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How Valuable are National Parks? Evidence from a Proposed National Park Expansion in Alaska

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Abstract

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Keywords: National Parks; willingness-to-pay; nature conservation; contingent valuation; biodiversity; environmental policy
JEL codes: Q24, Q28, Q51, Q57, Q58, R52.

How Valuable are National Parks? Evidence from a Proposed National Park Expansion in Alaska.

By Michael Spanbauer, Lindsay Johnson, Patrick Button *

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In 1916, President Woodrow Wilson created the National Park Service as a bureau under the Department of the Interior, which manages all National Parks, national monuments, and natural and historical areas.[1] Today, the National Park Service draws an annual budget of approximately $2.3 billion and employs more than 20 thousand individuals. These government employees care for 84 million acres of land, 54 million of which are located in Alaska.[2]

Alaska is outside the Contiguous United States (CONUS), and therefore does not have frequent visits from the majority of American taxpayers. It does, however, possess a rich history of oil pipelines and oil exploration which primarily dates back to the construction of the Trans-Alaska Pipeline System in the mid 1970s. Not only was it one of the longest pipelines ever constructed at the time, it was also one of the most controversial due to its crossing of traditional Native Alaskan land, concerns about its effect on the delicate arctic tundra, and other unique aspects of the Alaskan wilderness. A similar debate has occurred recently over the Dakota Access Pipeline. Proponents have argued that the pipeline would lower oil production costs and offer improved safety over existing rail-transport systems. Those opposed to the pipeline argue that it would desecrate tribal lands, endanger the water supply and thus be a cost to the Standing Rock Sioux tribe without providing the tribe an economic benefit.[3]

In the interest of balancing government spending and environmental preservation, it is critical to evaluate how taxpayers value national park land and for what they are valuing it. Since 64.3 percent of National Park acreage is located in remote Alaskan terrain, a crucial component of this evaluation is estimating the park's value for citizens who will never directly utilize it. Bateman and Langford (1997) describe this non-use value as being comprised of two categories: *bequest value*, or the value of passing the National Park to future generations, and *existence value*, or the value of preserving a wildlife habitat. Non-use value is also broadly referred to in the economics literature as *passive use value*.[4] The primary method for

[1] `https://www.nps.gov/aboutus/history.htm` United States National Park Service (2015a). U.S. National Park Service-Alaska Regional Office- Alaska Parks. U.S. Department of the Interior Web. 13 Dec.2015.

[2] `https://edit.doi.gov/sites/doi.gov/files/uploads/2017_Highlights_Book.pdf` United States National Park Service (2015b). History (U.S. National Park Service). U.S. Department of the Interior Web. 13 Dec. 2015.

[3] See, for example, `https://www.nytimes.com/2016/11/30/learning/lesson-plans/battle-over-an-oil-pipeline-teaching-about-the-standing-rock-sioux-protests.html?_r=0`.

[4] This term was adopted by the United States Federal Court of Appeals to describe the existence value of an object. See *Ohio v United States Department of Interior, 880 F.2d 432*, available

estimating passive use values is contingent valuation. This method uses a survey approach to determine how much an individual is willing to pay for a particular good.

A number of studies use contingent valuation methods to identify a consumer's willingness to pay (WTP) for environmental goods: however few focus on the passive use values of remote wilderness preservations. Studies often focus instead on local environmental issues (*e.g.* Hanley and Craig (1991), Bateman and Langford (1997), Amigues et al. (2002)) or preserving readily-accessible National Parks (*e.g.* Bateman et al. (1992), Willis and Garrod (1993), Hadker et al. (1997), Bateman and Langford (1997), White and Lovett (1999)). Alaska provides a unique example of National Park land where the vast majority of Americans will never physically see or directly utilize it, similar to Stefanski and Shimshack's (2016) study of the passive use for a remote marine sanctuary.

To estimate the national average WTP for Alaskan National Parks, we conducted a survey of 753 people and then estimate upper and lower bounds for their WTP using the contingent valuation method. The survey respondents indicate if they would be willing to pay a one-time tax to the federal government, which would be added to their federal taxes in a single year for the purpose of expanding a single Alaskan National Park by 325,340 acres, or roughly five percent. Following the contingent valuation method, respondents are randomly given a price ($4, $10, $20, $40, $80, or $120) and asked if they would be willing to pay for it. If they say yes, then they are asked if they would pay double this amount, or half if they say no. This allows us to create an upper and lower WTP bound for those that say (yes, no) or (no, yes). For those that indicate that they would be willing to pay some amount (they answer "yes" at least once), we ask them why they value national park land in order to learn what motivates their WTP.

Results from our preferred specifications indicate that individuals value our proposed national park expansion at $115 to $409, which is a larger WTP than most of the environmental literature. This difference is likely caused by our proposed method of payment, which required only a one-time payment rather than a perpetual monthly or annual fee. Responses to

at `www.doi.gov/sites/doi.gov/files/migrated/restoration/upload/laws_Ohio1989.pdf` (accessed 10 July 2017). This term was subsequently used in economics literature to describe various values, including the 'existence-,' 'preservation-,' 'stewardship-,' 'bequest-,' 'inherent-' and 'option-value' (Bateman and Willis 2001)

questions about attitudes toward environmental connection and questions about connection to Alaska indicate that this value is driven by passive use. We use several different empirical specifications and find that estimates are either similar or are larger, indicating high passive use values amongst a nationally representative[5] sample of individuals.

I. Background and Literature

A. The U.S. National Park System and National Parks in Alaska

In March of 1872, with the creation of Yellowstone, the United States became the first country to create a national park. Advocates like John Muir and Theodore Roosevelt argued that national parks were an expression of democracy at its best. The U.S., as a part of the new world, offered vast wilderness, great ecological treasures and sacred landscapes. Americans viewed their land as the last great wilderness and seized the unique opportunity to protect it. Proponents explained national parks could be the environmental monuments of the United States, contrasted to the architectural monuments of Europe. Furthermore, unlike many of the European monuments, national parks would be accessible to all Americans, not just the wealthy[6]. Today, the National Park Service comprises more than 400 areas spanning the 50 states, the District of Columbia, American Samoa, Guam, Puerto Rico, and the Virgin Islands[7]

Charles Sheldon worked to establish a park around Mount McKinley, succeeding on February 26, 1917 when President Woodrow Wilson signed the bill creating Mount McKinley National Park (renamed Denali National Park by President Obama in 2015) (Nash 2001; Davis 2015). In 1980, the U.S. Congress passed the Alaska National Interest Lands Conservation Act, designating 104 million acres as either national parks, forests, or preserves and also protecting 50 million more acres as wilderness. Mount McKinley National Park was renamed Denali National Park and Preserve after being expanded from 2 million acres to 6 million. Property rights were retained throughout the preserve, as were hunting and trapping rights in some sections (Clynes 2016).

In Alaska today, the government and the National Park Service play a huge role in

[5]Sample is nationally representative following our raking procedure, as discussed in Section II.A.
[6]`http://www.pbs.org/nationalparks`
[7]`https://www.nps.gov/aboutus/faqs.htm`

determining land use because the federal government owns 60 percent of the land in Alaska. There are currently 15 national parks in Alaska, which protect over 54 million acres of land.[8] Alaska is not only unique for how much land is managed by the National Park Service, but it is also unique for how few Americans will visit it.

Despite being unused by the majority of Americans, supporters of National Parks argue for its benefits. These benefits include its role as a critical habitat for endangered species, its biological diversity, and its carbon sequestration. The park also provides natural resources for Alaskan Natives to continue their subsistence living and cultural traditions on historically important lands. Finally, the park provides recreational activities and tourism jobs while also preserving unique American wilderness and beautiful landscapes. Critics of Alaskan National Parks, including many Alaskan residents, argue national parks harm commercial fishing activities, prevent oil development, stifle job creation, slow the economy for local residents, and stop potential development that locals may desire.

B. Related Literature

As previously discussed, a number of studies use contingent valuation methods to identify a consumer's willingness to pay (WTP) for environmental goods. These studies often focus instead on local environmental issues or preserving readily-accessible National Parks rather than measuring the passive use value of physically remote wilderness preservations. Our research contributes to the existing base of literature by examining a National Park that will never be seen or utilized by the vast majority of Americans, similar to the study conducted by Stefanski and Shimshack 2016 regarding a remote marine sanctuary.

Appendix Table A7 summarizes several prominent environmental economic publications which use Contingent Valuation methods. It can be seen that WTP values for National Parks and nature preservations range from as little as $0.33 per month up through $252.48 per year, in 2017 dollars. Studies focusing on local environmental protection efforts found smaller WTP values, between $9.67 and $43.62 in 2017 dollars. It can be seen that the existing body of literature focuses on recurring annual or monthly payments, with the exception being Stefanski and Shimshack 2016; they use a single-payment scheme and find a WTP of $28-107

[8] `https://www.nps.gov/aboutus/history.htm` United States National Park Service (2015a)

for marine sanctuary expansion. We follow the methods set by Stefanski and Shimshack 2016 and employ a single-payment scheme for our analysis.

