. 2000, Freeman 2003). In fact one of the earliest applications of the CE method pertained to cars (Freeman 2003). Under the right circumstances (few enough options and few enough attributes) it may be easier for respondents to choose a preferred option, or to rank the options than it is to determine a dollar value for a non-market good.

When analyzing the results of choice experiments, researchers are able to estimate the incremental willingness to pay (the economic value) for each of the non-monetary attributes of the preferred alternative (Freeman 2003). This will be beneficial in determining the overall value of National Park

Service programs and units as well as determining what attributes of these programs and units are most valuable to the public.

Boyle and Markowski (2003) and Turner (2012) both recommend using choice experiments when estimating economic values for National Park Service resources. Both describe a comprehensive framework for developing estimates of value for system resources and programs. Boyle and Markowski note that the choice experiment format most closely mimics revealed preference (market) behavior.

These authors include a lengthy section on the issues associated with other state preference methods.

ii. Issues with Stated Preference Methods

Validity refers to whether or not the choice experiment measures the value in question, in this case the respondents' true willingness to pay for National Park Service programs or units or true preferred option. Other aspects of validity are concerned with whether the characteristics of the response conform to economic logic, for example whether the quantity of the public good demanded rises and falls as expected in response to the cost to the respondent.

1. **Hypothetical Bias**

An issue frequently raised regarding stated preference results is "hypothetical bias" wherein the hypothetical nature of the survey induces respondents to give valuations or preference selections which do not reflect their true values or preferences. Most studies of hypothetical bias conclude that this bias is upward, that is the hypothetical values are often higher than the actual values (Loomis 2011).

Several approaches have been used to address hypothetical bias, including careful design of the hypothetical market to induce accurate responses. This includes explicitly stating the way that survey responses will be used to inform public policy, or the conditions under which the public good will be provided. The idea behind these approaches is to reduce or prevent strategic behavior on the part of respondents.

Taylor et al. (2010) compare three provision rules in a choice experiment: a binding choice where the respondent will be held to his or her own choice, a plurality vote where the option preferred by most respondents will be provided, and a case where no provision rule is stated (noting that this is what most researchers have done). They note that only the binding choice does not create an incentive for strategic behavior on the part of the respondent (that is it is "incentive compatible").

Taylor et al. apply these treatments to both public and private (market) good and with both hypothetical and actual payments. They find upward bias in the hypothetical WTP for the public good, but found no statistical difference between provision rule treatments, although the inclusion of an incentive compatible (binding) provision rule reduced the bias. For private goods they found that in markets with incentive compatible provision rules there was no statistical difference between hypothetical and real payments.

Another strategy for reducing hypothetical bias is to include language in the survey specifically designed to reduce respondents' tendency to overstate willingness to pay by explaining that these studies often result in overstated values (e.g. Cummings and Taylor 1999). This approach has been called "cheap talk" and has had mixed results (Loomis 2011, Silva et al. 2011).

Silva et al. (2011) note studies which show that "cheap talk" is most effective when respondents are less experienced or knowledgeable about the subject of the survey. This may have relevance for our survey about National Park Service units and programs, although we will not venture a guess as to the experience or knowledge of potential respondents. The authors compared actual and hypothetical willingness to pay for a private good, and further compared hypothetical treatments with and without a

cheap talk script, and found that the inclusion of the cheap talk script eliminated hypothetical bias in their experiment (Silva 2007).

Hypothetical bias can also be addressed by adjusting willingness to pay responses based on respondents' self-reported certainty of their actual willingness to pay. In a contingent valuation study, Champ et al. (1997) recoded "yes" responses to "no" when respondents are not "very certain" of their answers and found that this resulted in hypothetical willingness to pay that was similar to actual. Champ et al. (2009) compare this certainty approach with the "cheap talk" approach and find that follow-up certainty questions are the most effective approach to reducing hypothetical bias.

2. Choice Experiment Question Format

Zhang and Adamowicz (2011) examine the impact that the survey format has on responses and willingness to pay, noting that researchers face a tradeoff between a survey design which minimizes the difficulty of the respondents' task (the "cognitive burden") and one which maximizes statistical efficiency. They note that reducing the difficulty of the survey often results in increased model error and that many researchers have observed a "format effect" wherein differing the survey format (the number choice tasks (questions), the number of options to choose from, and the number of attributes) affects willingness to pay results.

