



Ferne Clyffe State Park

State Parks & Historic Sites

Measuring Intangible Benefits

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$$\text{ROI} = \frac{\text{Benefit} - \text{Cost}}{\text{Cost}}$$

- Perspective
 - Private, Public, Social
- Best practices
 - “but for” Benefits
 - Opportunity Cost
- Economic & Fiscal Benefits
 - Activities: Construction, O&M, Visitor Spending
 - Value Added, Fiscal Revenue

Table 3.9. Number and share of visitors from similar trails

	State	Number of visitors	Nonlocal visits	Overnight visits	Connectivity	
Grand County Trails	Colorado	2,000,000 non-local visits	44%	49%	Rocky Mountain National Park	5,694 jobs
Pikes Peak Region	Colorado	1,653,094	58%	78%	Pike National Forest	373 jobs
Steamboat Springs Trails	Colorado	31,300 - 43,500 non-local visits	44%	97%	Routt National Forest	300-400 jobs
Centennial Trail	Idaho	417,118	10%	-	-	54 jobs
Olympian Trail	Idaho	10,000 - 20,000	-	-	-	-
Route of the Hiawatha	Idaho	32,000	-	-	-	-
Missoula County	Montana	128,023 non-local visits	-	34%	-	-
Organized bicycle tourism events	Nebraska	20,000	-	90%	-	1,235 - 4,526 jobs
PIKE2BIKE	Pennsylvania	25,000 - 225,000 non-local visits	-	5%-5.7%	Buchanan State Forest	50 jobs (upper bound)
Snowmobile Trail System	South Dakota	-	-	-	-	1,449 jobs
Creeper Trail	Virginia	130,172	45%	27%	Cherokee National Forest	27 jobs
Teton County Trail System	Wyoming	222,533	44%	32%	Bridger-Teton National Forest	194 jobs

Aadland, D., Khalaf, C., & Zapata-Moran, I. (2021). Examining the Regional Economic Impact of the Pilot Hill Project and a Valuation of its Latent Attributes.

National Park Visitor Spending Effects

Table A-3. NPS visits, spending and economic contributions to state economies – 2022.