II. Questionnaire Design

Our questionnaire is designed around a realistic policy proposal which would increase the size of Denali National Park in Alaska by 5%, or 325,340 acres. Similar park expansions have occurred regularly since the establishment of the National Park Service. In 2014, congress passed a bill with bipartisan support that included the largest expansion to the National Park Service since 1978. The bill designated seven sites as official national park units, adding about 120,000 acres to be managed by the park service. Despite being larger in magnitude than past expansions, our proposal is still realistic; the land we propose to include into the National Park System has been reserved by Alaska's Department of Natural Resources as an outdoor recreation area since 1970.[9]

We distributed the questionnaire through Qualtrics Research Core™ to 753 respondents from April to September 2016.[10] The questionnaire opens by asking questions which gauge the policy priorities of the respondents. The first question has respondents indicate, using a Likert scale, if more or less money should be spent on several societal problems (crime, environmental protection, public education, national debt, health care, foreign aid). The next question asks them to indicate, using a Likert scale, how important specific environmental goals are (reducing air pollution, protection of endangered species, safe recreational areas, reducing water pollution, clean rivers, lakes and beaches, public waters safe for drinking and swimming). Next, respondents were educated regarding Alaskan geography, the current status of protected land and wildlife in Alaska, common arguments for and against National Park expansion, and how expanding the existing park will affect human activities such as commercial development, fishing, and oil exploration and drilling.

The survey then described a proposal to expand the Denali National Park in area by approximately 5%, incorporating uninhabited bordering land, rivers, and mountains into the existing protected area. This expansion is shown in Figures 1a and 1b.

[9] `http://dnr.alaska.gov/parks/units/denali1.htm` Alaska Department of Natural Resources (2015). Denali State Park. 5 July 2017.

[10] The entire questionnaire is presented in Appendix 2, available online.

Respondents were then told their household would be required to pay $\$X$ to support the program:

> *At present, government officials estimate the program will cost your household a total of $X. You would pay this in a special one time charge in addition to your regular federal taxes. This money would be used only for the Denali National Park expansion program. If the program cost your household a total of $X, would you vote for the program or against it?*

If they agreed to pay $\$X$ ("Yes"), they were asked if they would instead accept paying $\$2X$. If they refused to pay $\$X$ ("No"), they were asked if they are willing to pay $\$\frac{1}{2}X$. This approach attempts to bound the respondents' WTP, as those who answer (Yes, No) or (No, Yes) have a WTP that is bounded between either ($\$X$, $\$2X$) or ($\$\frac{1}{2}X$, $\$X$), respectively. We use this bounding approach because, as discussed by Johnston et al. (2017), open-ended questions often lead to unrealistic responses.

The questionnaire was administered in two phases. The first phase (April 6-7, 2016) had 226 respondents and had randomized initial program costs of $4, $10, $20, $40, and $80, which were the initial program costs used by Stefanski and Shimshack (2016). In the second phrase (August 26 to September 4, 2016) we had 527 respondents. In the second phase we replaced the initial program cost of $4 with $120 as $4 proved far too low given the high proportion of (Yes, Yes) responses in the first phase for this initial value (77.4%).

Those that indicated they they would pay some amount for the program [(Yes, No), (No, Yes), (Yes, Yes)] were asked follow-up questions to determine what motivated their WTP.[11] They were asked to indicate on a Likert scale how important certain components of environmental protection (see Figure 4, Panel A and B) were to their WTP. Those that did not indicate support (No, No) were asked follow-up questions to determine why they did not support the program (see Appendix Table A3).

At the end of the survey, we collected socio-economic and demographic information (gender, age, race, Hispanic/Latino ancestry, employment status, industry, household income, education, political affiliation, urban/rural/suburban residence), similar to in previous studies (e.g.,

[11]We made an error in the first wave of the questionnaire and those that answered (Yes, No) were accidentally not asked these follow-up questions. This meant that these responses are not available for 6.7% of the individuals who were supposed to be asked these questions.

Hadker et al. (1997), Bateman and Langford (1997), White and Lovett (1999), Stefanski and Shimshack (2016)). To learn to what extent affiliation or connection with Alaska matters, which speaks to if the WTP is driven by passive use or not, we also asked for current state of residence, state of upbringing, how often the respondent has visited Alaska, and if the respondent had visited a national park. We also asked respondents about their attitudes toward increasing federal taxes to pay for national park expansion.

A. Sample Composition

While our goal is to estimate a nationally-representative average WTP, unfortunately, our sample is not selected to be nationally representative. To correct for this, we raked the data following the procedures discussed by Kolenikov (2014), giving respondents from under-represented groups more weight and respondents from over-represented groups less weight. Raking the sample in this way makes the sample better reflect the average socio-economic and demographic characteristics of the national population. Table 1, columns 1 and 3, show that the survey over-sampled women, individuals aged 18-44, college graduates, Democrats, and individuals in households with income less than $150,000.

We used three data sources to construct weights using raking so that our raked sample matched the national population based on the variables in Table 1. Statistics on the national distribution of gender, Hispanic origin, race, and age are taken from July 2015 Census data.[12] Statistics on educational attainment and household income were drawn from the 2015 American Community Survey.[13] Political party affiliation was created by calculating the mean of bi-weekly Gallup Politics survey results, conducted from January 6, 2016, to October 9, 2016.[14]

Table 1 indicates that, after raking, our raked sample closely matches the national averages of these socio-economic variables. Henceforth, we use the raked sample for all of our results, although results from the unraked sample are available in the appendix. These unraked results indicate a slightly lower WTP (for example, the levels WTP is on-average $4.34 less).

[12] `https://www.factfinder.census.gov`, Dataset ID: PEPAGESEX and PEPALL5N (accessed 12/2016).
[13] `https://www.factfinder.census.gov`, Dataset ID: S1901 (accessed 12/2016).
[14] `http://www.gallup.com/poll/15370/party-affiliation.aspx` (accessed 12/2016)

III. Methodology

We use interval regression to estimate a WTP, which is the standard approach used for dichotimous-choice data that bounds responses in an interval (see, e.g., Cameron and Trivedi (2005); Cawley (2008); Viscusi, Huber and Bell (2012); Stefanski and Shimshack (2016)). We observe a bounded interval for the WTP for those that answer (Yes, No) ($\$X$, $\$2X$) and for those that answer (No, Yes) ($\$\frac{1}{2}X$, $\$X$). We first perform double-bounded dichotomous choice interval regressions in levels, using interval regressions. We then perform this regression in logs to adjust for the right-skew in the WTP responses (see Figure 2), as is common (e.g., Stefanski and Shimshack (2016)). For both the levels and logs regressions, we estimate the WTP with and without covariates. First, we add socio-economic and demographic covariates to observe how these factors influence WTP. We then we add covariates capturing region of residence and attachment to Alaska to see if WTP value are driven by actual use value rather than passive use value. Finally, we add preferences for environmental protection efforts and tax policies. Table 3 defines and summarizes each covariate used. We repeat this analysis using a single-bound dichotomous choice probit model[15] and a double-bounded dichotomous choice constrained bivariate probit model.[16] This is done to check the robustness of our model against changes to the functional form, as discussed in Section IV.A.

IV. Results

Table 2 and Figure 2 summarizes the complete set of possible responses for both waves of the survey. Support for the program generally declines with the initial program cost, although support for the program is high for all initial program costs. (Yes, Yes) is the most common response for all initial program costs. Even for the most expensive initial program cost ($120), the most common answer is (Yes, Yes) at 39.4%, giving a WTP of greater than $240 for this group.

For the smallest initial program cost ($4), 77.4% have a WTP of $8 or more, 3.8% have $4 to $8, 3.8% have $2 to $4, and 15.1% have a WTP of less than $2. The results for this $4 initial

[15]The unobserved WTP is modeled as $y_i^* = \mathbf{x}'\beta + \varepsilon$ where we observe $y_i = 1$ if $y_i^* > \$X$ or $y_i = 0$ if $y_i^* \leq \$X$ and $P(y_i = 1|\mathbf{x}) = \int_{-\infty}^{\mathbf{x}'\beta} \phi(t)dt$ and $\phi(\cdot)$ is the standard normal density.