The research presented by Zhang and Adamowicz compared two formats – binary format (the status quo plus one option) and a trinary format (status quo plus two options). They found that the different formats did produce different responses which they attribute to two competing effects. When the task is more complex (as it is with three options), respondents are *more likely to choose the status quo*, but when there are more options (the trinary format) there is a greater likelihood that one of the options will more closely match a respondents true preferences and they are *less likely to choose the status quo*. The strength of these competing effects in the particular research will determine whether the status quo is more likely to be chose.

Because of these competing effects from the question format, the researchers recommend a survey design which mixes formats in order to control for and analyze these effects. If it is not possible to have multiple formats, they recommend a binary approach since it is more conservative – respondents are more likely to choose the status quo, thus reducing upward bias in willingness to pay estimates. These authors also note that a binary choice is the most incentive compatible, that is there are fewer incentives for respondents to strategically choose an alternative that is not truly their most preferred.

3. Survey Mode

Taylor et al. (2009) compare several survey modes (mail, phone and internet with a standing panel) and find that phone surveys produce the highest willingness to pay, attributing this to potential "social desirability" effect often found in in-person surveys. They also found that the internet survey respondents who had been on the standing panel gave lower willingness to pay than other panel members, and that the variance of WTP responses was highest for the internet panel survey.

Our choice of which survey mode to use will be dependent on the layout and contents of the final survey, monetary costs of different survey modes (to be determined in Phase 1B) and the time required to implement the survey mode.

The advantages of each mode will be explored. For example, one advantage of the internet panel mode is the relative ease with which adjustments to the survey can be made. Half of the surveys can be sent out and initial analyses done to determine whether adjustments (such as bid amounts) are needed and the second half can be sent out once adjustments are made thus improving the potential quality of the responses.

4. Means of Payment

In order to elicit respondents' willingness to pay a means of payment must be described in any stated preference survey. These means of payment (called the payment vehicles) can be taxes, entrance fees, donations, or increased costs for goods and services. The payment vehicle must be credible, that is it must be a realistic way in which the non-market good in question would be provided.

Bergstrom et al. (2004) compare willingness to pay for improved water quality using two payment vehicles. One subset of respondents were presented with a special tax as the payment vehicle with two question formats. The other subset responded to a "tax reallocation" payment vehicle, where subjects were asked to reallocate a fixed amount of tax expenditure to pay for an environmental good. This format does not result in a reduction of the respondents income, but rather reduces the amount of public funds available for other public goods. Bergstrom et al. found that the willingness to pay and acceptance rates for the tax reallocation format were higher than the results from the special tax payment vehicle for both open-ended and dichotomous choice formats.

Focus group input will be gathered regarding participant views on fair or appropriate ways to pay for NPS system units and programs. We will also refine the Bergstrom et al. (2004) tax reallocation approach based on feedback from the authors of that paper.

5. Survey Response Rates

Survey response rates vary due to several factors including the mode by which the survey is administered (mail, phone, in person, internet), the respondents targeted (e.g. households or visitors) and the level and type of follow-up effort applied to encourage responses. Taylor et al. (2009) compare phone, mail and internet surveys and find that the mail survey garnered the largest response rate of the three, and benefitted the most responsive from follow-up efforts. They also find that the non-response varies by mode (that is different people participate in different survey modes). Taylor et al. concludethat "… with appropriate controls, a WTP estimate derived from a KN [Knowledge Networks] web survey should be no less accurate than that obtained from a well-designed and well-executed mail or phone survey." (p. 6)

Kaplowitz et al. (2004) also compare response rates between mail surveys and several treatments for web surveys and find little difference between five treatments (one mail survey and four variations of follow-up encouragement for web surveys). The notable exception is that the respondents to the mail survey were (statistically significantly) older than the respondents to the web survey. The mail survey produced the highest overall response rate, but was also substantially more costly per response.

c. Preliminary Survey Layout

We will have separate survey instruments for NPS system units and NPS programs. Each will include a description of the National Park Service, the mission, a general description of either National Park Service units or programs (depending on which survey).

The next section of both surveys will include a list of various public goods such as roads and highways, national defense, education, fire and police protection, etc., along with the National Park Service. This will place the NPS within the context of the general scope of public goods and will be followed by questions to determine the importance of these various public goods (including the National Park Service) where respondents will be asked to rate them on a scale from not important at all to very important (levels will be determined as part of the focus group process).

