

Understanding the Diversity of Public Interests in Wildlife Conservation

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Abstract: *North American state wildlife agencies are increasingly faced with the challenge of effectively representing a diverse public. With increasing social conflict over wildlife issues, the future of wildlife conservation hinges on preparedness of the profession to respond to this challenge. In the interest of finding ways to improve response, 19 agencies in the western U.S. joined forces to initiate an investigation that would provide a better understanding of the diversity of wildlife-related interests in the region. Specific objectives, accomplished through use of a mail survey administered in 2004, were to categorize people on the basis of their value orientations toward wildlife and explore how different groups were distributed across states and to examine differences on sociodemographic characteristics and attitudes toward wildlife-related topics among groups. The focus was on two orientations: domination (view of wildlife that prioritizes human well-being over wildlife and treats wildlife in utilitarian terms); and mutualism (view of wildlife as capable of relationships of trust with humans and defined by a desire for companionship with wildlife). Four types of people were identified on the basis of these orientations. Types differed in their geographic distribution and wildlife-related attitudes and behaviors, revealing how value orientations can form the foundation for conflict on wildlife issues. Our characterizations of stakeholder groups offer a framework that can be applied over time and across geographic scales to improve conservation planning efforts and inform broader thinking about the social aspects of wildlife conservation.*

Keywords: attitudes, conflict, human dimensions, values, value orientations, wildlife

Entendiendo la Diversidad de Intereses Públicos en la Conservación de Vida Silvestre

Resumen: *Las agencias estatales de vida silvestre norteamericanas enfrentan cada vez más el reto de representar efectivamente a un público diverso. Con el incremento del conflicto social sobre temas de vida silvestre, el futuro de la conservación de vida silvestre depende del estado de preparación de la profesión para responder a este reto. Con el interés de encontrar maneras para mejorar la respuesta, 19 agencias del oeste de E. U. A. unieron fuerzas para iniciar una investigación que proporcionaría un mejor entendimiento de la diversidad de intereses relacionados con la vida silvestre en la región. Los objetivos específicos, cumplidos mediante el uso de una encuesta aplicada por correo en 2004, fueron la categorización de personas con base en su orientación de valores hacia la vida silvestre y explorar cómo se distribuyeron los diferentes grupos y examinar las diferencias entre grupos en cuanto a características socioeconómicas y actitudes hacia tópicos relacionados con la vida silvestre. El enfoque tuvo dos orientaciones: dominación (punto de vista sobre la vida silvestre que prioriza el bienestar humano sobre la vida silvestre y la trata en términos utilitarios) y mutualismo (punto de vista sobre la vida silvestre que reconoce las relaciones con los humanos definido por un deseo de acompañamiento con la vida silvestre). Con base en estas orientaciones se identificaron cuatro tipos de personas. Los tipos difirieron en su distribución geográfica y sus actitudes y conductas relacionadas con temas de vida silvestre. Nuestras caracterizaciones de los grupos de interés ofrecen un marco de referencia que puede ser aplicado con el transcurso del tiempo y a través de escalas geográficas para mejorar los*

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esfuerzos de planificación de la conservación e informar sobre los aspectos sociales de la conservación de vida silvestre.

Palabras Clave: actitudes, conflicto, dimensiones humanas, orientación de valores, valores, vida silvestre

Introduction

How effective are North American state wildlife agencies in meeting their public trust mandate (under which publicly owned resources, such as wildlife are entrusted to government for safeguarding in the interest of all citizens [Prukop & Regan 2005])? Do these agencies manage resources in a way that creates sustainable benefits to the people they serve, and are these benefits distributed equitably? Are the diverse interests of the public represented adequately in decisions? Answers to these questions depend on the time period under consideration, the societal interests of that period, and the contemporaneous condition of wildlife resources. In fact, many writers note that the responsiveness of wildlife agencies today is largely an artifact of an earlier historical period (Heberlein 1991; Gill 1996; Peyton 2000).

The pattern of public responsiveness in wildlife management was forged at a time when there was a strong utilitarian view toward wildlife in North America. Wildlife provided nutritional and commercial benefits, and protection against wildlife ensured economic well-being and safety. Yet the unconstrained pursuit of benefits was the most serious detriment to their attainment.

The early 20th century brought recognition of widespread loss of wildlife populations due to the commercial exploitation and threats to societal interests. Emergence of the wildlife management profession, including its philosophical basis, its institutions (wildlife agencies), university-based research and educational systems, and its professional societies, occurred with a heavy emphasis on reversing this trend. To illustrate, a guiding principle of wildlife management proposed that environments should be manipulated to “convert hunting from exploitation to cropping” (Leopold 1949). Conservation programs formed around such principles of game management, and participation in hunting and fishing was viewed as an important component of professional preparation. Thus, it is not surprising that “state agencies became dominated by a hunting subculture” (Organ & Fritzell 2000).