[16]A two-equation model, where $y_{1i} = 1$ if $y_{1i}^* > \$X$, $y_{2i} = 1$ if $y_{2i}^* > \$X$, and zero otherwise.

program cost suggest two things. First, the average WTP is significantly higher than $4, such that this initial value does a poor job of bounding the WTP. This motivated us to replace this initial value with $120 in our second phase of the questionnaire, which does a better job of bounding WTP even though it is significantly higher. Second, there are a significant number of people with very low, likely zero, WTP. We probe this issue by asking those who answer (No, No) a follow up question in order to determine how many respondents have a true WTP near zero versus how many are "protest nos" and are responding negatively for reasons unrelated to having a near-zero WTP. We examine this issue further in Section IV.A.

We now turn to our interval regression analysis to estimate the average WTP. Table 4 presents our interval regression estimates in both level and log form. For the levels regressions (columns (1), (2), (3), and (4)), the WTP estimates are $111.10, $121.04, $115.82, and $116.19 respectively. For the logs regressions (columns (5), (6), (7), and (8)), the WTP estimate varies much more: $81.50, $123.60, $142.07, and $225.46, respectively. The inclusion of covariates seems to significantly affect the WTP estimate only in the logs regressions, but not in the level regressions. This magnitude appears partly driven by the raked data, as the range is somewhat smaller for the log regressions using unraked data ($83.44 to $186.77) (see Appendix Table A1). The WTP estimates under levels are similar regardless of if the data is raked or not (range for unraked estimates is $110.43 to $114.17).

It can be seen that significant determinants in respondent's WTP are generally consistent across all specifications. Significant determinants decreasing an individual's WTP include spending the majority of childhood in Alaska ($p < 0.01$) and the feeling of opposition to increasing federal taxes to expand national parks ($p < 0.01$). While the latter is not unexpected, the fact that those who spent a majority of their childhood in Alaska have a lower WTP could be surprising. One might expect individuals who grew up in Alaska to have a stronger preference towards preserving its natural state. However, those who grew up in Alaska may also be more aware of the economic benefits to expanding the use of land for economic development. This effect could be driven by outliers, as only seven individuals indicated that they spent a majority of their childhood in Alaska. The effect of gender is significant and negative in specifications 2 and 6, but this significance disappears as other covariates are included. This corroborates the findings of Stefanski and Shimshack (2016),

who found gender to be unimportant.

Significant determinants increasing an individual's WTP include, unsurprisingly, preferences towards increased tax expenditures on national parks ($p < 0.01$). Frequent visits to the state of Alaska also increases WTP ($p < 0.01$ for more than five visits), a finding consistent with the literature that finds direct users have a higher WTP than passive users for environmental goods (e.g., Carson and Mitchell 1993; Carson 1997; Stefanski and Shimshack 2016). College education also tends to increase WTP, but this relationship is slightly weaker ($p < 0.05$) and not significant across all specifications.

We do not find a significant relationship between age and WTP, contrary to the literature showing that WTP for environmental public goods appears to decline with age (Hoehn 1991; Whitehead and Blomquist 1991; Carson 1997). Furthermore, having personal goals aligned with environmental protection is not significantly related to WTP for the park expansion.

We asked those who supported the park expansion proposal (they said "Yes" to at least one program cost) why they supported the program. The results, shown in Figure 4, indicate that most respondents see a variety of benefits to national parks and see national parks as a very important contributor to more than one goal. However some goals were deemed relatively more important by respondents. The goal that was most often listed as either "very important" or "important" was to increase protection from oil spills (85.8% very important or important), followed by increasing and protecting Alaska's biodiversity (84.3%) and preserving Alaska's beauty (84.2%). While all goals receive large support, the least supported goals are supporting recreational opportunities (77.1% very important or important, 5.8% not important at all), carbon sequestration (77.0%, 3.85%), and protecting Alaska Native populations (82.6% , 4.9%). The least supported (but still highly supported) goals are thus those linked more to active use of the park land rather than passive use.

A. Robustness and Limitations

We investigate several possible issues that may affect our WTP estimates. In most cases addressing for these issues makes our WTP estimates even higher. Since our estimated WTP is already high, this suggests that it could be even higher and that our estimates are likely lower bounds.

Functional Form

Since our dependent variable, the dichotomous choice for or against paying the one-time tax, is not continuous, the linear interval regression[17] model may not provide the most consistent estimates. For this reason, we also estimate a probit model using the initial program cost and a constrained bivariate probit model using both the initial and follow-up program costs. As above, we repeat our analysis using logs and with and without control variables. These estimates are presented in Table 5 (with unraked estimates in Appendix Table A2). The levels results are similar in range to the interval regression results, ranging from \$143.59 to \$174.98. The log estimates, however, are larger in magnitude, ranging from \$161.68 to \$408.62. While our WTP estimates do not seem robust to this change in the functional form, they do indicate that our preferred WTP estimates in Table 4 are lower bounds.

"Protest Nos"

The possibility of "protest nos" may bias WTP estimates towards zero. A "protest no" would be an answer of (No, No) such that the upper bound for their WTP estimate ($\$\frac{1}{2}X$) is lower than their true WTP. This means that the individual is indicating a lack of support for the proposal for reasons other than their WTP, such as objecting to any taxes or to any government program. "Protest nos" seem likely for some respondents, as 15.1% who were given an initial program cost of \$4 supposedly have a WTP of less than \$2, as judged by their (No, No) responses. For many this is likely not a true "near zero" WTP. We ask those who answer (No, No) to give reasons why they do not support the program. Appendix Table A3 indicates the reasons for this lack of support. We group these reasons into those that suggest a true "near zero" WTP[18] and those that suggest a "protest no."[19] We deem any respondent who indicates one of the "protest no" reasons to be a "protest no," and we re-estimate the

[17] Interval regressions are a generalization of the Tobit Maximum Likeliehood Estimator. Tobit estimations require that regression errors are heteroskedastic and normally distributed, but are inconsistent if these assumptions are violated (Long 1997).

[18] "I cannot afford to pay any amount at this time" (22.8% indicated this), "I live far from Alaska and do not see how the program is relevant to me" (14.7%), "Society has more important problems than protecting Alaskan wilderness" (6.5%), "I feel that the protection of Alaskan wilderness is unimportant" (2.72%).

[19] "I am opposed to paying any new taxes" (12.5%), "I do not want to put a monetary value on protecting Alaskan wilderness" (10.3%), "I do not trust the institutions that will handle the money for this program" (9.2%), "I do not believe that paying will solve the problem" (4.9%), "It is not my responsibility to protect Alaskan wilderness" (3.8%).

main results in Table 4 without these respondents. These results are shown in Appendix Table A4 and are similar, ranging from $110.76 to $210.84.

Confusion over Payment Vehicle

Another possible threat to our WTP estimates is that some individuals did not understand how they would be asked to pay for our proposed national park expansion. Such confusion could threaten the validity of our estimates, as discussed in Johnston et al. (2017). We state in the questionnaire that it is a one-time charge. But if respondents thought it was a charge over multiple years, then they may have indicated a lower WTP. This suggests that our WTP could be a lower bound. Following Stefanski and Shimshack (2016) we included a debriefing question to assess if respondents thought that this was a one-time versus multiple-year charge. 49.04% (48.73% without raking weights) indicated that they did not think this was a one-time charge. We re-estimate our main results in Table 4 with these respondents dropped. These results are presented in Appendix Table A5. The WTP estimates decrease slightly, ranging from $90.67 to $184.06, and there are no significant changes to the factors linked to WTP.

Sensitivity to Scope

As discussed more by Stefanski and Shimshack (2016), our WTP estimates could be sensitive to scope. Essentially, our WTP estimates may depend on the amount of the public good we offer in our proposal. We propose a 5% expansion of Denali National Park, and thus our WTP estimates reflect an increase of this magnitude. Like Stefanski and Shimshack (2016) we use a single sample approach, that is, we only proposed one type of expansion of the park. We did this because we had limited funding to disseminate our questionnaire, and we wanted to focus on statistical power to provide a more precise estimate of the WTP. However, we agree with the recent literature (e.g., Diamond 1996; Whitehead, Haab and Huang 1998; Hausman 2012; Haab et al. 2013; Carson et al. 2013) that it would have been ideal to have had multiple samples with different sized proposed expansions of the park (e.g., 10% increase instead of just 5% increase) to see if more or less of this good being provided leads to increased or decreased WTP.[20]

[20] Johnson et al. (2012) is an example of a paper that has done this.