Next will be a section listing either the resources found in NPS system units or the outcomes and results of NPS programs (depending on the survey), and will be followed by a set of questions rating the importance of these attributes similar to the one described above.

This will be followed by a description of the National Park Service management alternatives or options, including the status quo, and a description of how the non-status quo alternatives will be paid for.

Several researchers have used a technique called “cheap talk” (discussed above) to attempt to alleviate the hypothetical bias often found in state preference surveys. The next section of each survey will include a “cheap talk” script.

The next section will include the choice experiment question(s) to determine value of either National Park Service units or programs. We will also include another scale asking how certain respondents are that they would actually choose the alternative selected if they were faced with an actual choice situation. This will be followed by a tax reallocation question (similar to those described above) where respondents will be asked whether they would support shifting tax revenue from other public goods to NPS units or programs.

The final section will include questions about respondents visits to NPS units and/or use of NPS programs, and a series of standard demographic questions. See the appendix for a general outline of the survey.

d. Case Studies

1. Following on the model used in Joshua Tree National Park (Choi and Marlowe, 2012), Harvard will conduct a number of field case studies in different types of park holdings, including analysis of historical, cultural, bird migratory, scenic wonder, watershed protection, natural landmark, botanical and animal habitat protection, educational and other elements. These studies will be used to validate some of the findings of the survey, to provide more animated examples of how the park units actually provide some of the services that create value, and to help estimate some of the value created by the NPS organizational and cooperative activities.
2. Harvard Kennedy School student Tyler Evilsizer, from Montana and formerly staff to Senator Max Baucus on the Simpson-Bowles committee, will be conducting a detailed case study of one of the western parks commencing in November.

These case studies will be reviewed and advised by an advisory committee for the project that includes Dr. Rita Colwell (former Director of NSF), Professor Lisa Randall (Harvard Physics department) Dr. Sylvia Earle (former chief scientist at NOAA), and Henry Lee (Professor at HKS).

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Appendix

Table A1. National Park Service System Units By State

National Parks	Alaska	8	Maine	1	South Carolina	1
	American Samoa	1	Michigan	1	South Dakota	2
	Arizona	3	Minnesota	1	Tennessee	1
	Arkansas	1	Montana	2	Texas	2
	California	8	Nevada	1	Utah	5
	Colorado	4	New Mexico	1	Virgin Islands	1
	Florida	3	North Carolina	1	Virginia	1
	Hawaii	2	North Dakota	1	Washington	3
	Idaho	1	Ohio	1	Wyoming	2
	Kentucky	1	Oregon	1		
National Monuments	Alaska	2	Louisiana	1	Oregon	2
	Alabama	1	Maryland	1	South Carolina	1
	Arizona	13	Minnesota	2	South Dakota	1
	California	5	Missouri	1	Texas	1
	Colorado	4	Montana	1	Utah	6
	Florida	2	Nebraska	3	Virginia	3
	Georgia	3	New Mexico	10	Virgin Islands	2
	Hawaii	1	New York	5	Wyoming	2
	Iowa	1				
	Idaho	2				
National Historic Sites, National Historical Parks, International Historic Site	Alabama	2	Louisiana	3	Oregon	2
	Alaska	2	Maine	1	Pennsylvania	8
	Arizona	3	Maryland	4	Puerto Rico	1
	Arkansas	3	Massachusetts	12	South Carolina	2
	California	6	Michigan	1	South Dakota	1
	Colorado	2	Missouri	2	Tennessee	1
	Connecticut	1	Mississippi	1	Texas	4
	Georgia	3	Montana	2	Utah	1
	Guam	1	New Hampshire	1	Vermont	1
	Hawaii	4	New Jersey	3	Virgin Islands	2
	Idaho	2	New Mexico	2	Virginia	4
	Illinois	1	New York	10	Washington	4
	Indiana	1	North Carolina	2	Washington DC	6
	Iowa	1	North Dakota	2	West Virginia	2
	Kansas	4	Ohio	5	Wyoming	1
	Kentucky	2	Oklahoma	2		
National Battlefields, National Battlefield Parks, National Battlefield Sites, National Military Parks	Alabama	1	Mississippi	3	Pennsylvania	2
	Arkansas	1	Missouri	1	South Carolina	2
	Georgia	2	Montana	1	Tennessee	3
	Maryland	2	North Carolina	2	Virginia	4
	Michigan	1				