The profession was remarkably effective in dealing with the problems of the early 1900s and in meeting the societal interests of that time period; its accomplishments are obvious today. There are widely available opportunities for hunting and fishing, significant annual participation rates, great social benefits arising from this participation, and widespread control of problems associated with commercial taking of wildlife. It is increasingly being asked, however, whether or not the agencies bound

by this tradition are adequately representing the public interests of the 21st century (Peyton 2000). The ability to do so is challenged by many factors. Prominent among them is the changing nature of contemporary interests, which are increasingly characterized by conflict and a desire to intervene in policy through such mechanisms as ballot initiatives (e.g., trapping bans; Minnis 1998) and a diversity of viewpoints and lack of understanding among agencies regarding this diversity. Furthermore, there is a reluctance among agencies to embrace change, which is rooted in the continued dependence on hunting and fishing license revenues to support agency programs and in a perception that emergent public interests conflict with the personal and institutional interests borne from a prior era (Gill 1996).

To speak of the wildlife profession in such terms as static and unresponsive, however, would be underestimating the change that is actually occurring. There has been a growing involvement of social scientists in wildlife management and emergence of an area of specialization known as human dimensions of wildlife (Manfredo et al. 1995); education of wildlife professionals increasingly emphasizes social science topics (Decker et al. 2001); and social science inquiry is increasingly included in wildlife decision making. In line with these developments, we launched an investigation with 19 state wildlife agencies in the western United States to enhance knowledge of the changing nature of public interests regarding wildlife. The study was undertaken with recognition that a broadly applicable understanding of the diversity of contemporary interests and empirical data to allow geographic and longitudinal comparisons are lacking. We sought to establish a baseline for such comparisons and to offer a social science approach to assist wildlife conservation planning efforts.

A theory of wildlife value orientations (i.e., sets of basic beliefs about wildlife) served as the conceptual foundation for our study (Manfredo et al. 2009). This theory builds on the widely applied value-attitude-behavior framework (Homer & Kahle 1988) in which individual behavior is guided by a series of interrelated cognitions arranged in a hierarchical fashion. At the base of this hierarchy are values, which are foundational cognitions that shape the formation of many attitudes that form within an individual. Attitudes, defined as the association of an evaluation and an object in memory, in turn, direct behavior. Value orientations reflect the influence of ideology in this cognitive hierarchy; they consist of networks of basic beliefs that organize around values and provide contextual meaning to those values in relation to a

particular domain such as wildlife. Ideology is a group-level concept referring to consensually held beliefs that enable the people who share them to define themselves, to understand meaning, and to relate to one another (Pratto 1999). The strength of a given ideology, and hence value orientations, varies among individuals, and differences in attitudes and behaviors stem from this variation. Consider, for example, two individuals who both assign high priority to a value such as being humane toward all living things. One person may interpret this to mean people should not harm wildlife for most any reason, whereas the other may believe it is acceptable to kill wildlife for human use if ensuring the animal does not experience undue suffering. These two people would profess to hold the same value and yet would act very differently toward wildlife. We contend the first individual's value has a mutualism orientation and the other individual's value is oriented by a domination ideology.

Empirical findings suggest domination is the prominent value orientation of most Americans, which has implications for human-nature as well as human-human relationships (Schwartz 2006). Individuals with a domination value orientation toward wildlife, according to our model, believe wildlife should be managed for human benefit and are more likely to prioritize human well-being over wildlife in their attitudes and behaviors. They are also more likely to find justification for treatment of wildlife in utilitarian terms and to rate actions that result in death or harm to wildlife as acceptable. Our mutualism-wildlife value orientation reflects an egalitarian ideology that has fostered perceptions of social inclusion and equality that extend to human-animal relationships (Wildavsky 1991). Individuals with a mutualism orientation view wildlife as capable of relationships of trust with humans, as if wildlife were part of an extended family, and as deserving of rights and care. These individuals are less likely to support actions resulting in death or harm to wildlife, more likely to engage in welfare-enhancing behaviors for individual wildlife, and more likely to view wildlife in human terms.

We contend that individual behavior toward wildlife is driven by specific attitudes and that these attitudes are directed by wildlife value orientations, which are ideologically shaped beliefs that orient and provide personal meaning to one's more basic values in relation to wildlife. These orientations are assumed to play an important role in explaining individual variation in wildlife-related behaviors and attitudes toward issues dealing with wildlife treatment. We applied this theory in an examination of the distribution of wildlife value orientations in the western United States. We divided people into "types" on the basis of their wildlife value orientations, explored how the types were distributed across states, and compared the sociodemographic and lifestyle characteristics and attitudes toward wildlife-related topics among types. Attitudinal comparisons were intended to explore the

predictive validity of our concepts and to show how differences in value orientations form the foundation for conflict on wildlife issues.

Methods

Data Collection

We collected data via a mail survey administered to a sample of residents in each of the 19 western U.S. states in fall 2004. Survey administration was preceded by a pilot phase in six states in 2002 and pretesting in the 19 states in summer 2004 (Teel et al. 2005). We obtained resident contact information from Survey Sampling International (Shelton, Connecticut). Samples were stratified by state and age to ensure adequate representation of population subgroups. We attempted to get 400 completed surveys per state, allowing for population estimates within 5% at the 95% confidence level.