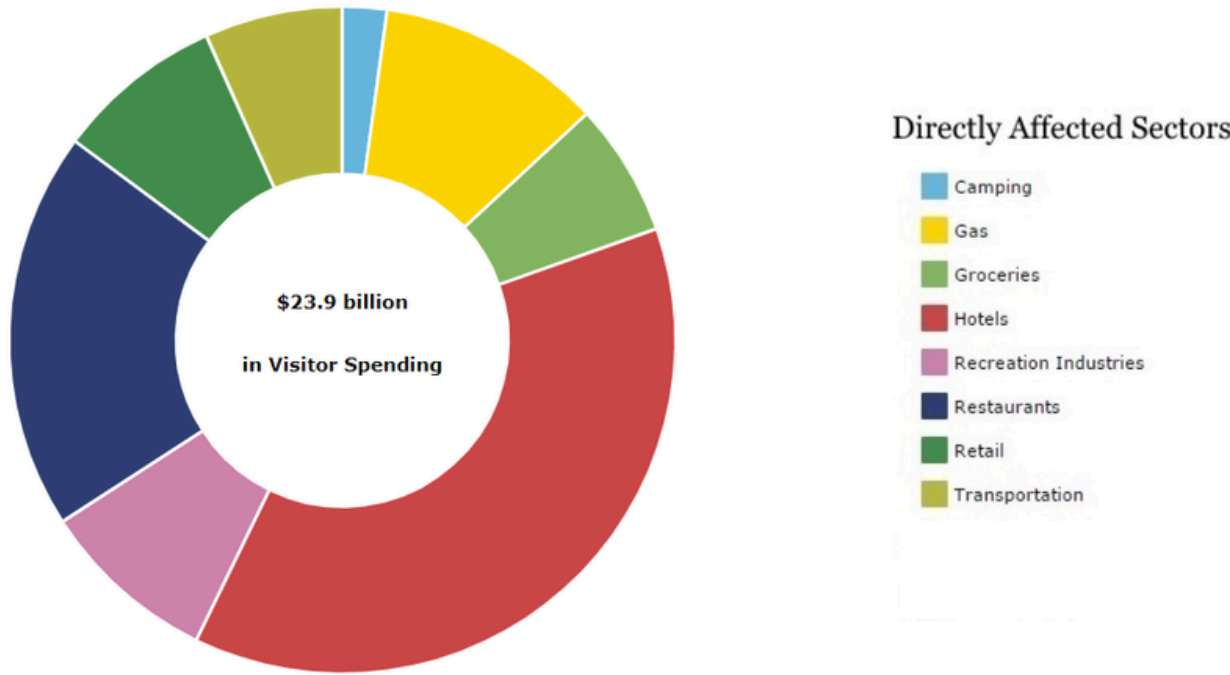
State	Total Recreation Visits	Total Visitor Spending (\$Millions, \$2022)	Jobs	Labor Income (\$Millions, \$2022)	Value Added (\$Millions, \$2022)	Economic Output (\$Millions, \$2022)
Alabama	1,294,952	\$88.4	1,340	\$39.0	\$63.3	\$121.2
Alaska	2,023,881	\$1,160.6	16,450	\$646.5	\$1,006.9	\$1,785.8
American Samoa	1,887	\$0.1	1	\$0.1	\$0.1	\$0.2
Arizona	10,276,078	\$1,151.7	16,418	\$644.8	\$1,089.4	\$1,880.1
Arkansas	4,279,263	\$278.2	3,895	\$106.9	\$191.4	\$362.0
California	38,237,342	\$2,747.5	34,935	\$1,750.5	\$2,794.6	\$4,489.9
Colorado	7,434,362	\$803.6	11,312	\$476.5	\$777.6	\$1,291.4
Connecticut	37,977	\$2.5	29	\$1.5	\$2.3	\$3.6
District of Columbia	39,440,786	\$973.0	9,140	\$486.6	\$782.9	\$1,144.4
Florida	14,399,362	\$947.5	13,149	\$489.0	\$835.6	\$1,458.7
Georgia	6,616,113	\$381.9	5,438	\$191.6	\$321.8	\$569.9
Guam	380,578	\$25.1	258	\$11.7	\$21.0	\$32.4
Hawaii	4,887,315	\$566.1	5,931	\$273.4	\$519.0	\$786.0
Idaho	696,380	\$39.4	558	\$17.0	\$28.3	\$53.4
Illinois	145,144	\$9.9	131	\$6.0	\$9.7	\$16.0
Indiana	3,063,228	\$155.1	2,007	\$67.7	\$113.9	\$202.2
Iowa	160,226	\$10.9	160	\$4.7	\$7.8	\$14.6
Kansas	98,739	\$5.4	72	\$2.3	\$3.9	\$7.1
Kentucky	1,953,748	\$113.8	1,686	\$53.4	\$84.6	\$157.5

^a Delaware does not include any National Park System units that collect visitor data.

Economic Contributions to the National Economy

In 2022, 312 million park visitors spent an estimated \$23.9 billion in local gateway regions while visiting National Park Service lands across the country. These expenditures supported a total of 378 thousand jobs, \$17.5 billion in labor income, \$29.0 billion in value added, and \$50.3 billion in economic output in the national economy.

Visitor Spending Jobs Labor Income Value Added Economic Output



Total Visitor Spending (All Parks)

National Park Service (2023). 2022 National Park Visitor Spending Effects: Economic Contributions to Local Communities, States, and the Nation.