Table A1. National Park Service System Units By State

National Memorials	Arizona	1	Indiana	1	Pennsylvania	3
	Arkansas	1	Missouri	1	Rhode Island	1
	California	1	New York	3	South Dakota	1
	Washington DC	7	North Carolina	1	Texas	1
	Florida	2	Ohio	1	Virginia	2
National Parkways	Alabama	1	North Carolina	1	Virginia	1
	Washington DC	1	Tennessee	1	Wyoming	1
	Mississippi	1				
National Lakeshores	Indiana	1	Michigan	2	Wisconsin	1
National Seashores	California	1	Massachusetts	1	North Carolina	2
	Florida	2	Mississippi	1	Texas	1
	Georgia	1	New York	1	Virginia	1
	Maryland	1				
National Recreational Rivers, National Rivers, National River & Recreation Area, National Scenic Rivers and Riverways, Scenic & Recreational Rivers, Wild & Scenic Rivers, Wild Rivers	Alaska	1	Nebraska	1	Tennessee	2
	Arkansas	1	New Jersey	1	Texas	1
	Kentucky	1	New York	1	Wisconsin	1
	Minnesota	1	Pennsylvania	2	West Virginia	2
	Missouri	1	South Dakota	1		
National Preserves and National Reserves	Alabama	1	Colorado	1	Kansas	1
	Alaska	10	Florida	2	Texas	1
	California	1	Idaho	2	Washington	1
National Recreation Areas	Arizona	2	Nevada	1	Texas	2
	California	3	New Jersey	1	Utah	1
	Colorado	1	New York	1	Washington	3
	Georgia	1	Oklahoma	1	West Virginia	1
	Massachusetts	1	Pennsylvania	1	Wyoming	1
	Montana	1				
National Scenic Trails	Alabama	1	Massachusetts	1	Pennsylvania	2
	Connecticut	1	Mississippi	1	Tennessee	2
	Washington DC	1	New Hampshire	1	Vermont	1
	Georgia	1	New Jersey	1	Virginia	2
	Maine	1	New York	1	West Virginia	1
	Maryland	2	North Carolina	1		
Parks and other designations [1]	DC Wash	6	Maryland	4	Virginia	3

[1] Includes the White House, National Mall, Wolf Trap National Park for the Performing Arts, The Washington Monument, and other areas.
Sources: National Park Service Land Resources Division, Listing of Acreage and Acreage Summary (downloaded October 4, 2012 from NPS Stats: https://irma.nps.gov/Stats/Reports/ReportList), data on park units from http://inside.nps.gov/index.cfm?handler=parkunitlist. (downloaded October 2, 2012), and The National Parks: Index 2009-2011.

Table A2.1 – Highlights of National Park Service System Units and Program Activities by State

