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Public Perceptions on the Ideal Balance between Natural Resource Protection and Use in the Western USA

Abstract
Attitudes of Western residents of the USA toward natural resources have been changing due to changes in demographics and rapid population growth in the region. The objective of the study reported here was to determine how residents in 15 Western states view the balance between natural resource exploitation and protection. In general, natural resource protection was more important than resource use for people having the following demographic characteristics: (1) female, (2) younger than 60, (3) more formally educated, and (4) residing in communities larger than 25,000.

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Introduction

Traditionally, people in the Western USA, more than in any other region, have depended on natural resource exploitation and use for their livelihood. Industries including agriculture, forestry, and mining have been vital to the economies of most Western states (Nie, 1999). These industries still comprise more than 40% of the economies of the less populated, more rural Western states, including Alaska, Idaho, Wyoming, Montana, North Dakota, and South Dakota.

The 15 Western states have experienced rapid population growth over the past 15 years. The 26% increase in population has greatly changed traditional demographics and resulted in economies less dependent on natural resource exploitation. Surveys from the Pacific Northwest and Rocky Mountain states have shown that residents greatly value natural resource use (Mahler, Simmons, & Sorensen, 2005; Mahler, Simmons, Sorensen, & Miner, 2004; Clay, Ren, Reese, Waskom, Bauder, Mesner, Paige, Reddy, Neibauer, & Mahler, 2007). At the same time, numerous studies have documented increasing interest in resource protection. It is therefore important to understand how the public values both natural resource exploitation/use and natural resource protection (Kunagy, Humphrey, & Firebaugh, 1994; Inglehart, 1977, 1990; Milbrath, 1989).

Actions to protect the environment work best when political leaders and educators know their constituents' preferences for environmental quality and resource allocation. In this context, public opinion surveys are a potentially valuable source of information on people's perceptions of environmental quality, their awareness of the causes and severity of environmental problems, and

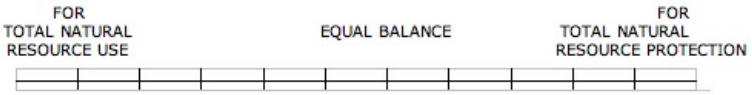
preferred solutions to these problems. While many surveys have been conducted at the national level and in many states, little information has been collected about the environmental perceptions and attitudes of Western state residents. This type of Western survey is particularly important for Extension professionals who are developing programs in water resources, forestry management, and sustainable systems (Nie, 1999; Dunlap, 1993; Hays, 1991).

This article evaluates and reports information on how people in the 15 Western states believe natural resource exploitation and natural resource preservation should be balanced.

Materials and Methods

Data for the analysis provided here were derived from surveys designed in 2002 to assess public attitudes about water issues in the states of the Pacific Northwest, in 2003 for the Pacific Southwest, and in 2004 for the Rocky Mountains. A separate survey was conducted in 2005 in New Mexico. This article deals with the following question that was common to all surveys:

Q-Place an X on the line below to show how you see the relative importance of natural resource use and natural resource protection:

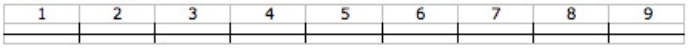


The target sample size for each state is shown in Table 1. Surveys were sent to residents of each of the 15 Western states on a proportional population basis. Residents of each state were randomly selected from phonebooks and switchboard.com or by purchasing random addresses from a company specializing in survey sampling. The mail survey process resulted in a completed survey return rate in excess of 50% (Dillman, 2000; Salant & Dillman, 1994).

Table 1.
Relevant Survey Data from the 15 Western States Surveyed on how Residents View the Appropriate Balance between Natural Resource Use and Protection

State	Survey Date	Respondents	Response Rate, %
Alaska	1/2002	120	51.7
Arizona	8/2003	370	50.5
California	8/2003	988	47.5
Colorado	10/2004	267	44.5
Hawaii	8/2003	163	52.6
Idaho	1/2002	160	57.6
Montana	10/2004	135	54.0
Nevada	8/2003	211	53.4
New Mexico	6/2005	195	50.5
North Dakota	10/2004	144	64.0
Oregon	1/2002	256	50.6
South Dakota	10/2004	130	52.0
Utah	10/2004	239	57.8
Washington	1/2002	392	51.7
Wyoming	10/2004	140	70.0

Survey answers to the resource use/protection question were coded and entered into Microsoft Excel. The continuum line was split into nine equal segments receiving values of 1 (starting on the left side of the continuum) all the way up to 9 (right end):



If a person placed an X at the equal balance spot on the continuum a 5 was recorded. Missing data were assigned the number 0 on the coding system and were excluded from analysis.