Social Benefits

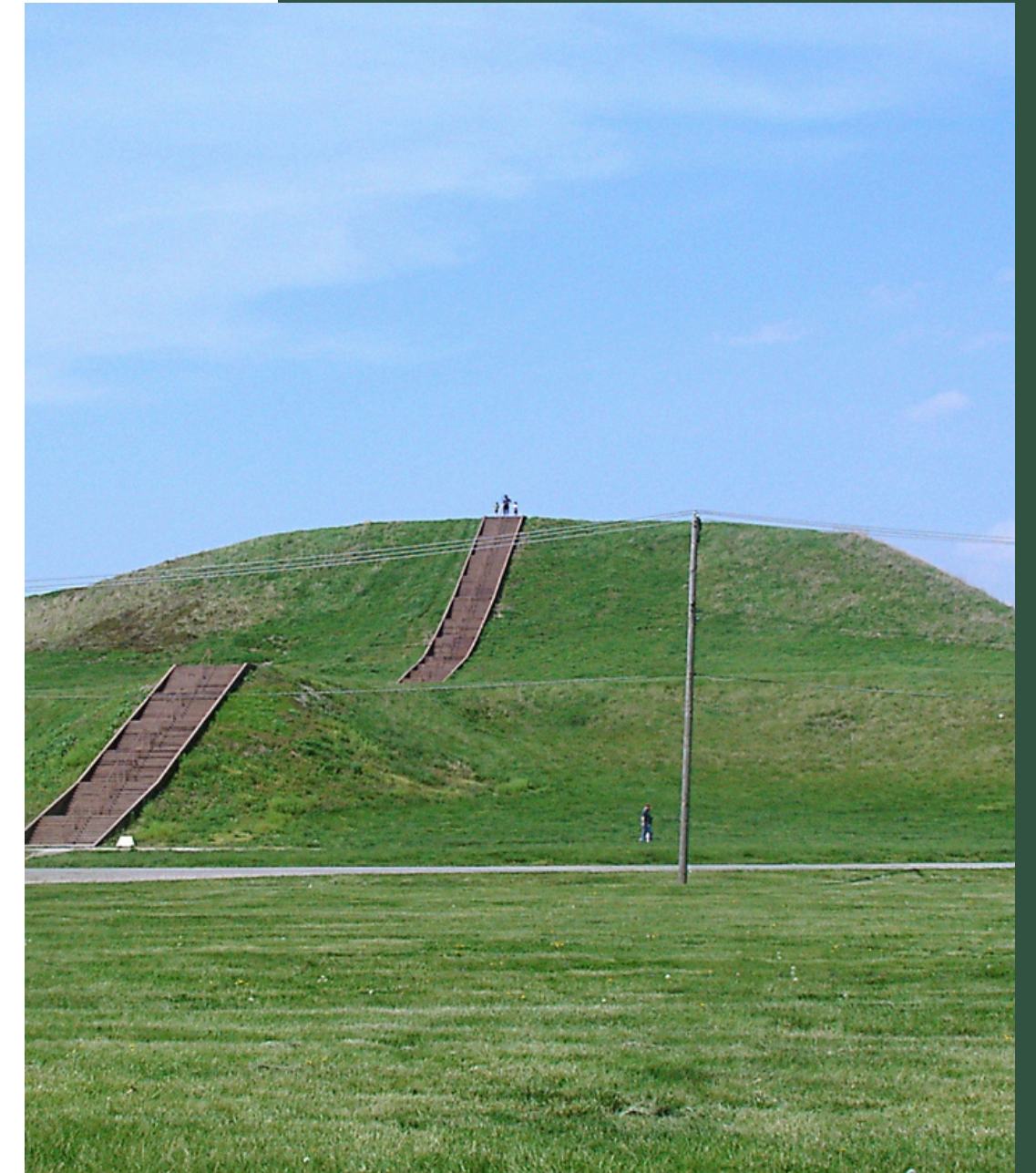
- Recreational Activities
 - Backpacking, Beach Use, Boating, Camping, Diving, Fishing, Hiking, Hunting, Horseback Riding, Mountain Biking, Off-Highway Vehicle, Rock Climbing, Snowmobiling, Swimming, Wildlife Viewing
- Conservation/Preservation
 - Ecosystems, Wildlife, History
- Clean Water & Air



Argyle Lake State Park

Hedonic Pricing

- Uses property sale prices to infer people's WTP for an environmental amenity
- Total price decomposed into implicit prices of characteristics, e.g., proximity to state park
- A property located 100 meters closer to a National Wildlife Refuge than a neighboring property has a price premium of \$984 (Neumann et al., 2009)
- Premium for properties located closer to trailheads: 0.6% for each minute closer in driving time to the nearest trailhead (Gnagey & Grijalva, 2018)



Monks Mound of Cahokia



Moraine Hills State Park

Contingent Valuation

- How much are you willing to pay for x?
 - Take-it-or-leave-it” bid + follow-up question
 - Randomize bids
- Estimate parameters that are then used to calculate average WTP
- Hypothetical bias

Would you be willing to pay \$10 per visit to support the Pilot Hill recreation area as currently planned?

☐ Yes

☐ No

Prev.

