Incorporating Beliefs and Experiences into Choice Experiment Analysis: Implications for Policy Recommendations – A Synopsis

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Abstract: We use a choice experiment survey of greater New England residents to understand preferences and WTP to create a new National Park/Recreation Area in Maine. We use the study to analyze how respondents' beliefs about prior recreational experiences and future outcomes affect policy recommendations from choice experiments. We find that respondents who engage in hunting and snowmobiling are willing to pay significantly more for a park allowing these activities whereas . We also find that willingness to pay for a new National Park in Maine differs based on respondents’ stated beliefs about the status-quo long-term land use. Land managers may find a two-park solution (one allowing the activities and one prohibiting them) would be best; this insight would be missed when neglecting to model conflicting recreational preferences.

Keywords: National Park, Choice Experiment, Non-Market Valuation, Experience and Beliefs

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I. Introduction and Motivation

The United States has designated about 14% or 300 million acres as protected areas. These protected areas are designated and managed through both Federal and State agencies. The lands protect the environment, generate many ecosystem services, and provide an economic stimulus to the neighboring regions. For example, the National Park Service (NPS) covers more than 84 million acres and includes over 400 sites. In 2014, NPS lands attracted 292 million visitors that spent $15.7 billion in local gateway regions, which resulted in 277,000 jobs and 29.7 billion in economic output (Cullianane, 2015).

The Organic Act, which established the NPS in 1916, emphasized both conservation and recreation from National Parks and this emphasis is a core foundation of the national park service today. At the same time National Parks do not allow hunting and off-road vehicle. The National Recreation Areas were established in the early 1960s in an effort to include more recreational activities in protected areas. Unlike National Parks, National Recreation Areas often allow hunting and off-road vehicles.

The question of how to manage our existing wilderness areas given demand for competing recreation activities is an important question that directly impacts all Federal and State agencies that manage land. There has been much discussion and debate at local, regional, and national levels on this question. Examples include whether there should be a ban on snowmobiles in Yellowstone National Park, or if we should expand motorized boating access in the Boundary Waters Canoe Area Wilderness (BWCAW) or if hunting and snowmobiling should be allowed in a new National Park in Maine (Draker 2014, Shogren 2013, Lilieholm 2007, Sambides 2015a, Sambides 2015b).

The non-market valuation methods used by environmental and resource economists to value for environmental goods and policies can also be used to elicit preferences for conflicting recreation uses and to guide management decisions. There are many previous studies that estimate consumers’ preferences for recreational sites and examine how recreational activity responds to changes in environmental quality.¹ However, relatively little work examines preferences for land management when recreational uses conflict.

As our first contribution, we show how incorporating information about respondents’ past recreation activities provide valuable policy insights and can even change policy recommendations on how to incorporate competing recreational activities into public lands.

Our second contribution is more general to the stated preference valuation literature. Valuation studies typically have given little attention to beliefs about future land use outcomes in the absence of an intervention, in effect treating environmental or resource outcomes as certain. However, environmental improvements seldom have scientifically certain outcomes and future states of natural resources are often unknown in the real world. Some recent studies have

¹ For examples, see Alvarez et al. (2014), Bockstael et al. (1987), Egan et al. (2009), Hanley et al. (2002), Hanley et al. (2003), Kling (1988), Loomis et al. (2000), and Whitehead et al. (2000). We present an extensive discussion in the literature review in the full paper.
focused on exploring uncertainty by incorporating uncertainty in outcomes (see Glenk and Colombo 2011, 2013, Lundhede et al. 2015 and Roberts et al. 2008 for example). We contribute to this literature by exploring uncertainty that manifests in a different dimension. Rather than addressing uncertainty in the outcome of an intervention, we address the uncertainty over future outcomes in the absence of an intervention.

As our second contribution to the literature, we incorporate respondents’ stated beliefs about the status-quo long-term land use. Several recent papers have argued that valuation studies should include individual perceptions/beliefs in the analysis (Ahtiainen et al., 2015; Artell et al., 2013; Glenk, 2011; Kataria et al., 2012; Marsh et al., 2011; Whitehead, 2006). Johnston et al (2017) specifically state “both objective information and subjective (respondent) perceptions of this [baseline] information should be considered”.

Our study is the first study to incorporate beliefs about the future status of the land. We show that for our application, WTP differs based upon respondents’ stated beliefs of what will happen to the land in absence of the creation of a park. We explore these issues with an application to the creation of a new national park in Maine.

II. The Application

Maine is currently home to one National Park, Acadia. Over the last few decades, there have been multiple efforts to introduce a second National Park in Maine in the Maine Northwoods (see Lilieholm 2007 and Vail 2007 for a discussion of these efforts). There has been strong support and also strong opposition within Maine for the proposed National Park. Supporters of a national park argue that the park would bring a number of tourists into Maine and help to boost the stagnating economy. Opponents of the creation of a national park claim that a park would create only seasonal, lower-paying jobs, hurt traditional industries such as forest product and paper industries, and be too restrictive as it would prevent recreational activities such as hunting and snowmobiling. One potential solution to address this last criticism is to designate both a National Park and a National Monument (which would allow hunting and snowmobiling).