	National Park System Units	Visitors to National Park System Units in 2011	Economic impact from National Park system tourism (in 2010)	National Heritage Areas	National Natural Landmarks	National Historic Landmarks	Hours donated by volunteers (in 2011)	Objects in national park museum collections	Threatened and endangered species in national parks	Archeological sites in national parks	Teaching with Historic Places lesson plans	Discover Our Shared Heritage travel itineraries
Alabama	7	763,515	$24,048,000	1	7	36	10,824	268,518	13	228	4	4
Alaska	23	2,331,977	$208,767,000	1	16	49	100,704	4,649,663	5	4,746	2	2
American Samoa	1	7,916	$0	0	7	2	21,905	146,675	3	33	0	0
Arizona	22	10,263,291	$700,026,000	1	9	41	209,030	6,789,012	23	11,172	2	4
Arkansas	7	2,867,074	$148,995,000	0	5	16	46,973	1,757,667	4	739	3	5
California	25	35,370,881	$1,312,824,000	0	35	138	1,197,656	23,274,460	89	9,528	6	9
Colorado	13	5,805,431	$306,544,000	3	12	22	170,367	5,048,815	9	6,813	4	4
Connecticut	2	21,921	$1,249,000	2	8	60	5,298	216,283	0	10	3	3
Delaware	0	0	$0	0	0	13	0	0	0	0	2	3
Florida	11	10,160,418	$581,999,000	1	18	42	206,187	9,598,709	40	1,119	5	8
Georgia	11	7,052,204	$258,017,000	3	10	48	150,789	4,459,801	18	297	4	7
Guam	1	489,781	$7,637,000	0	4	0	4,583	27,034	2	51	0	0
Hawaii	7	4,667,330	$252,166,000	0	7	33	140,461	2,864,624	66	1,454	1	2
Idaho	7	587,338	$20,631,000	0	11	10	6,043	499,582	5	115	2	3
Illinois	1	298,376	$18,516,000	2	18	84	5,933	412,464	0	19	4	9
Indiana	3	2,053,723	$75,689,000	0	30	37	35,946	182,102	4	199	2	6
Iowa	2	213,804	$11,714,000	1	7	24	2,543	162,442	1	77	2	7
Kansas	5	92,609	$4,650,000	1	5	24	21,129	271,802	1	21	3	7
Kentucky	4	1,685,360	$92,528,000	0	7	30	61,942	1,880,942	21	1,629	4	8
Louisiana	5	568,343	$24,688,000	2	0	53	26,495	946,980	1	90	2	4
Maine	3	2,394,027	$186,282,000	0	14	42	55,121	1,390,058	2	203	1	5
Maryland	16	6,060,354	$178,418,000	2	6	71	242,675	1,643,891	10	587	6	6
Massachusetts	15	10,035,294	$444,219,000	5	11	185	255,667	5,283,550	9	446	10	8
Michigan	5	1,912,324	$143,396,000	1	12	34	58,579	742,279	4	453	0	3
Minnesota	5	554,400	$30,695,000	0	8	25	47,835	378,169	6	514	2	3
Mississippi	8	7,042,627	$139,552,000	3	5	39	23,660	1,388,446	18	244	1	5
Missouri	6	3,948,733	$175,947,000	1	16	37	56,166	2,081,381	3	532	2	6
Montana	8	4,084,405	$297,036,000	0	10	25	83,549	1,151,112	5	912	2	3
Nebraska	5	276,617	$10,654,000	0	5	20	171,545	675,568	6	149	1	6
Nevada	3	5,012,902	$195,286,000	1	6	7	141,265	773,396	11	822	3	3
New Hampshire	2	31,476	$1,169,000	1	11	22	4,737	55,877	1	20	1	2

	National Park System Units	Visitors to National Park System Units in 2011	Economic impact from National Park system tourism (in 2010)	National Heritage Areas	National Natural Landmarks	National Historic Landmarks	Hours donated by volunteers (in 2011)	Objects in national park museum collections	Threatened and endangered species in national parks	Archeological sites in national parks	Teaching with Historic Places lesson plans	Discover Our Shared Heritage travel itineraries
New Jersey	9	5,470,987	$157,526,000	1	11	55	18,251	6,137,214	11	421	4	5
New Mexico	13	1,545,616	$67,931,000	1	12	44	80,733	6,407,943	9	8,791	4	5
New York	22	16,349,381	$490,911,000	4	27	262	170,601	3,319,381	11	298	11	10
North Carolina	10	17,310,766	$739,147,000	2	13	38	131,278	2,196,340	22	536	7	7
North Dakota	3	618,446	$31,303,000	1	4	6	22,410	741,607	3	387	2	3
N. Mariana Islands	0	0	$0	0	0	2	3,800	100,065	2	0	0	0
Ohio	7	2,441,236	$68,979,000	2	23	70	178,256	754,445	1	241	5	8
Oklahoma	3	1,174,953	$17,646,000	0	3	21	9,123	169,313	0	78	2	5
Oregon	5	852,258	$55,215,000	0	7	17	19,320	1,009,679	9	149	2	4
Pennsylvania	18	8,424,875	$356,706,000	7	27	164	378,419	10,502,417	2	984	10	6
Puerto Rico	1	1,214,764	$54,976,000	0	5	4	4,692	435,413	0	4	1	0
Rhode Island	1	50,053	$3,334,000	1	1	44	54,848	14,189	0	40	0	2
South Carolina	6	1,574,067	$47,313,000	2	6	76	78,442	1,025,668	5	92	3	5
South Dakota	6	3,811,546	$167,834,000	0	13	16	32,763	531,932	6	411	2	6
Tennessee	12	7,695,502	$548,135,000	1	13	30	206,472	2,987,758	36	1,413	3	5
Texas	13	4,373,534	$237,378,000	0	20	46	139,860	4,057,874	23	3,642	3	7
Utah	13	9,205,114	$617,132,000	2	4	14	125,390	2,077,725	20	6,625	2	2
Vermont	2	28,986	$1,552,000	1	12	17	7,829	39,361	0	19	1	4
Virgin Islands	5	565,824	$67,050,000	0	7	5	15,359	1,031,416	15	152	0	0
Virginia	22	23,348,544	$578,288,000	2	10	119	255,347	3,999,970	21	1,555	9	11
Washington	13	7,394,826	$264,320,000	0	17	24	253,794	5,074,200	14	940	3	4
Washington DC	23	28,966,981	$1,006,427,000	0	0	75	181,528	3,463,834	4	153	8	6
West Virginia	6	1,486,136	$65,259,000	3	13	16	368,892	6,262,446	5	382	1	4
Wisconsin	2	304,348	$20,111,000	0	18	41	79,785	473,134	5	269	1	4
Wyoming	7	5,982,465	$616,613,000	0	6	24	127,449	5,919,548	3	2,055	1	0