Next

Contingent Valuation

Table 1 –

Previous Studies on the WTP, or Similar, for Environmental Preservation

Authors	Publication Year	WTP or Equivalent	Approximate WTP in 2017 Dollars	Payment Schedule	Notes
This Paper		\$77.88-\$408.62	\$77.88-\$408.62	One-time	Expansion of Denali National Park in Alaska by 5%
Stefanski & Shimshack	2016	\$28.07-\$107.50	\$28.07-\$107.50	One-time	Expansion of Flower Garden Banks National Marine Sanctuary in the Gulf of Mexico
Haefele & Loomis	2016	\$1,445-\$2,967 (per household)	\$1,494.03-\$3,067.68	One-time	Value of all National Park programs and entire National Park system.
Petrolia et al.	2014	\$909	\$962	One-time	Louisiana coastal wetlands restoration
Schuhmann	2013	\$41-\$62	\$44.1-\$66.69	Pay for use	Scuba divers and marine biodiversity in Barbados
Bishop et al.	2011	\$249.74 or \$69.98	\$286.27or \$80.22	Annually	Protecting and restoring Hawaiian coral
Baranzini et al.	2010	\$45 or \$60	\$51.71 and \$68.95	Annually	Amazon tropical forest conservation
Ransom & Mangi	2010	\$3.10 or \$15.00	\$3.65 or \$17.65	Admission Fee	Kenyan coral reefs for recreation
Togridou et al.	2006	€5	\$7	Open ended	Greek National Marine Park
Carson et al.	2003	\$30-\$60	\$41.68-\$111.15	One-time	Exxon Valdez oil spill in Alaska
Amigues et al.	2002	\$7.00-\$25.00	\$9.67-\$34.55	Annually	5-year program, preservation of Garonne River near Toulouse, France
Hall et al.	2002	\$6	\$8.36	Annually	California rocky intertidal ecosystems
Lee & Han	2002	\$5-\$14	\$6.96-\$19.50	Admission Fee	South Korean National Park
Giraud et al.	2002	\$61.13	\$85.15	Annually	Program for Stellar sea lion
Jakobsson & Dragun	2001	\$29 or \$118	\$41.36 or \$168.29	Annually	Conservation of possum and endangered flora and fauna in the state of Victoria, Australia
Loomis et al.	2000	\$21	\$30.56	Monthly	Restoring ecosystem services of Platte river basin in Nebraska area
Berrens et al.	2000	\$25 or \$55	\$36.38 or \$80.04	Annually	New Mexico instream flows
White & Lovett	1999	£119.05	\$252.48	Annually	Preservation of 11 National Parks in the UK
Bateman & Langford	1997	£23.29	\$53.50	Annually	Preservation of a National Park in the UK
Hadker et al.	1997	₹.50	\$0.33	Monthly	Preservation of a National Park in India
Bateman et al.	1996	£9.94	\$22.83	Annually	Providing local recreation spaces in the UK
Carson et al.	1994	\$80	\$138.13	One-time	Conservation zone in National Park in Australia
Loomis & Larson	1994	\$16.18-\$18.14, \$25.00-\$29.73	\$28.90-\$32.40, \$44.65-\$53.10	Annually	Increasing Gray-Whale population
Carson & Mitchell	1993	\$106, \$80, or \$89	\$183.82, \$138.73, or \$154.34	Annually	Clean boating, fishing, swimming water in the United States
Willis & Garrod	1993	£24.56	\$68.31	Annually	Cleaning Yorkshire Dales in the UK

Johnson et al.

