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Climate change perception, observation and policy support in rural Nevada: A comparative analysis of Native Americans, non-native ranchers and farmers and mainstream America

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ABSTRACT

As climate change research burgeons at a remarkable pace, it is intersecting with research regarding indigenous and rural people in fascinating ways. Yet, there remains a significant gap in integrated quantitative and qualitative methods for studying rural climate change perception and policy support, especially with regard to Native Americans. The objectives of this paper are to utilize our multi-method approach of integrating surveys, interviews, video, literature and fieldwork in innovative ways to: (1) address the aforementioned gap in rural studies, while advancing knowledge regarding effective methodologies for investigation of linkages between socio-political variables and climate change perceptions; and (2) perform comparative primary research regarding the climate change assumptions, risk perceptions, policy preferences, observations and knowledge among rural Nevada's tribes and tribal environmental leaders, non-native ranchers and farmers, and America's general public. The results of this study have ramifications for similar populations in arid and semi-arid lands, particularly in the U.S. Southwest.

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1. Introduction

Major climate change perception surveys have been conducted in the U.S. within the last 20 years (Bord et al., 1998; O'Connor et al., 1999; Krosnick et al., 2000; Leiserowitz, 2005, 2006; Kellstedt et al., 2008; Brody et al., 2008; Leiserowitz et al., 2009; Malka et al., 2009; McCright, 2010; McCright and Dunlap, 2011a,b). Pew Research Center (2010) polls found that 57% (2009) and 59% (2010) of Americans believed that global warming was occurring. From 2006 to 2008 Pew reported 70–79%. Meanwhile, survey data from Borick and Rabe (2010) varied from 69% to 75%. Related surveys have also been conducted on a state-scale, for example,

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concerning Michigan and Virginia (Dietz et al., 2007; Shwom et al., 2008, 2010), New Hampshire (Hamilton, 2010), and Virginia, California, Mississippi, and Pennsylvania (Borick and Rabe, 2010).

Fewer studies have focused on rural American climate change perceptions. Hamilton and Keim (2009) surveyed nineteen rural counties in nine states and noted a significant perception-temperature influence. Coles and Scott (2009) conducted seventeen interviews in Arizona, and found that the major perceived climatic risks were drought, floods, and frosts, and that farmers and ranchers continued to rely on past experiences and short-range forecasts as adaptive strategies. While Arbuckle et al. (2013) studied farmers' beliefs in climate change in the Midwest.

2. Methods

In this paper we explore perceptions, knowledge and preferences regarding climate change with less-powerful actors who have an intimate connection to their local, and sometimes extreme, Nevada environment. Supporting their voices is important, as Sachs (1993) and others have indicated that the way potential "multifaceted dangers to mankind" are often wrapped-up in high level discourse may bring the major players at the table (i.e. UN mega-conferences), but the result can be a merging of views that can mute the smaller actor and calls for necessary radical change. A mixed-method approach can capture the views of these actors (Supplemental detailed discussion of our study communities and regional climate change predictions are located in Appendix A).

2.1. Video

Through "Community Based Participatory Methods" (CBPR) we engaged in fieldwork with the Summit Lake Paiute Tribe (SL) and Pyramid Lake Paiute Tribe (PL), including a rare opportunity to film the spawning of the Lahontan Cutthroat Trout. Found only in Nevada's mountainous northwest corner, its viability under future climate change scenarios spurs deep tribal concern (Figs. 1–5, and video by Smith and Fruth, 2012). The tribes were interviewed on camera and had editorial input, raising salient climate justice issues that attracted the interest of academic, governmental, tribal, NGO, and other actors in areas such as professional training, research, and education (Figs. 6 and 7) (2013 *Environmental Politics*). This research output provided information used throughout this paper, helped us to scope which research questions would be important to address through our survey construction, highlighted important questions to pursue regarding climate observations, and culturally and geographically contextualized the scenarios examined. While our linkages to broader literature helped ensure 'broader impacts,' the CBPR approach ensured local relevance with regard to the outputs produced. Buy-in to this process was partially fueled by groups' desires to understand what their own 'public' perceived and would also support in relation to climate change impacts, policies, and adaptation, and also to give voice to vital observations that they believed were being made by local persons, but were not being considered by outsiders.

2.2. Surveys

To study tribal climate and risk perceptions, assumptions, knowledge and policy preferences in relation to climate change we primarily researched three NA groups and ranchers/farmers (RF) (the RF were non-Native American). Tribal groups included the SL, PL, and environmental managers (EM) of tribes across Nevada (ITCN, 2014). Surveys were tied to the literature at the time of creation, utilized Likert scale, open-ended and other formats, with outputs transformed into Access and spatial databases. Our survey analysis integrates, but is not limited to, *t*-tests, unstructured and semi-structured interview analysis, geostatistics (most of which do not appear in this paper) and basic statistics. Information from our interviews, video and field observations facilitated survey interpretation.

The EM survey response rate was 54% ($N = 24$). The EM represent statewide tribal governmental perspectives, knowledge, and action plans. Respondents were from various Native American tribes. Their views are crucial, powerfully influencing tribal perception, policies, and planning. We also conducted PL tribal-wide surveys on its general public, with a response rate of 20% ($N = 549$). We targeted tribal households through mail and house-to-house surveys distributed by a tribal member undergraduate researcher (Headwaters Economics, 2012). SL research focused on interviews with a core group of six tribal leaders and fieldwork. The RF survey achieved a 26% response rate ($N = 481$), solid for a survey-resistant group and lengthy survey (Fig. 8).

3. Results and discussion

3.1. Profiles

Table 1 shows that EM have much in common with the RF community in terms of education, and both groups have major land and water management responsibilities. The relative similarities in formal education between the EM and RF groups may reduce the difference in this one important variable for comparative analysis across subgroups, but not necessarily across major differences in *informal* education. We crystallize the demographic and political profiles of our study groups in Table 2, and also note their fundamental perceptions regarding the existence and origin of climate change and its associated priority level.

RF were 73% Republican, 14% Democrat, 10% independent and 2% other and no party ($N = 436$). Underscoring the contrast, they are 43% very conservative, 33% conservative, 16% middle of the road, 7% liberal, and 1% very liberal. PL is 52% Democrat and only 5% Republican ($N = 103$); whereas, 7.8% are independent with 9.7% "other party." Interestingly, 24% indicate no interest in politics.

Differences in RF and PL perspectives do not reflect major income disparities. Sixty-two percent of all RF who responded to our surveys earn between $0 and $25,000, with virtually no

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