Sensitivity to Media Coverage of Oil Spills and Pipelines

We consider factors which may have increased our WTP estimates. One factor we consider is increased coverage of pipelines spills that may have occurred at the time of the second phase of the survey. Appendix Figure A1 shows increased search activity for "pipelines" at the same time as the second phase. While individuals can search for "pipelines" for a variety of reasons, we see this increase as being driven by coverage of Native Americans protesting an oil pipeline being built in North Dakota. On August 15th, 11 days before our survey was conducted, Dakota Access, LLC, filed a lawsuit against the Native American tribal leaders.[21] On August 22nd, four days before our survey was conducted, media reports began circulating that 29 protestors were arrested near the work site.[22]

Increased pipeline coverage may, for legitimate reasons, increase the WTP of individuals as they are more aware of the benefits of national parks as a way to protect land from environmental disasters. Evidence of this is seen by evaluating the respondents' ranking of "Increasing oil spill protection for Alaska" on a Likert importance scale. 70.02% of second phase respondents value this category as either important or very important, while only 52.65% of first phase respondents held the same beliefs.

As can be seen in Figure A1, Phase 1 occurred during a low-interest period. This allows us to re-estimate our main results using Phase 1 and Phase 2 survey respondents separately.[23] A comparison of Phase 2 results with Phase 1 results will determine if this event skewed our full-sample results. Appendix Table A6 presents these estimates, and it can be seen that WTP values are similar across phases. This is evidence indicating the increased search interest in pipelines during Phase 2 does not influence our full-sample results.

[21] *Dakota Access, LLC, vs. Dave Archambault II, Jonathan Edwards, Dana Yellow Fat, Valerie Dawn Wolfnecklace, Clifton Verle Hollow, Donald Dennis Strickland, Aaron Gabriel Neyer, and John and Jane Does*, Case 1:16-cv-00296-DLH-CSM filed in the United States District Court for the District of North Dakota, Western Division.

[22] `www.chicagotribune.com/news/nationworld/ct-dakota-access-pipeline-timeline-dapl-20161219-htmlstory.html` Howard, Brandon (2017). Timeline: History of the Dakota Access Pipeline. Chicago Tribune. 24 Jan 2017.

[23] We drop those with initial program costs of $4 from phase one and those with initial program costs of $120 from phase two so that both phases have the equivalent distribution of initial program values.

V. Discussion and Conclusion

National Parks provide many important benefits, but could also be used for economic development. Alaska has a history of developing land for oil exploration and transportation, similar to recent land developments related to the Dakota Access Pipeline. Determining the best use of land requires a full understanding of the costs and benefits of National Parks, as well as how taxpayers value the land in question. A key component of this is to estimate the "passive use" value that individuals attribute to protected National Park land that they may never directly use. We estimate this passive use value using a questionnaire, where we use the contingent valuation method to determine a willingness to pay (WTP) for expanding the size of Denali National Park by 5%.

We find that respondents do value National Parks. We estimate that the national average WTP for a 5% expansion of Denali National is a single payment of $115 to $409, according to our preferred specifications, but this WTP may be even higher under other plausible specifications. Moreover, from respondents' answers to questions about what motivated their support for the program, we find that this WTP is largely driven by passive use value.

Our range of WTP estimates is higher than in other studies. A number of possible explanations for this difference exist, such as respondents holding higher passive use values of Alaskan wilderness reserves. This is possible as national parks have a higher profile relative to other areas such as marine ecosystems or less prominent park lands. It is also possible some of our large WTP estimates are driven by the particular functional forms of the model, such as the probit regressions. Finally, it is possible this difference arises because our survey described the expansion's cost as a one-time payment; most other authors asked respondents to commit to monthly or annual fees in perpetuity.

Our estimated WTP for national park land suggests that there are significant passive use values that should be considered in any assessment of whether to expand national parks or to permit the economic development of protected land.

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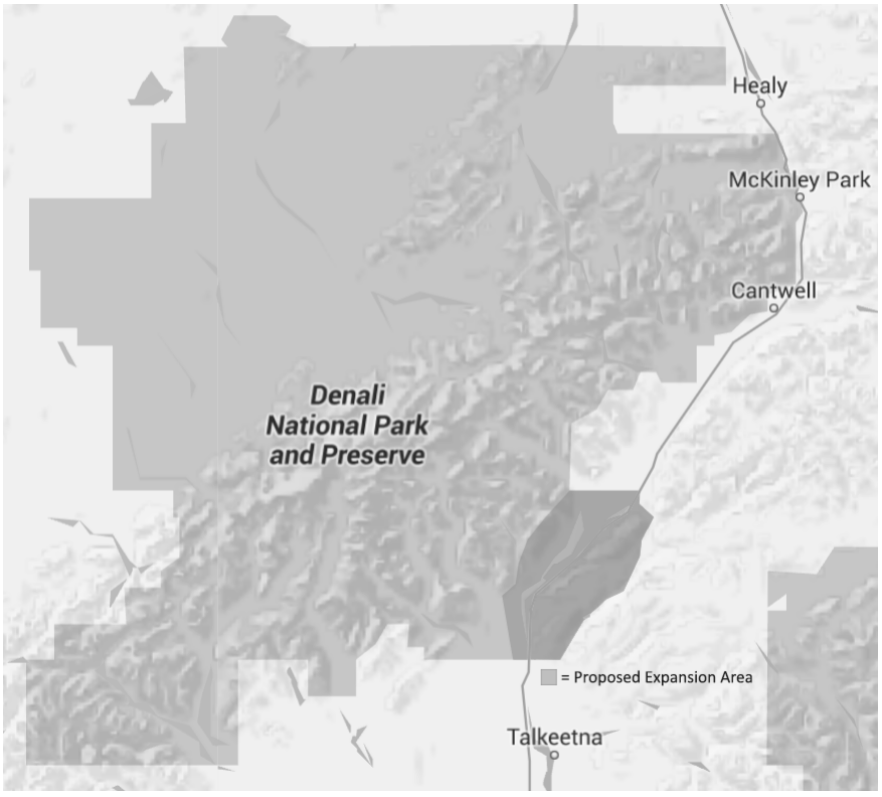
Figure 1. Map of the Proposed Expansion to Denali National Park

Figure 1(a): Alaska State

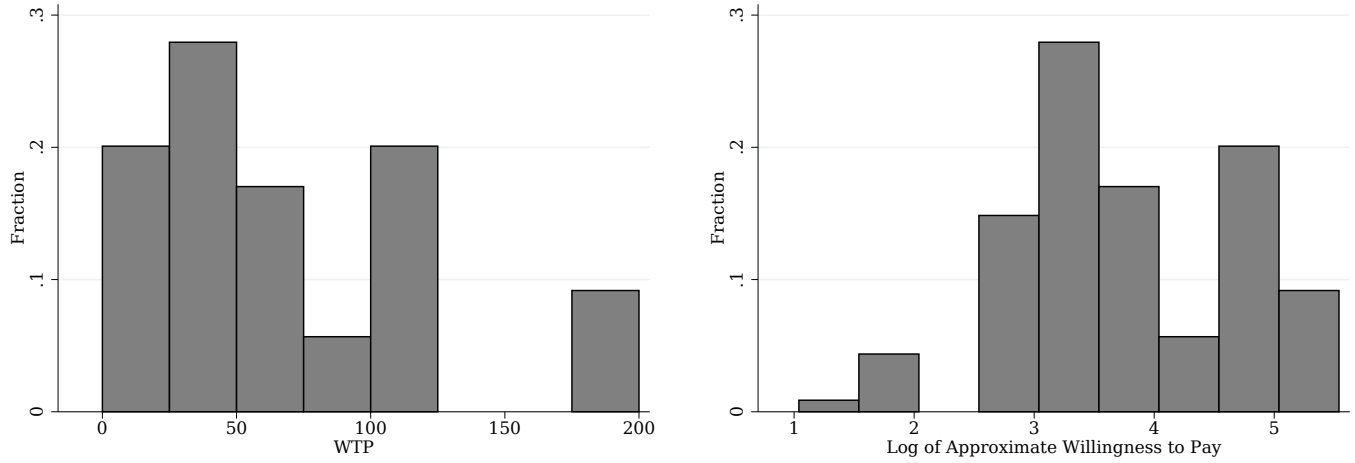
Figure 1(b): Denali National Park



Notes: Figure 1a illustrates the size and location of Denali National Park in Alaska, while Figure 1b illustrates the proposed expansion area. The map in Figure 1b was shown to survey respondents prior to inquiring about their willingness to pay for the expansion project.