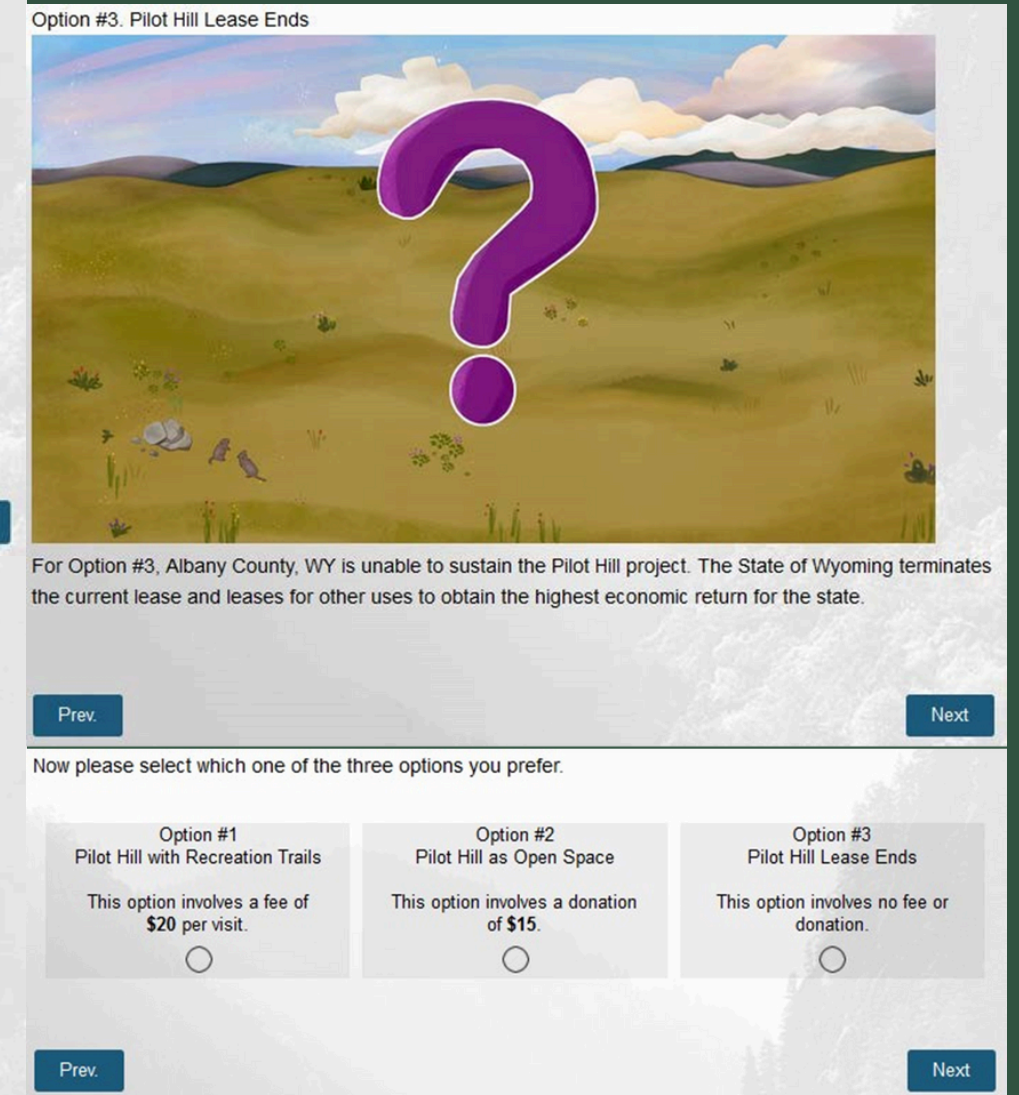
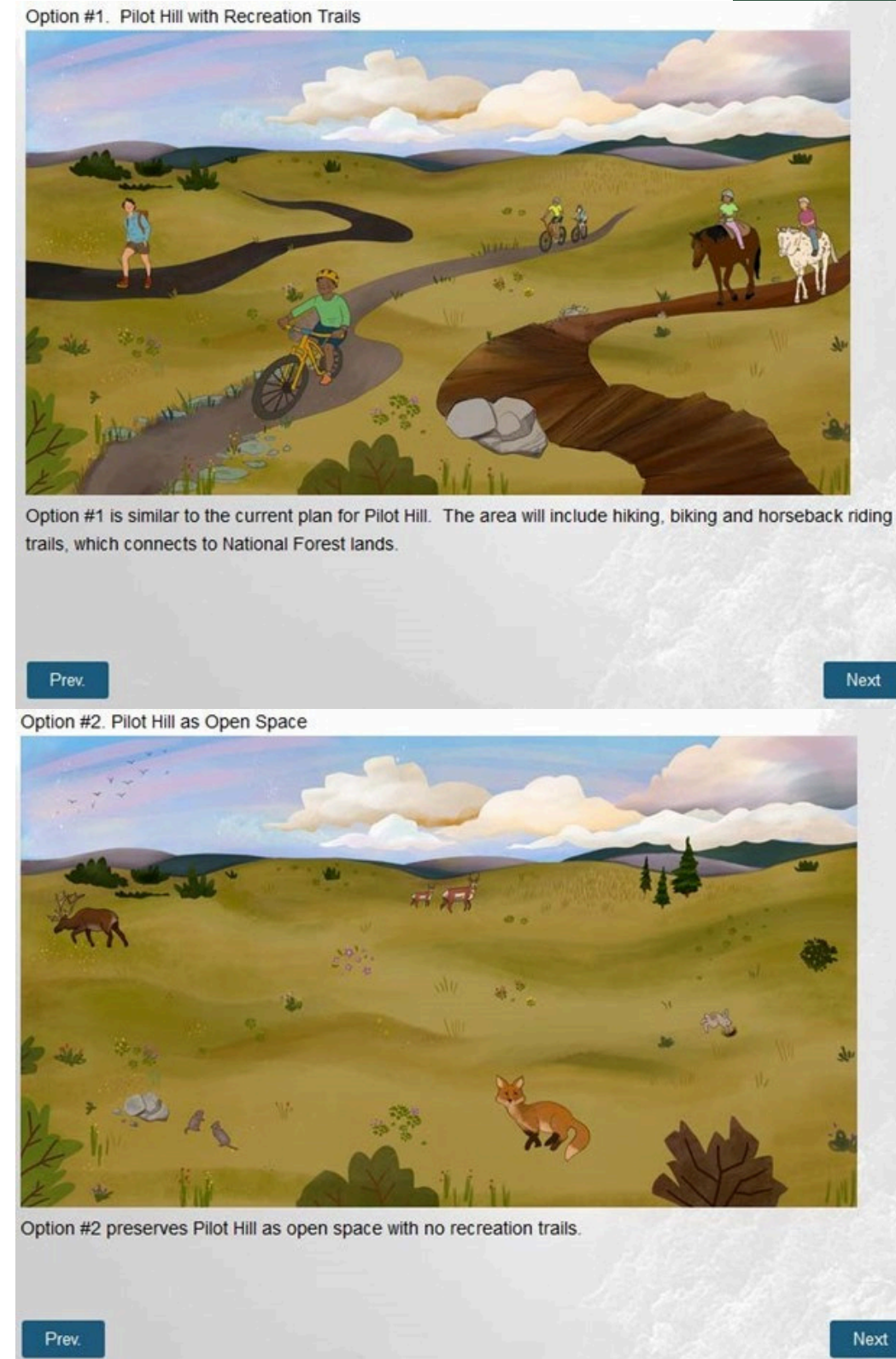
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- A policy proposal to increase the size of Denali National Park in Alaska by 5%, or 325,340 acres
- WTP = \$77 to \$409
- This is estimated to be a total WTP of \$15.1 billion to \$79.3 billion for all individuals aged 18 to 64 in the U.S.