The continuum data were analyzed using a one-way classification analysis of variance. Classification variables included were the demographic variables from the survey, namely gender, age, education, community size, and state. Each demographic variable was analyzed separately. Within each analysis, single degree of freedom contrasts were used to test hypotheses of interest. All statistical computations were carried out using SAS (2004). Because this survey originated in Idaho many of the state specific comparisons were designed to compare Idaho responses to the

other Western states.

Results and Discussion

The average balance values discussed in this section are based on how survey respondents saw their own views on natural resource use and protection compared to their perceptions of the views of the average American. The average value of 5.59 was significantly different (P=0.0001) from the theoretical midpoint of 5.0 on the continuum, indicating a slight preference for protection compared to natural resource use. The demographic factors of gender, age, education level, community size, and state of residence significantly influenced how respondents viewed the ideal balance between natural resource exploitation/use and natural resource protection.

Gender

Females considered environmental protection more important than males (5.69 vs. 5.49; Table 2). This finding is consistent with past state, national, and international studies (Zelezny, Chua, & Aldrich, 2000; P=0.0006). Even though the numerical difference between males and females (5.49 vs. 5.69) was small, the large data set (n=3,972) resulted in a statistical difference. It should be noted that both genders believed in a balance between natural resource use and natural resource protection.

Table 2.
The Impact of Gender on How Respondents Perceive the Appropriate Balance Between Natural Resource Use and Protection in the Western USA Based on Surveys Conducted Between 2002 and 2005

Gender	Balance Mean	Standard Error
Male	5.49	0.03656730
Female	5.69	0.04663160
P value=0.0006, n=3, 972;		

Age

Age had a significant impact on how respondents in the Western USA view the appropriate balance between natural resource use and natural resource protection (Table 3). In general, younger respondents had higher balance values--viewing natural resource protection as being more important than natural resource use. However, all age groups had balance values between 5.2 and 5.8.

Table 3.
The Impact of Age on How Respondents Perceive the Appropriate Balance Between Natural Resource Use and Protection in the Western USA Based on Surveys Conducted Between 2002 and 2005

Age	Balance Mean	Standard Error
< 30	5.68	0.09121325
30 - 39	5.76	0.07675818
40 - 49	5.74	0.06293017
50 - 59	5.73	0.06314710
60 - 69	5.37	0.07104355
70+	5.20	0.06623839
Contrast		P > F
< 30 vs. > 70		0.0001
< 40 vs. 40 - 60		0.8250
< 30 vs. > 30		0.2270
> 70 vs. < 70		0.0001
< 50 vs. > 50		0.0001

Three specific contrasts were evaluated for age. Three of the contrasts resulted in significant differences (Table 3). Respondents less than 30 years old were more likely to see natural resource protection as more important than did people over 70 years old (5.68 vs. 5.20; P=0.0001). Respondents less than 50 considered natural resource protection more important than did people older than 50 (P=0.0001). In addition, respondents less than 70 considered natural resource

protection to be more important than natural resource use, compared to people older than 70 (P=0.0001).

An important observation about the age demographic data is that younger respondents are more likely to consider natural resource protection more important than natural resource use. This age demographic difference may be attributed to a general rise of environmentalism in American culture that pervades our media, education system, and businesses. Previous studies have shown that age has been a key differentiating variable since the 1980s, as younger survey respondents are generally more supportive of environmental issues than other age groups (Mohai & Twight, 1987).

Formal Education

Highest level of formal education completed had a significant effect on how respondents viewed the appropriate balance between natural resource use and natural resource protection in the Western USA (Table 4). In general, increasing levels of formal education resulted in respondents being more likely to favor natural resource protection compared to natural resource use. This finding is also consistent with past national surveys (Kunagy, Humphrey, & Firebaugh, 1994; Inglehart, 1977, 1990; Milbrath, 1989; Mohai & Twight, 1987).