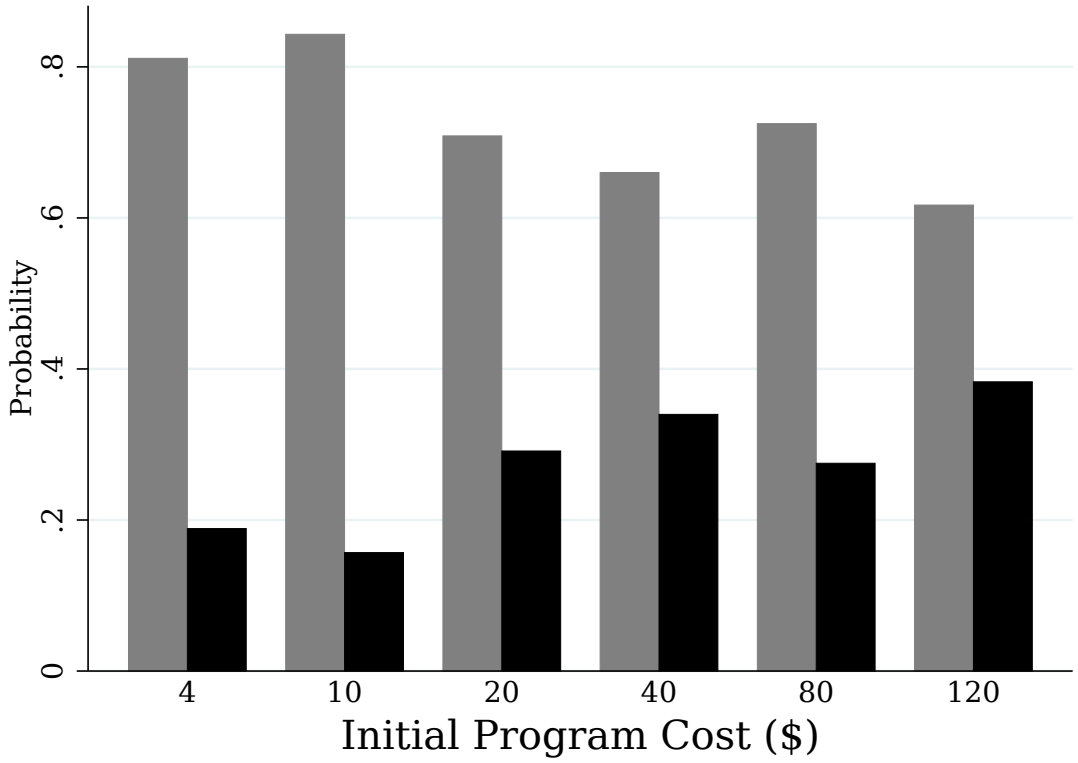
Source: Map data ©2015 Google. Expansion area added to map using commercially available photo-editing software.

Figure 2. Distribution of Willingness-to-Pay (WTP) Estimates



Notes: Midpoint value of WTP, as reported in survey data, reported in both level and log form. WTP is only calculated when both interval endpoints are observed in survey data (when responses are (Yes, No) or (No, Yes)).

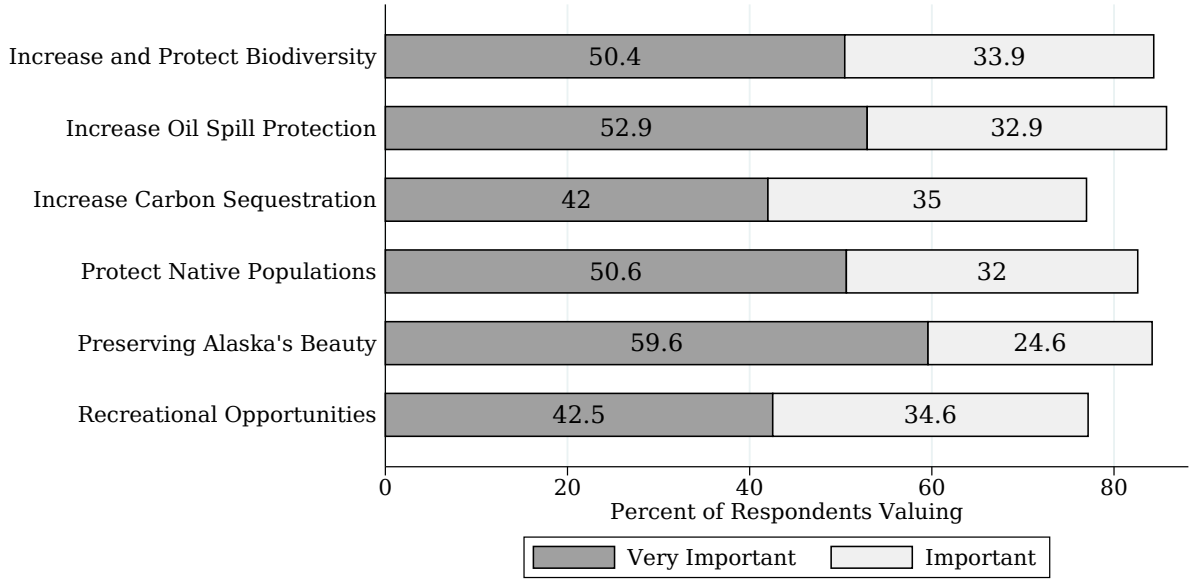
FIGURE 3. PROBABILITY OF "YES" AND "NO" RESPONSES



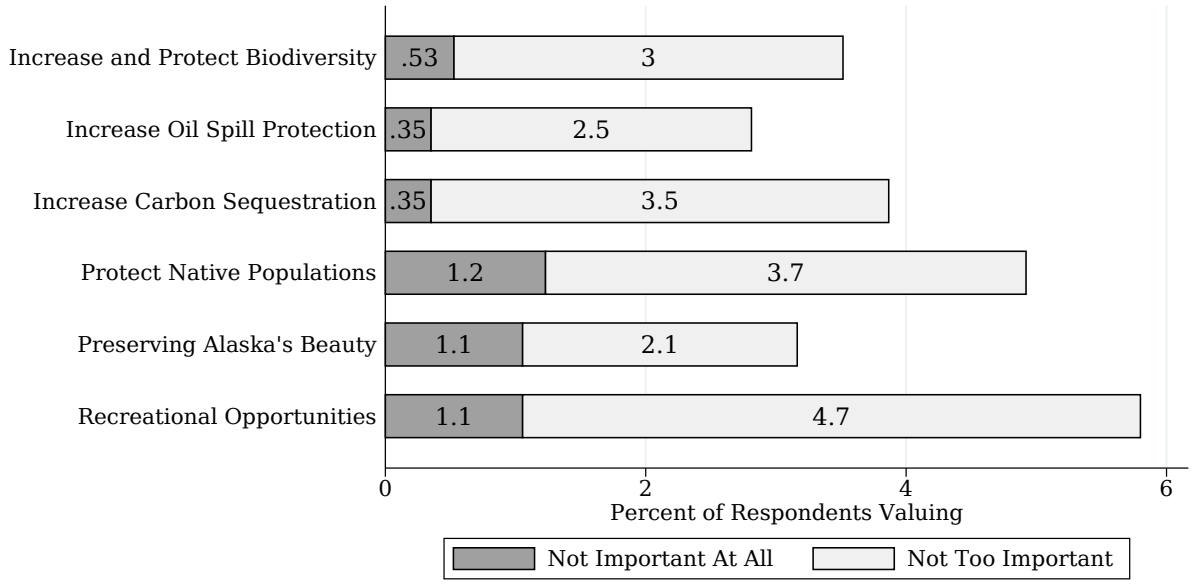
Notes: Probability of "yes" (light bar) or "no" (dark bar) responses to each initial program cost. Initial program costs were randomized.

Figure 4. Respondents' Perspective of Goals, Motivations for Affirmative Vote

Panel A: Percent of Respondents Viewing Goals as Important



Panel B: Percent of Respondents Viewing Goals as Not Important At All



Notes: Respondents were asked to rank each goal on a scale of [Very Important, Somewhat Important, Neutral, Not Too Important, Not Important At All, Not Sure]. Very Important and Somewhat Important categories are classified as viewing the particular goal as Important. Not Too Important and Not Important At All categories are classified as viewing the particular goal as Unimportant. Results reported as percent of Affirmative voters.

TABLE 1—SAMPLE COMPOSITION

Characteristic	Our Sample (%)	Raked Sample (%)	U.S. Population (%)
Gender: Female	61.27	51.26	51.32
Ethnicity: Hispanic or Latino	15.14	15.53	15.51
Race: White	79.05	78.35	78.39
Race: Black	11.95	12.75	12.71
Race: Asian	5.58	5.71	5.73
Age: 18-44	71.97	46.75	46.79
Age: 45 and older	28.03	53.25	53.20
Educ: Bachelor's deg or higher	37.18	26.69	26.65
Party: Identify as Democrat	41.64	30.41	30.42
HH Income: <$25,000	25.77	23.11	23.05
HH Income: $25,000 - $49,999	29.35	23.50	23.49
HH Income: $50,000 - $74,999	18.99	17.80	17.81
HH Income: $75,000 - $99,999	12.88	12.08	12.12
HH Income: $100,000 - $149,999	10.09	13.15	13.13
HH Income: >$150,000	2.92	10.36	10.39

Notes: U.S. Population information obtained from the United States Census Bureau. Statistics on Gender, Origin, Race and Age calculated using July 2015 Census data. Statistics on Educational Attainment and Household Income calculated using 2015 American Community Survey data. Political party affiliation obtained from Gallup Politics. Political party affiliation statistic created by calculating the mean of bi-weekly survey results, which were conducted from January 6, 2016, to October 9, 2016, by Gallup Politics. N=753.