Source: National Park Service State Summaries: http://www.nps.gov/findapark/index.htm#

Table A2.2 – Highlights of National Park Service System Units and Program Activities by State

	Acres transferred by Federal Lands to Parks for local parks & recreation (since 1948)	Land & Water Conservation Fund grants (since 1965) [1]	Historic preservation grants [1]	Dollars of historic rehabilitation projects stimulated by tax incentives (since 1995)	National Register of Historic Places listings	Places recorded by heritage documentation programs	Community conservation & recreation projects (since 1987)	World Heritage Sites	Certified Local Governments
Alabama	4,073	$64,101,801	$32,029,577	$366,619,987	1,248	1,230	26	0	31
Alaska	266	$34,198,938	$23,442,633	$25,642,152	410	517	84	1	13
American Samoa	0	$1,040,714	$7,206,703	0	24	0	0	0	0
Arizona	832	$58,499,812	$21,978,392	$74,282,151	1,394	548	57	1	29
Arkansas	864	$48,247,381	$28,056,760	$138,541,945	2,544	163	14	0	19
California	14,050	$288,152,638	$50,634,972	$2,098,220,255	2,516	3,421	162	2	61
Colorado	3,014	$59,594,798	$27,190,588	$395,955,599	1,415	888	66	1	50
Connecticut	297	$63,195,093	$25,736,231	$637,911,903	1,561	638	41	0	44
Delaware	2,444	$36,289,038	$18,300,414	$127,930,448	684	391	17	0	5
Florida	12,061	$129,555,789	$32,157,790	$833,895,337	1,629	695	46	1	60
Georgia	3,862	$81,926,765	$33,050,439	$596,689,876	2,049	934	45	0	83
Guam	88	$2,227,258	$8,769,717	$0	122	6	0	0	0
Hawaii	368	$38,622,713	$15,586,859	$8,481,512	331	840	30	2	2
Idaho	2,915	$39,044,964	$19,704,046	$20,521,350	1,021	367	33	0	34
Illinois	5,096	$155,338,937	$29,449,345	$1,582,496,832	1,729	947	58	1	72
Indiana	15,998	$84,333,812	$21,669,833	$729,723,041	1,731	454	43	0	19
Iowa	906	$54,278,713	$25,311,146	$540,253,611	2,156	481	54	0	107
Kansas	1,026	$50,416,387	$17,084,435	$238,956,044	1,253	221	13	0	15
Kentucky	7,498	$59,392,965	$34,838,933	$19,637,125	3,308	400	25	1	23
Louisiana	1,125	$71,512,081	$25,493,778	$1,655,334,833	1,355	609	38	0	45
Maine	273	$40,828,858	$18,981,506	$145,076,533	1,544	387	76	0	10
Maryland	1,550	$78,814,087	$35,866,364	$1,296,336,305	1,499	1,777	79	0	19
Massachusetts	6,835	$97,645,792	$42,999,763	$2,155,047,585	4,185	1,629	57	0	18
Michigan	4,504	$128,816,202	$30,353,042	$1,258,269,985	1,776	624	63	0	22
Minnesota	508	$71,314,823	$27,832,629	$469,437,608	1,604	563	60	0	42
Mississippi	805	$46,348,638	$26,324,352	$4,218,813,533	1,344	350	25	0	62
Missouri	6,337	$84,433,977	$28,399,516	$3,674,570,547	2,110	1,377	45	0	52
Montana	120	$37,624,396	$22,425,607	$50,601,777	1,098	448	27	2	15
Nebraska	1,152	$44,755,840	$17,869,733	$303,564,986	1,025	113	48	0	7
Nevada	432	$40,716,768	$18,970,037	$7,290,996	367	415	42	0	4
New Hampshire	184	$36,508,412	$17,816,487	$46,900,212	732	281	67	0	18