Johnson, L., Spanbauer, M., & Button, P. (2019). How Valuable are National Parks? Evidence From a Proposed National Park Expansion in Alaska. Journal of Park and Recreation Administration, 37(2).

Choice Experiments



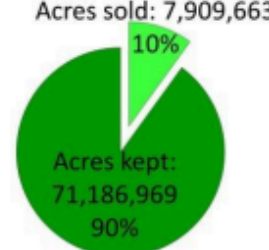


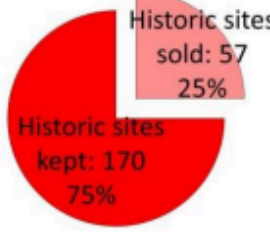




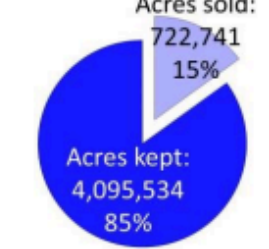

- Select preferred bundle
- More complex to design & analyze



Aadland, D., Khalaf, C., & Zapata-Moran, I. (2021). Examining the Regional Economic Impact of the Pilot Hill Project and a Valuation of its Latent Attributes.

Choice Experiments










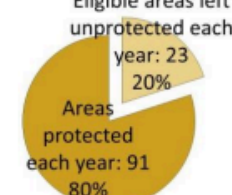
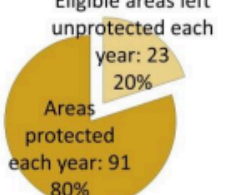
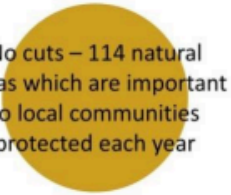

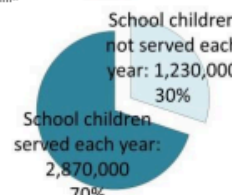
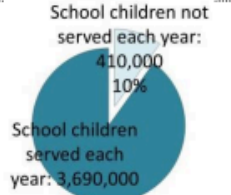