TABLE 2—DICHOTOMOUS PROGRAM RESPONSE BY QUESTIONNAIRE VERSION

Version	Yes-Yes (%)	Yes-No (%)	No-Yes (%)	No-No (%)	N
A ($4, $8, $2)	77.36	3.77	3.77	15.09	53
B ($10, $20, $5)	71.24	13.07	5.23	10.46	153
C ($20, $40, $10)	45.70	25.17	9.27	19.87	151
D ($40, $80, $20)	47.71	18.30	16.99	16.99	153
E ($80, $160, $40)	41.61	30.87	7.38	20.13	149
F ($120, $240, $60)	39.36	22.34	13.83	24.47	94
Total	51.93	20.58	9.83	17.66	753

Notes: Summary of the complete set of possible response outcomes for the combined survey data. Yes-Yes represents respondents who voted in favor of the program for both the first and second (doubled) price. Yes-No represents respondents who voted in favor of the program for the first price and against the program when presented the second (doubled) price. No-Yes represents respondents who voted against the program when presented the first price and then voted for the program when presented the second (halved) price. No-No represents respondents who voted against the program for both the first and the second (halved) price. Versions A to E were randomly given with equal probability in phase one, while B to F were given in phase two.

Table 3—WTP and Determinants of WTP Estimation: Interval Regressions

Characteristic	Description	Mean	Raked Mean
WTP	Approximate WTP (using midpoint method)	66.89	75.30
White	Race: White, Not Hispanic or Latinx	0.672	0.784
Young	Age: 18-34	0.471	0.305
Female	Gender: Female	0.614	0.512
College	Education: Bachelor's degree or higher	0.372	0.267
Low Income	Household Income: Less than $20,000	0.195	0.182
Democrat	Party: Democrat	0.417	0.304
NPS Visitor	Experience: Has visited a National Park	0.699	0.721
AK Visit 1	Experience: Has visited Alaska 1 time	0.089	0.097
AK Visit 2	Experience: Has visited Alaska 2 times	0.070	0.058
AK Visit 3-5	Experience: Has visited Alaska 3-5 times	0.028	0.015
AK Visit >5	Experience: Has visited Alaska 5+ times	0.016	0.036
AK Birth	Experience: Born in Alaska	0.009	0.004
Env. Protect More	Attitude: Nation should spend more on Environmental Protection	0.628	0.565
Env. Protect Less	Attitude: Nation should spend more on Environmental Protection	0.096	0.144
Air	Attitude: Air pollution reduction is an important personal goal	0.495	0.457
Endangered	Attitude: Endangered species protection is an important personal goal	0.434	0.415
Water	Attitude: Water pollution reduction is an important personal goal	0.689	0.681
Support Tax	Attitude: Support increasing federal taxes to expand national parks	0.514	0.499
Oppose Tax	Attitude: Oppose increasing federal taxes to expand national parks	0.276	0.278
Observations		753	753

Notes: Summary statistics of respondents to Qualtrics online survey and definitions of WTP determinants used in various models.

TABLE 4—WTP AND DETERMINANTS OF WTP ESTIMATION:

INTERVAL REGRESSIONS, RAKED DATA

	Double-Bounded Dichotomous Choice Interval Estimations in Levels				Double-Bounded Dichotomous Choice Interval Estimations in Logs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	111.10***	124.15***	92.98***	42.23*	4.40***	4.59***	4.04***	3.13***
	(11.77)	(22.79)	(23.51)	(23.44)	(0.15)	(0.34)	(0.37)	(0.39)
White		-31.08	-24.96	-3.42		-0.47	-0.45	-0.08
		(19.45)	(17.17)	(16.82)		(0.29)	(0.28)	(0.27)
Young		14.30	5.11	4.84		0.30	0.20	0.20
		(14.63)	(13.03)	(12.66)		(0.24)	(0.23)	(0.21)
Female		-32.84**	-20.63	-15.88		-0.52**	-0.33	-0.25
		(15.21)	(14.13)	(12.34)		(0.26)	(0.25)	(0.21)
College		38.60**	15.72	16.67		0.57*	0.23	0.23
		(18.78)	(16.87)	(15.04)		(0.30)	(0.30)	(0.26)
Low Income		-17.58	-6.68	-3.08		-0.25	-0.06	0.00
		(17.22)	(16.24)	(14.70)		(0.30)	(0.29)	(0.25)
Democrat		48.60***	44.15***	29.55**		0.75***	0.71***	0.48**
		(15.14)	(13.85)	(13.29)		(0.23)	(0.22)	(0.21)
NPS Visitor			22.50	16.06			0.50**	0.40*
			(14.45)	(12.17)			(0.25)	(0.21)
AK Visit 1			31.25	34.12			0.59	0.64
			(25.75)	(22.39)			(0.43)	(0.40)
AK Visit 2			24.84	3.72			0.41	0.06
			(29.35)	(36.64)			(0.43)	(0.56)
AK Visit 3-5			88.70	75.03*			1.40	1.19
			(60.76)	(44.53)			(1.02)	(0.74)
AK Visit >5			296.07***	232.11***			4.29***	3.08***
			(56.98)	(46.77)			(0.84)	(0.64)
AK Birth			-99.25**	-89.80***			-1.72**	-1.55***
			(48.07)	(33.65)			(0.79)	(0.55)
Env. Protect More				20.12				0.32
				(14.92)				(0.26)
Env. Protect Less				12.53				0.40
				(17.98)				(0.32)
Air				11.39				0.25
				(15.61)				(0.26)
Endangered				-3.17				0.02
				(15.10)				(0.24)
Water				8.56				0.18
				(14.83)				(0.27)
Support Tax				76.34***				1.23***
				(14.86)				(0.26)
Oppose Tax				-61.27***				-1.16***
				(14.51)				(0.26)
Observations	753	753	753	753	753	753	753	753
Log Likelihood	-956.90	-918.22	-894.43	-796.46	-920.74	-887.56	-867.63	-765.09
Predicted WTP ($)	**111.10**	**121.04**	**115.82**	**116.19**	**81.50**	**123.60**	**142.07**	**225.46**

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

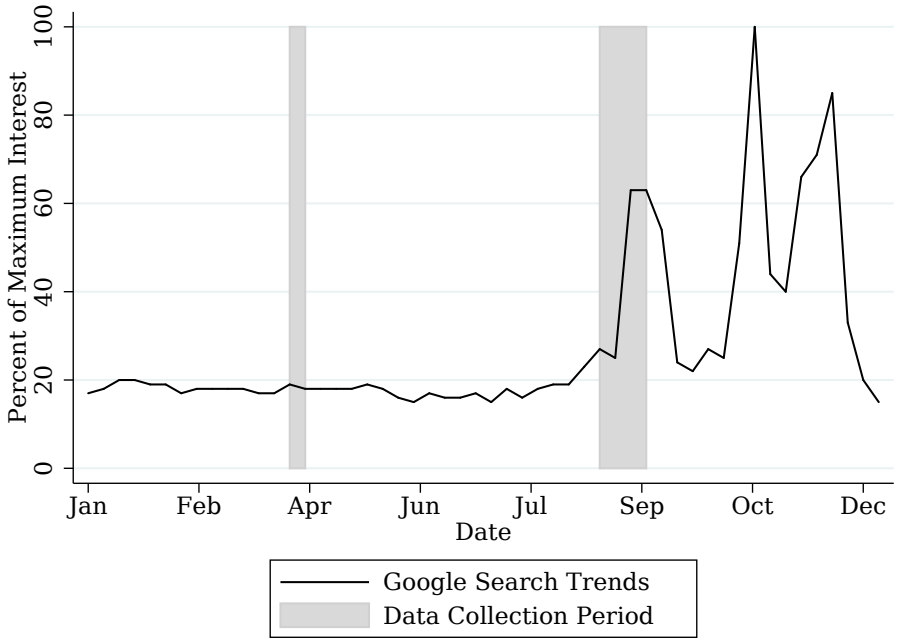
Table 5—WTP and Determinants of WTP Estimation: Probit and Bivariate Probit, Raked Data