	Acres transferred by Federal Lands to Parks for local parks & recreation (since 1948)	Land & Water Conservation Fund grants (since 1965) [1]	Historic preservation grants [1]	Dollars of historic rehabilitation projects stimulated by tax incentives (since 1995)	National Register of Historic Places listings	Places recorded by heritage documentation programs	Community conservation & recreation projects (since 1987)	World Heritage Sites	Certified Local Governments
New Jersey	2,164	$119,539,924	$24,045,045	$690,328,711	1,620	1,578	45	1	45
New Mexico	1,816	$41,402,335	$25,561,088	$57,254,405	1,086	270	50	3	8
New York	6,452	$234,454,498	$62,228,241	$3,014,502,775	5,379	1,993	83	1	75
North Carolina	250	$79,653,135	$33,405,197	$1,047,358,480	2,762	551	36	1	51
North Dakota	155	$34,979,733	$15,072,385	$40,517,883	422	126	6	0	7
N. Mariana Islands	0	$409,859	$7,737,712	$0	37	0	0	0	0
Ohio	2,623	$146,687,757	$40,940,121	$1,815,290,106	3,809	887	52	0	53
Oklahoma	1,965	$55,563,415	$21,903,778	$248,706,980	1,202	111	20	0	13
Oregon	3,492	$58,590,922	$21,820,069	$550,415,521	1,922	490	86	0	40
Pennsylvania	9,721	$163,817,247	$53,506,548	$2,748,275,929	3,292	3,746	137	1	44
Puerto Rico	4,718	$42,892,870	$14,005,922	$0	303	165	1	1	0
Rhode Island	1,987	$39,856,280	$27,235,223	$950,104,843	758	464	22	0	16
South Carolina	7,850	$58,966,737	$29,392,802	$278,915,995	1,470	1,150	24	0	32
South Dakota	201	$36,913,470	$20,384,620	$69,359,281	1,278	101	13	0	19
Tennessee	3,309	$72,872,040	$28,686,107	$559,463,709	2,012	383	44	1	32
Texas	8,618	$177,411,214	$40,537,691	$983,705,799	3,113	874	102	0	66
Utah	2,765	$48,553,517	$22,109,160	$194,753,274	1,522	657	51	0	89
Vermont	190	$33,315,420	$21,932,036	$175,194,284	807	149	58	0	14
Virgin Islands	2	$2,295,578	$10,611,459	$0	88	183	0	0	0
Virginia	5,635	$82,694,213	$55,955,548	$2,012,325,375	2,840	1,958	101	1	31
Washington	9,936	$71,130,788	$28,936,988	$556,781,454	1,452	794	108	1	50
Washington DC	0	$14,425,124	$25,307,551	$561,432,273	532	1,003	14	0	0
West Virginia	531	$44,578,124	$23,178,401	$153,148,222	1,005	504	67	0	52
Wisconsin	3,202	$75,754,197	$28,028,819	$589,254,286	2,231	761	68	0	67
Wyoming	793	$34,012,960	$18,836,952	$14,943,711	516	516	14	1	23

Source: National Park Service State Summaries: http://www.nps.gov/findapark/index.htm#

[1] These dollar values do not include any NPS appropriations.