- Survey of a sample of U.S. households
- Participants were asked their WTP in increased annual federal income taxes over 10 years
- Estimate of the total economic value to the American public is \$92 billion
- Two-thirds of this total (\$62 billion) is for National Park lands, waters and historic sites; the remaining \$30 billion is attributed to programs

	Option A Sale of some land in all parks	Option B Smaller land sales in some or all parks	Option C No sale of park lands
 National Park areas that focus on the preservation of nature and nature-based recreation.			
 National Park areas that focus on the preservation of American history and culture.			
 National Park areas that focus on protecting shorelines and bodies of water.			
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"/>

Haefele, M., Loomis, J. B., & Bilmes, L. (2016). Total Economic Valuation of the National Park Service Lands and Programs: Results of a Survey of the American Public.

Choice Experiments

- Calculating National Total Economic Value assumed zero benefits for 82% of households

OPTIONS FOR PROGRAMS IN COMMUNITIES			
Options D and E are proposals to make cuts or reductions to some or all types of programs in local communities. Option F would keep all programs in local communities at their current levels.			
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 Smaller cuts to some or all 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
6. Select Your Single Most Preferred Option:	Option D <input type="checkbox"/>	Option E <input type="checkbox"/>	Option F <input type="checkbox"/>
7. Select Your Single Least Preferred Option:	Option D <input type="checkbox"/>	Option E <input type="checkbox"/>	Option F <input type="checkbox"/>

Haefele, M., Loomis, J. B., & Bilmes, L. (2016). Total Economic Valuation of the National Park Service Lands and Programs: Results of a Survey of the American Public.

Benefit Transfer Analysis

- Transfer existing benefit estimates from studies already conducted to make inferences about the value of similar goods or services
- Accuracy depends on similarity & quality of research

Table 5.1. Nonmarket Economic Valuation by Activity and Use Scenario				
	Meta-Regression Function Transfer Values	Low Use	Medium Use	High Use
Hiking	\$56.32	\$1,689,600	\$3,379,200	\$5,068,800
Mountain Biking	\$46.28	\$1,388,400	\$2,776,800	\$4,165,200
Wildlife Viewing	\$52.84	\$1,585,200	\$3,170,400	\$4,755,600

Table 5.2. Nonmarket Economic Valuation of Clean Water		
	Minimum	Maximum
WTP per Household/Year 2020 USD	\$37	\$238
Albany County Valuation	\$585,034	\$3,796,347

Aadland, D., Khalaf, C., & Zapata-Moran, I. (2021). Examining the Regional Economic Impact of the Pilot Hill Project and a Valuation of its Latent Attributes.

Which method to use?

Table 3. Valuation methods and estimates relevant to ecosystem services. Please note that this table presents illustrative examples of valuation methods and estimates rather than a comprehensive list.

These valuation methods and estimates*...	May be applicable to value these ecosystem services:
Revealed preference/indirect use	Water supply for recreation income, real estate value, drinking, energy production, and agriculture
	Water quality maintenance for real estate value, drinking, and energy production
	Wildfire risk reduction for timber production and property protection
	Pollination for farmland value and crop productivity
	Pest control for crop productivity
	Nature for aesthetics in viewsheds; wildlife, places for recreation income, and recreation opportunities
	Flood risk reduction for property protection
	Air quality for real estate value
Revealed preference/direct use	Productivity for timber, fish, crops, or other products
Stated preference	Water quality maintenance for recreation opportunities
	Wildlife, places or features for recreation opportunities or existence
	Air quality for recreation opportunities
Revealed or stated preference or health utility	Water quality maintenance for non-fatal physical health risks
	Wildfire risk reduction for non-fatal physical health risks
	Pest control for non-fatal physical health risks
	Nature exposure for non-fatal mental health risks
	Flood risk reduction for non-fatal physical health risks
Value of statistical life or value of statistical life years	Air quality or cooling for non-fatal physical health risks
	Wildfire risk reduction for fatality
	Flood risk reduction for fatality
Social cost of greenhouse gases	Air quality or cooling for fatality
	Greenhouse gas effects on various services

* See Circular A-4 for more detail on these methods and estimates.

OMB. (2023). Guidance for Assessing Changes in Environmental and Ecosystem Services in Benefit-Cost Analysis.

Data Availability

Accuracy Needs

Capacity Constraints

THANK YOU!

Rock Cut State Park

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