Table 4.
The Impact of Highest Formal Education on How Respondents Perceive the Appropriate Balance Between Natural Resource Use and Protection in the Western USA Based on Surveys Conducted Between 2002 and 2005

Education Level	**Balance Mean**	**Standard Error**
< High school diploma	5.29	0.10876908
High school diploma	5.05	0.08298772
Some college	5.45	0.05142859
College graduate	5.67	0.05121524
Advanced college degree	6.00	0.06297230
Contrast		P > F
HS graduate vs. College graduate	0.0001	
Some college vs. College graduate	0.0024	
College grad. vs. Adv. College degree	0.0001	

Three specific education level contrasts were statistically evaluated. College graduates were more likely than high school graduates to favor natural resource protection over natural resource use (5.67 vs. 5.05; P=0.0001). Respondents who graduated from college were more likely to favor natural resource protection than respondents who had attended some college, but not graduated (5.67 vs. 5.45; P=0.0024). Likewise, respondents with advanced college degrees supported natural resource protection more than natural resource use compared to respondents with four-year college degrees (6.00 vs. 5.67; P=0.0001).

The result that people in the Western USA appeared to be more likely to favor natural resource protection with increasing levels of formal education can be explained in two ways. First, people with increased levels of formal education have more exposure to environmental and natural resource issues and thus have a greater appreciation for the protection and conservation of soil, water, air, mineral, and biological resources. Second, people with higher levels of formal education are more likely to have higher incomes and jobs not associated with natural resource extraction. Consequently, natural resource exploitation does not affect their personal income as much as it does people with less education working in extractive industries.

Community Size

Community size had a significant impact on how respondents in the Western USA view the appropriate balance between natural resource use and natural resource protection (Table 5). In general, respondents from larger communities had higher balance values, viewing natural resource protection as more important than natural resource use. However, residents from all community size groups had balance values between 5.1 and 5.8. This range of values can be interpreted as citizens in all community groups slightly favoring protection over use; however, urban residents were more inclined than rural residents to support protection.

Table 5.
The Impact of Community Size on How Respondents Perceive the Appropriate Balance Between Natural Resource Use and Protection in the Western USA Based on Surveys Conducted Between 2002 and 2005

Community Size	Balance Mean	Standard Error
> 100,000	5.76	0.04468078
25,000 - 99,999	5.55	0.05451616
7,000 - 24,999	5.42	0.07976255
3,500 - 6,999	5.38	0.11523290
< 3,500	5.17	0.08392355
Contrast		P > F
> 100,000 vs. < 3,500		0.0001
> 100,000 vs. 25,000 - 99,999		0.0031
3,500 - 24,999 vs. < 3,500		0.0357

Four community size contrasts evaluated resulted in significant differences due to community size (Table 5). Respondents from communities with more than 100,000 people had significantly higher values than communities with less than 3,500 residents (5.76 vs. 5.17; P=0.0001). Respondents from communities with more than 100,000 also had higher index values than residents in communities with between 25,000 and 100,000 residents (5.76 vs. 5.49; P=0.0031). Significant differences were also observed in smaller communities, as residents of towns between 3,500 and 25,000 had higher index values than residents of communities with less than 3,500 people (5.40 vs. 5.17; P=0.0357).

Value differences as a result of community size in the Western USA can be explained based on occupation. Residents of smaller communities are more likely to rely on natural resource extraction for their livelihoods when compared to larger cities. Many smaller Western communities depend on agriculture, forestry, tourism, fishing, and/or mining--all occupations that depend on natural resource exploitation (Switzer, 1997).

State of Residence

State of residence had a significant effect on how respondents viewed the appropriate balance between natural resource use and natural resource protection in the Western USA (Table 6). In general, the states with the highest populations (also the most urban) in the Western USA resulted in respondents being more likely to favor natural resource protection over natural resource use.