	Single Bound Dichotomous Choice Probit				Double-Bounded Dichotomous Choice Constrained Bivariate Probit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.68***	0.27	1.19***	0.91**	0.69***	0.31	1.36***	1.17***
	(0.12)	(0.32)	(0.27)	(0.37)	(0.09)	(0.24)	(0.25)	(0.33)
Initial Program Cost	-0.00*	-0.01***			-0.00***	-0.01***		
	(0.00)	(0.00)			(0.00)	(0.00)		
LN(Initial Program Cost)			-0.20***	-0.29***			-0.27***	-0.37***
			(0.08)	(0.08)			(0.07)	(0.06)
Full Covariates	-	Yes	-	Yes	-	Yes	-	Yes
Observations	753	753	753	753	753	753	753	753
Log Likelihood	-463.16	-347.14	-459.48	-344.89	-895.20	-731.21	-900.92	-737.08
Predicted WTP (in dollars)	**174.98**	**161.92**	**352.75**	**408.62**	**143.59**	**150.49**	**161.68**	**205.74**

Notes: Set of full covariates includes all coefficients used in Table 4. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

Appendix: Additional Results

FIGURE A1. TIMING OF SEARCH TRENDS FOR PIPELINES IN AMERICA



Notes: Google search trends for keyword "pipeline" in the year 2016. Shaded areas represent timing of survey. Increased interest in pipelines could indicate increased media coverage of controversial environmental activities, which may have contributed to the larger WTP values found in our analysis relative to existing literature. Notice that Phase 1 occurred during a low-interest period, so comparison of Phase 2 results with Phase 1 results will determine if this event skewed our full-sample results.

Source: Google Trends (www.google.com/trends)

TABLE A1—WTP AND DETERMINANTS OF WTP ESTIMATION:
INTERVAL REGRESSIONS (UNRAKED)

	Double-Bounded Dichotomous Choice Interval Estimations in Levels				Double-Bounded Dichotomous Choice Interval Estimations in Logs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	110.43***	116.61***	87.70***	43.85**	4.42***	4.42***	3.86***	3.14***
	(6.12)	(15.20)	(16.82)	(18.33)	(0.09)	(0.25)	(0.28)	(0.32)
White		-11.46	-11.76	-7.81		-0.10	-0.12	-0.04
		(11.11)	(11.06)	(10.42)		(0.19)	(0.19)	(0.17)
Young		1.41	-0.09	-2.66		0.08	0.06	0.02
		(10.00)	(10.05)	(9.51)		(0.17)	(0.17)	(0.16)
Female		-27.14**	-18.17*	-23.21**		-0.44**	-0.28	-0.38**
		(10.62)	(10.74)	(10.23)		(0.18)	(0.18)	(0.17)
College		22.51**	11.78	12.61		0.39**	0.19	0.22
		(10.63)	(11.05)	(10.39)		(0.18)	(0.18)	(0.17)
Low Income		-24.50*	-15.70	-10.57		-0.37*	-0.20	-0.11
		(12.69)	(12.86)	(11.86)		(0.22)	(0.22)	(0.20)
Democrat		33.51***	33.12***	14.67		0.56***	0.55***	0.23
		(10.26)	(10.11)	(9.77)		(0.17)	(0.17)	(0.16)
NPS Visitor			28.30**	12.80			0.58***	0.30*
			(11.10)	(10.03)			(0.19)	(0.17)
AK Visit 1			25.32	26.86			0.46	0.48
			(20.00)	(18.06)			(0.33)	(0.30)
AK Visit 2			39.61*	46.10*			0.58*	0.69*
			(21.64)	(23.75)			(0.34)	(0.38)
AK Visit 3-5			31.87	23.52			0.53	0.35
			(34.70)	(35.68)			(0.56)	(0.53)
AK Visit >5			171.25***	138.93***			2.90***	2.32***
			(49.22)	(36.97)			(0.77)	(0.58)
AK Birth			-69.81*	-70.16***			-1.34*	-1.31**
			(37.67)	(27.06)			(0.73)	(0.57)
Env. Protect More				28.10**				0.52***
				(11.18)				(0.19)
Env. Protect Less				-9.57				-0.02
				(15.77)				(0.28)
Air				4.84				0.08
				(11.75)				(0.19)
Endangered				7.59				0.13
				(11.12)				(0.18)
Water				13.73				0.28
				(11.71)				(0.20)
Support Tax				83.49***				1.33***
				(11.41)				(0.19)
Oppose Tax				-33.63***				-0.70***
				(11.17)				(0.19)
Observations	753	753	753	753	753	753	753	753
Log Likelihood	-985.63	-967.35	-956.31	-870.37	-924.33	-907.71	-894.99	-805.00
Predicted WTP ($)	**110.43**	**110.49**	**111.72**	**114.17**	**83.44**	**94.05**	**108.67**	**186.77**

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

Table A2—WTP and Determinants of WTP Estimation: Interval Regressions

	Single Bound Dichotomous Choice Probit				Double-Bounded Dichotomous Choice Constrained Bivariate Probit			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.79***	0.21	1.23***	0.71***	0.69***	0.22	1.33***	0.86***
	(0.08)	(0.22)	(0.18)	(0.28)	(0.06)	(0.17)	(0.16)	(0.22)
Initial Program Cost	-0.00***	-0.00***			-0.00***	-0.00***		
	(0.00)	(0.00)			(0.00)	(0.00)		
LN(Initial Program Cost)			-0.18***	-0.22***			-0.25***	-0.26***
			(0.05)	(0.06)			(0.04)	(0.04)
Full Covariates	-	Yes	-	Yes	-	Yes	-	Yes
Observations	753	753	753	753	753	753	753	753
Log Likelihood	-437.90	-335.38	-435.97	-333.63	-897.75	-757.34	-898.78	-755.11
Predicted WTP (in dollars)	**196.84**	**206.49**	**812.91**	**1066.65**	**160.91**	**223.24**	**207.52**	**531.17**

Notes: Set of full covariates includes all coefficients used in Table 4. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

Table A3—Respondents' Reasons for Negative Vote (No, No)

Motivation	Count	Percent	Raked Count	Raked Percent
"Near Zero" WTP				
I cannot afford to pay any amount at this time	22	16.5	15.3	11.5
I live far from Alaska and do not see how the program is relevant to me	19	14.3	19.1	14.4
Society has more important problems than protecting Alaskan wilderness	8	6.0	4.8	3.6
I feel that the protection of Alaskan wilderness is unimportant	4	3.0	3.3	2.5
"Protest No"				
I am opposed to paying any new taxes	22	16.54	29.6	22.2
I do not want to put a monetary value on protecting Alaskan wilderness	14	10.5	14.7	11.1
I do not trust the institutions that will handle the money for this program	11	8.3	15.6	11.7
I do not believe that paying will solve the problem	7	5.3	4.0	3.0
It is not my responsibility to protect Alaskan wilderness	7	5.3	7.0	5.24
No answer	10	7.5	5.5	4.2
Other	9	6.8	14.0	10.5

Notes: This question was asked to respondents who responded "No" to both program costs (No, No). Of the 753 survey respondents, 133 were asked this question. 51 additional respondents were asked this question by mistake; their responses are omitted from this table.

TABLE A4—WTP AND DETERMINANTS OF WTP ESTIMATION:

INTERVAL REGRESSIONS, RAKED DATA, DROPPING "PROTEST NOS"

	Double-Bounded Dichotomous Choice Interval Estimations in Levels				Double-Bounded Dichotomous Choice Interval Estimations in Logs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	131.31***	148.36***	119.16***	55.23**	4.71***	4.95***	4.44***	3.33***
	(12.79)	(24.23)	(22.49)	(23.42)	(0.15)	(0.34)	(0.34)	(0.38)
White		-12.49	-7.84	6.97		-0.18	-0.20	0.06
		(19.21)	(15.89)	(15.83)		(0.27)	(0.25)	(0.23)
Young		-2.78	-10.82	-7.35		0.02	-0.06	0.01
		(14.41)	(12.27)	(12.23)		(0.22)	(0.21)	(0.20)
Female		-47.30***	-35.54**	-28.73**		-0.72***	-0.54**	-0.43**
		(15.39)	(13.85)	(11.81)		(0.25)	(0.24)	(0.20)
College		29.09	8.10	10.90		0.41	0.10	0.13
		(19.50)	(16.83)	(14.89)		(0.30)	(0.30)	(0.25)
Low Income		-22.83	-12.25	-6.82		-0.32	-0.14	-0.04
		(16.43)	(15.28)	(14.12)		(0.29)	(0.27)	(0.24)
Democrat		36.76**	31.36**	21.27		0.55***	0.51**	0.34*
		(14.85)	(12.96)	(13.09)		(0.21)	(0.20)	(0.19)
NPS Visitor			22.35*	13.64			0.52**	0.38*
			(13.53)	(11.74)			(0.24)	(0.20)
AK Visit 1			25.01	19.48			0.49	0.40
			(23.89)	(21.48)			(0.39)	(0.37)
AK Visit 2			8.59	-8.17			0.14	-0.14
			(29.23)	(34.78)			(0.42)	(0.52)
AK Visit 3-5			94.28*	75.99*			1.53*	1.25**
			(50.47)	(39.43)			(0.80)	(0.60)
AK Visit >5			279.04***	224.21***			3.82***	2.79***
			(53.66)	(44.05)			(0.80)	(0.60)
AK Birth			-96.07**	-80.26**			-1.66**	-1.42***
			(44.90)	(31.46)			(0.71)	(0.48)
Env. Protect More				17.44				0.28
				(14.16)				(0.25)
Env. Protect Less				22.96				0.60*
				(18.16)				(0.32)
Air				1.74				0.14
				(14.28)				(0.23)
Endangered				6.34				0.15
				(14.24)				(0.21)
Water				14.85				0.25
				(14.69)				(0.26)
Support Tax				76.66***				1.21***
				(14.31)				(0.25)
Oppose Tax				-33.59**				-0.70***
				(14.50)				(0.26)
Observations	692	692	692	692	692	692	692	692
Log Likelihood	-834.32	-802.89	-778.17	-710.64	-795.44	-769.32	-749.24	-673.96
Predicted WTP ($)	**131.31**	**132.25**	**126.65**	**127.86**	**110.76**	**134.57**	**154.67**	**210.84**