Table A3. Details of National Park Service Valuation Studies

Study	Type of values	Scope of survey	Method	Payment vehicle	WTP question format	Survey mode	Who was surveyed	Sample size	Response rate
Choi & Marlow 2012	TEV	Single unit	Other	NA	NA	NA	NA	NA	NA
Douglas & Harpman 2004	Use, passive use	Single unit	CVM	Entrance fee/pass	Dichotomous choice	In person	Visitors	1498	50%
Duffield et al. 2010	Use	Single unit	CVM	Travel cost, entrance fee	Payment card, dichotomous choice	In person	Visitors	1512	64%
Heberling & Templeton 2009	Use	Single unit	TCM	Travel cost	NA	Combination (mail back survey distributed in person)	Visitors	314	76%
Kaval & Loomis 2003	Use	Multiple units	Meta-analysis	NA	NA	NA	NA	1239 values (200 papers)	NA
Kerkvliet et al. 2002	Use	Single unit	TCM	Travel cost	Dichotomous choice	Combination (mail back survey distributed in person)	Visitors	386	35%
Leggett et al. 2003	Use	Single unit	CVM	Entrance fee	Payment card, dichotomous choice	In person (self-administered, collected onsite)	Visitors	854	90%
Parsons et al. 2009	Use	Single unit	TCM, reported trips	NA	NA	Combination (phone recruit, mail form, collect data by phone)	Households	1012	87%
Richardson & Loomis 2004	Use	Single unit	Contingent visitation	NA	NA	Combination (mail back survey distributed in person)	Visitors	1266	76%
Schulze et al. 1983, 1985	Use, passive use,	Multiple units	CVM	Higher electric bills	Payment card	In person	Households	600	Not reported
Turner & Willmarth 2009	Passive use	Single unit	Contingent choice	Tax	Contingent ranking	Internet	Individuals	240	Not reported
Welsh et al 1997	Passive use	Single unit	CVM	Tax, higher electric bill	Dichotomous choice	Mail	Households	5950	66%-Nat'l, 75%-mkt

General Outline of Survey

- Front Cover – common to both versions
  - Title of Survey (e.g. Your National Park Service: What Do You Think?)
  - Photo(s)
  - University logo(s)
- Part 1 – common to both versions
  - Introduction to survey
  - Description of public goods/government services
    - National defense
    - U.S. Highways and Interstate Highways
    - National Park Service
    - Space program
    - Threatened and endangered species protection
    - Air and Water Quality
  - Scale rating the importance of the public goods (Likert scale or similar) e.g. "On a scale of 1 to 5 (where 1 is not at all important and 5 is very important) please indicate how important each of these public goods is to you:"
    - National defense
    - U.S. Highways and Interstate Highways
    - National Park Service
    - Space program
    - Threatened and endangered species protection
    - Air and Water Quality
- Part 2
  - Description of National Park Service - general (same for both survey versions), include mission, information on community impacts, natural services
    - Units Version: Description of NPS system units
    - Programs Version: Description of NPS programs
  - Units Version: Scale rating the importance of the National Park Service system units (Likert scale or similar) e.g. "On a scale of 1 to 5 (where 1 is not at all important and 5 is very important) please indicate how important each of these types of National Park Service system units is to you:"
    - National Parks
    - National Monuments
    - Etc.
  - Programs Version: Scale rating the importance of the National Park Service programs (Likert scale or similar) e.g. "On a scale of 1 to 5 (where 1 is not at all important and 5 is very important) please indicate how important each of these types of National Park Service programs is to you:"
    - Historic preservation programs
    - Recreation access programs
    - Programs for the conservation of natural resources
- Part 3
  - Alternatives:
    - status quo (current units or current programs),
    - option(s) expansion of NPS system units or expansion of NPS programs
  - Explanation of why, who would pay, how respondent would pay, for how long etc.
  - Cheap talk script

- Choice experiment – Units Version example:

	Option A (status quo)	Option B
Type of NPS System Unit 1	Current acres	Additional acres
Type of NPS System Unit 2	Current acres	Current acres
Type of NPS System Unit 3	Current acres	Current acres
Cost to your household per year for 5 years	$0	$5
I would choose:	☐	☐

- Choice experiment – Program Version example:

	Option A (status quo)	Option B
Type of program 1	Current outcome	Additional outcome
Type of program 2	Current outcome	Current outcome
Type of program 3	Current outcome	Current outcome
Cost to your household per year for 5 years	$0	$5
I would choose:	☐	☐

- Certainty questions – e.g. "On a scale from 1 to 10, where 1 is 'very uncertain' and 10 is 'very certain,' please indicate how certain you are that you would actually choose the option you selected above:"

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

- Tax reallocation question – will be specific to version (Units or Programs)
- Questions about respondents' use of National Park Service system units – common to both versions

- Part 4 – Demographics common to both versions
  - Are you male or female?
  - Age
  - Are you retired?
  - What is your zip code?
  - Membership in environmental organizations
  - Highest level of education
  - Do you work outside the home?
  - Children in household
  - Race
  - Income
- Back Cover
  - Photo (or not)
  - If you have any additional comments please write them here.
  - Thank You

Map insert – show National Park Service units (would we want this for both?)