The designation of a National area is likely to draw a significant number of visitors from neighboring states. At the same time there is a lack of information on the preferences of the out-of-state New Englander’s for the proposed park and the conflicting recreation activities. To investigate these potentially competing preferences we conduct a discrete choice experiment (DCE) with snowmobiling and hunting as attributes among respondents from 7 greater New England States.² We estimate respondent’s preferences and willingness to pay (WTP) for the proposed park/recreation area and analyze how engaging in snowmobiling and hunting impact the preferences and WTP.

² The survey was conducted in Connecticut, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Vermont as the most number of tourists to Maine come from these states.
III. Data and Methods

Our survey data collection was conducted among residents of New England using an online survey and resulted in 532 completed surveys. The survey design allowed respondents to express their preferences over pairs of hypothetical parks that have the following attributes: types of access (fishing and hunting), types of trails (hiking and ATV/snowmobile), economic impact (expected number of jobs), and entrance fee. The attributes and the levels, were identified and finalized after informal discussions with the public, researchers, and policy makers, conducting multiple formal focus groups, and a pilot survey of out-of-state residents. Johnston et al. (2017) state that “a payment vehicle should be selected to be realistic, credible, familiar, and binding for all respondents to as great an extent as possible and to ensure that payments are viewed as fixed and nonmalleable.” Given that we are seeking to elicit the preferences and WTP of out-of-state visitors to a national park in Maine, we use the entrance fee, a realistic, credible, familiar and binding option, as the payment vehicle (it is not possible in this context to consider alternate payment options such as taxes). ³ It is important to note that entrance fee is only binding to visitors and therefore the results should not be generalized to non-visitors or extrapolated to the population.

An example of one choice question is shown in Figure 1. As represented in Figure 1, each choice question presented two potential park options and a status-quo option. Respondents could choose the status-quo option if they preferred no national park (with its associated $0 cost) over either of the potential parks.

³ We further address potential implications of this payment vehicle choice in the conclusion.
To analyze the DCE data, we utilize a random utility model (RUM) (McFadden, 1974) and follow standard practice in the DCE literature. We generate results using WTP-space estimation and perform robustness checks by also analyzing the data using preference-space with the standard conditional logit and mixed logit (random parameter logit) models. We refer the reader to the full paper for details on the analysis and the robustness checks.

III. Results

We present a brief synopsis of the results here and refer the reader to the full paper for the detailed results with the WTP values across difference assumptions. In a prior policy review article using this data, we find that ignoring past recreational engagement in the analysis leads to a recommendation for the creation of a homogenous park that prohibits snowmobiling and hunting. Specifically, we find that allowing fishing and emphasizing job creation increase a respondents’ WTP for the proposed park and that allowing hunting and snowmobile access decreases the overall respondents’ WTP. By allowing preferences to vary according to past recreational experiences, we find that respondents could be better off if they could sort to a park with recreational attributes matching their experience. These results show that land managers should pay attention to how various forms of recreation may be in conflict and think about potential solutions to alleviate the conflict.

In this paper, we first replicate the above analysis across multiple estimation methods, including WTP-Space estimation, and show that prior experience with hunting or snowmobiling is important for determining support for a park that does not allow hunting and snowmobiling versus a park that does allow hunting and snowmobiling. We then quantify welfare effects under multiple assumptions regarding recreation use and access and show that the welfare maximizing recommendation would be the creations of both a National Park and a National Recreation area.

We then expand the analysis to incorporate belief heterogeneity for the likely outcomes of the status-quo. Specifically, we include information on respondents’ beliefs about future outcomes for the status-quo. We find that individuals who believe the land will be developed are willing to pay significantly more than individuals who believe the land will be left as is. This demonstrates the practical importance of modeling systematic heterogeneity in recreational preferences and beliefs about future land use.

IV. Conclusion

In summary, we focus this study on understanding how past engagement with recreational activities and beliefs about future land use impact preferences and support for land management. First, we model heterogeneous preferences for park attributes, allowing preferences to depend on respondents’ past experiences with hunting and snowmobiling. We find that for our application, the potential creation of a new national park in Maine, land
managers may be able to increase overall welfare by providing heterogenous recreational areas so that users can sort into their preferred park. For example, one area of the park prohibiting snowmobiling and hunting and another area allowing these activities could increase overall welfare relative to a park with a homogenous recreational profile. This insight would be lost if one neglected to model recreational preferences as a function of past experiences, especially when recreational uses conflict.

We also build on the growing literature that incorporates uncertainty into non-market valuation exercises. Whereas other papers in this literature focus on uncertainty in the impacts of an intervention, we instead focus on uncertainty over future states of land use in a world without any intervention. We operationalize this notion by collecting information about respondents’ beliefs on what would be the status-quo long-term land use. We show that WTP differs based upon respondents’ stated beliefs of what will happen to the land in absence of the creation of a park.

V. References
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