Notes: Results using Raked data while dropping "Protest Nos." * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

TABLE A5—WTP AND DETERMINANTS OF WTP ESTIMATION:

INTERVAL REGRESSIONS, RAKED DATA, DROPPING THOSE CONFUSED ABOUT PAYMENT VEHICLE

	Double-Bounded Dichotomous Choice Interval Estimations in Levels				Double-Bounded Dichotomous Choice Interval Estimations in Logs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	114.93***	121.20***	110.45***	54.43*	4.51***	4.58***	4.28***	3.32***
	(10.08)	(25.67)	(28.86)	(29.93)	(0.14)	(0.37)	(0.41)	(0.47)
White		-19.19	-28.83	-9.73		-0.30	-0.50	-0.19
		(21.47)	(21.36)	(20.59)		(0.33)	(0.34)	(0.33)
Young		2.73	2.45	-2.34		0.15	0.15	0.08
		(16.21)	(16.55)	(15.91)		(0.28)	(0.28)	(0.27)
Female		-7.32	-3.16	1.89		-0.17	-0.08	-0.02
		(17.68)	(17.74)	(14.80)		(0.31)	(0.31)	(0.26)
College		29.59	26.04	33.12*		0.49*	0.39	0.50*
		(19.17)	(20.21)	(19.41)		(0.29)	(0.31)	(0.30)
Low Income		-11.63	-3.55	-5.75		-0.16	0.01	-0.00
		(20.20)	(19.91)	(17.46)		(0.36)	(0.34)	(0.29)
Democrat		18.00	17.40	6.41		0.31	0.32	0.16
		(17.11)	(16.73)	(16.99)		(0.27)	(0.26)	(0.26)
NPS Visitor			12.51	10.83			0.39	0.37
			(18.10)	(15.92)			(0.30)	(0.27)
AK Visit 1			59.34	47.65			0.97	0.81*
			(39.83)	(29.83)			(0.63)	(0.49)
AK Visit 2			-1.08	-27.33			0.01	-0.42
			(32.64)	(39.62)			(0.47)	(0.59)
AK Visit 3-5			107.21	82.27			1.59	1.15
			(73.42)	(58.62)			(1.25)	(0.99)
AK Visit >5			175.31***	125.58***			3.22***	2.33***
			(53.95)	(40.37)			(1.05)	(0.77)
AK Birth			-127.38***	-98.77**			-2.53***	-2.05***
			(45.04)	(42.43)			(0.92)	(0.79)
Env. Protect More				23.00				0.33
				(21.44)				(0.37)
Env. Protect Less				-7.87				0.04
				(20.52)				(0.35)
Air				-2.30				0.07
				(20.28)				(0.33)
Endangered				4.71				0.07
				(19.86)				(0.31)
Water				26.86				0.46
				(20.07)				(0.35)
Support Tax				54.60***				0.89**
				(20.25)				(0.35)
Oppose Tax				-33.67*				-0.62*
				(18.67)				(0.32)
Observations	386	386	386	386	386	386	386	386
Log Likelihood	-498.54	-492.39	-485.28	-450.15	-485.25	-478.52	-470.30	-433.54
Predicted WTP ($)	**114.93**	**121.23**	**125.88**	**123.97**	**90.67**	**109.81**	**145.50**	**184.06**

Notes: Results using Raked data while dropping respondents who reported being confused about payment amounts or methods.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

Table A6—WTP and Determinants of WTP Estimation: Interval Regressions, Raked Data, Phase 1 vs Phase 2

Table A6(a): Phase 1 Respondents, Drop Initial Cost of $4

	Double-Bounded Dichotomous Choice Interval Estimations in Levels				Double-Bounded Dichotomous Choice Interval Estimations in Logs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	76.98***	156.35***	142.57***	64.85*	4.09***	5.92***	5.56***	3.83***
	(14.37)	(38.90)	(41.44)	(37.56)	(0.29)	(0.85)	(0.89)	(0.76)
Demographic Covariates	-	Yes	-	-	-	Yes	-	-
Experience Covariates	-	Yes	Yes	-	-	Yes	Yes	-
Attitude Covariates	-	Yes	Yes	Yes	-	Yes	Yes	Yes
Observations	179	179	179	179	179	179	179	179
Log Likelihood	-237.59	-223.10	-219.89	-171.97	-229.01	-213.92	-210.35	-160.76
Predicted WTP ($)	**76.98**	**85.72**	**92.95**	**96.49**	**59.77**	**133.73**	**461.01**	**606.77**

Table A6(b): Phase 2 Respondents, Drop Initial Cost of $120

	Double-Bounded Dichotomous Choice Interval Estimations in Levels				Double-Bounded Dichotomous Choice Interval Estimations in Logs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	88.03***	85.41***	54.44**	37.26	4.30***	4.24***	3.53***	3.17***
	(9.16)	(22.76)	(23.89)	(24.59)	(0.18)	(0.50)	(0.53)	(0.56)
Demographic Covariates	-	Yes	-	-	-	Yes	-	-
Experience Covariates	-	Yes	Yes	-	-	Yes	Yes	-
Attitude Covariates	-	Yes	Yes	Yes	-	Yes	Yes	Yes
Observations	433	433	433	433	433	433	433	433
Log Likelihood	-480.81	-466.82	-455.95	-421.60	-461.66	-448.80	-438.60	-404.01
Predicted WTP ($)	**88.03**	**99.87**	**101.76**	**105.40**	**73.88**	**118.91**	**157.72**	**240.96**

Notes: Results using Raked data, by survey phase, dropping respondents with initial costs of $4 (in Phase 1) or $120 (in Phase 2). WTP values are similar across phases, indicating the event described in Figure A1 does not influence our full-sample results. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$, Robust standard errors in parentheses

TABLE A7—SAMPLE OF PREVIOUS STUDIES; PUBLICATIONS REGARDING WTP FOR ENVIRONMENTAL PRESERVATION.

Authors	Year	WTP	Approximate Value in 2017 Dollars	Payment Schedule	Notes
Stefanski & Shimshack	2016	$28.07–107.50	$28.07–107.50	One-time	Expansion of marine sanctuary
Amigues, *et al.*	2002	$7.00–25.00	$9.67–34.55	Annually	5-year program, local river preservation
White & Lovett	1999	£119.05	$252.48	Annually	Preservation of 11 National Parks
Bateman & Langford	1997	£23.29	$53.50	Annually	Preservation of a National Park
Bateman, *et al.*	1996	£9.94	$22.83	Annually	Providing local recreation spaces
Hadker, *et al.*	1996	₹7.50	$0.33	Monthly	Preservation of National Park
Willis, Garrod	1993	£24.56	$68.31	Annually	Cleaning Yorkshire Dales
Bateman, *et al.*	1992	£76.74	$194.37	Annually	Preservation of Norfolk Broads
Siep & Strand	1992	200kr–1000kr	$59.37-296.89	Annually	Membership to Norwegian Ecology Club
Hanley & Craig	1991	£16.60	$43.62	Annually	Preventing local deforestation

Notes: 2017 dollar values obtained by (1) calculating original currency inflation then (2) converting into dollar values using exchange rates as of 29 June 2017. Inflation calculations made using publication year, unless authors present their results in prior year's values; *e.g.*, Bateman, *et al.* (1992) express their results in 1990 values, therefore 1990 values are used for inflation calculations.