Table 6.
The Impact of State of Residence on How Respondents Perceive the Appropriate Balance Between Natural Resource Use and Protection in the Western USA Based on Surveys Conducted Between 2002 and 2005

State of Residence	Balance Mean	Standard Error
Colorado	5.97	0.10718249
Montana	5.81	0.16037804
Washington	5.78	0.09010370
California	5.73	0.05516739
Hawaii	5.70	0.13562994
New Mexico	5.61	0.13037252
Oregon	5.56	0.10981852
Nevada	5.50	0.11217036
South Dakota	5.43	0.15498563
Alaska	5.36	0.16481329
Arizona	5.34	0.08960450
Utah	5.22	0.11878196
North Dakota	5.08	0.15434913
Wyoming	5.07	0.16037804
Idaho	5.05	0.14109372

Before specific state contrasts are presented, it should be noted that average state balance values ranged from 5.05 to 5.97 in the Western USA. Even though this range is narrow, considering the initial evaluation scale for respondents ranged from 1 to 9, it should be noted that the range in average state balance values was wider than the average balance value ranges for the gender, age, education, and community size demographics.

The two general categories of contrasts chosen for evaluation were: (1) comparisons to Idaho's value scores, and (2) comparisons between sub-regions within the Western USA. In the first set of contrasts, Idaho responses were compared to balance values of neighboring states. Idaho's balance value (5.05) was statistically similar to Utah (5.22; P=0.3610), Wyoming (5.07; P=0.9403), and Alaska (5.36, P=0.1535). Conversely, Idaho's balance value was statistically lower than Montana's balance value (5.81; P=0.0004). Idaho's balance value was also statistically lower than the pooled balance value of Washington + Oregon (5.68; P=0.0001). When compared to the other 14 states (pooled) in the Western USA, Idaho's balance value was statistically lower (5.05 vs. 5.59; P=0.0017).

Based on the above six contrasts, Idaho resident views about natural resource utilization are similar to residents of Utah, Wyoming, and Alaska. There are obvious similarities among Idaho, Wyoming, and Alaska because the state economies have a significant reliance on natural resource use. Residents of Idaho and Utah share similar politics and ethics. Conversely, Idaho has a lower balance value than do larger and more urban states in the Western USA.

Table 7.
State of Residence Contrasts on How Respondents View the Correct Balance Between Natural Resource Use and Protection Based on Surveys Conducted Between 2002 and 2005 in the Western USA

Contrast	**P > F**
Idaho vs. rest	0.0017
Idaho vs. Montana	0.0004
Idaho vs. Utah	0.3610
Idaho vs. Wyoming	0.9403
Idaho vs. Alaska	0.1535
Idaho vs. Oregon + Washington	0.0001
California vs. Oregon + Washington	0.4869
Region 10 vs. Region 9	0.2518
Region 10 vs. Region 8	0.0107
Region 9 vs. Region 8	0.2944

In the second set of comparisons between groups of states composing sub-regions in the Western USA, results are not as clear-cut as the Idaho comparisons. California residents had a similar index value to the combined scores of Oregon + Washington (5.73 vs. 5.68; P=0.4869). Western states were grouped into the following three regions, which were roughly equivalent to the administrative regions of the United States Environmental Protection Agency: Region 8 (CO, MT, ND, NM, SD, UT, WY), Region 9 (AZ, CA, HI, NV), and Region 10 (AK, ID, OR, WA). The Pacific Northwest and the Pacific Southwest had similar balance values. Similarities, rather than differences, were found between the Rocky Mountain states (Region 8) and the Pacific Southwest (Region 9) (P=0.2944). Conversely, people in Region 10 had higher balance values compared to residents of Region 8 (P=0.007).

Conclusion

All demographic factors affected how respondents balanced natural resource use/exploitation and natural resource protection. Females considered environmental protection to be more important than did males (5.69 vs. 5.49). Respondents less than 60 years of age considered natural resource protection more important than did people over 60. The more formal education received by a respondent resulted in a greater importance being placed on natural resource protection. In addition, respondents from larger communities tended to consider natural resource protection more important compared to people from smaller communities. State of residence also affected the perceived balance between natural resource use and protection.

Data collected in the study reported here are important for three major reasons. First, the data can be used to measure future changes in attitudes from residents in the Western USA. Second, the data helps to dispel traditional beliefs that most people in rural areas of the Western USA have cornucopian perceptions of natural resources. In fact, the vast majority of Westerners surveyed believe in a practical balance between natural resource use and natural resource protection. Third, the data can be used as a starting point to develop educational programs for Western USA residents about natural resource issues and associated policies.

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