We used a modified Dillman (2007) approach to survey administration that included two mailings of the survey and cover letter and a reminder postcard. To achieve relatively equal representation of men and women, half of the first mailing cover letters requested participation by a female and half requested participation by a male in the household. To test for nonresponse bias, we phoned a sample of nonrespondents in each state following data collection. The phone survey contained several questions from the mail survey, including items to assess wildlife value orientations, participation in wildlife-related recreation, and sociodemographics.

Measurement

We measured domination and mutualism orientations with composite scales consisting of items representing basic beliefs about wildlife and wildlife management. Item development followed domain sampling procedures of scale construction, with a focus on ensuring adequate representation of a priori specified "belief dimensions" (i.e., sets of basic beliefs; Nunnally & Bernstein 1994). These dimensions, verified and refined through open-ended interviews, were intended to reflect core areas of thought within each ideological domain. A domination orientation was indicated in our final approach by beliefs corresponding to two dimensions: hunting and use of wildlife. A mutualism orientation was also described in relation to two belief dimensions: caring and social affiliation. Respondents rated their level of agreement with belief items on a scale ranging from 1 (strongly disagree) to 7 (strongly agree) (Table 1).

We used fixed response options to collect data on gender, education, income, and the area of residence (urban or rural). Respondents were also asked to select from fixed categories to indicate past, current, and future interest in participation in hunting, fishing, and wildlife

Table 1. Reliability and confirmatory factor analysis (CFA) results for wildlife value orientations from a 2004 survey of western U.S. residents.^a

| <i>Wildlife value orientation, basic belief dimension, and basic belief item^b</i> | <i>Factor loading (SE)^c</i> | <i>Cronbach's alpha</i> |
|--|--|-------------------------|
| Domination | | 0.83 |
| Appropriate use beliefs | 0.86 (0.02) | 0.78 |
| Humans should manage fish and wildlife populations so that humans benefit. | 0.57 (0.02) | |
| The needs of humans should take priority over fish and wildlife protection. | 0.65 (0.02) | |
| It is acceptable for people to kill wildlife if they think it poses a threat to their life. | 0.54 (0.01) | |
| It is acceptable for people to kill wildlife if they think it poses a threat to their property. | 0.68 (0.02) | |
| It is acceptable to use fish and wildlife in research even if it may harm or kill some animals. | 0.54 (0.02) | |
| Fish and wildlife are on earth primarily for people to use. | 0.67 (0.02) | |
| Hunting beliefs | 0.53 (0.01) | 0.80 |
| We should strive for a world where there is an abundance of fish and wildlife for hunting and fishing. | 0.51 (0.02) | |
| Hunting is cruel and inhumane to the animals. ^d | 0.79 (0.02) | |
| Hunting does not respect the lives of animals. ^d | 0.80 (0.02) | |
| People who want to hunt should be provided the opportunity to do so. | 0.74 (0.01) | |
| Mutualism | | 0.86 |
| Social affiliation beliefs | 0.82 (0.02) | 0.82 |
| We should strive for a world where humans and fish and wildlife can live side by side without fear. | 0.57 (0.02) | |
| I view all living things as part of one big family. | 0.73 (0.02) | |
| Animals should have rights similar to the rights of humans. | 0.81 (0.02) | |
| Wildlife are like my family and I want to protect them. | 0.82 (0.02) | |
| Caring beliefs | 0.67 (0.01) | 0.80 |
| I care about animals as much as I do other people. | 0.53 (0.02) | |
| It would be more rewarding to me to help animals rather than people. | 0.42 (0.02) | |
| I take great comfort in the relationships I have with animals. | 0.84 (0.01) | |
| I feel a strong emotional bond with animals. | 0.72 (0.02) | |
| I value the sense of companionship I receive from animals. | 0.85 (0.01) | |

^aConsistent with requirements of procedures like those performed in Amos (version 5.0.1), analyses used unweighted data.

^bItem response scales range: 1 (strongly disagree) to 7 (strongly agree).

^cStandardized factor loadings from the CFA. All *t* values for factor loadings were significant at $p < 0.001$.

^dItem was reverse coded prior to analysis.

viewing. Age and length of in-state residence were recorded in number of years.

Wildlife issues for attitudinal measures were identified by participating agencies, and items for these issues were contained in a separate, state-specific section of the survey. Items asked respondents to rate their level of agreement with statements representing an issue or the extent to which they found management actions acceptable. Responses were recorded on either a 1 to 7 (1, strongly disagree or highly unacceptable; 7, strongly agree or highly acceptable) or a dichotomous (yes or no) response scale.

Analyses

We examined the internal consistency and structure of value-orientation scales by conducting reliability analysis in SPSS (version 13.0; Chicago, Illinois) and confirmatory factor analysis (CFA) in Amos (version 5.0.1; SPSS, Chicago, Illinois). These procedures allowed us to deter-

mine whether hypothesized groupings of items into belief dimensions and value orientations provided a good fit for the data collected. Reliability analyses assessed the extent to which we obtained consistent results across multiple items measuring a given belief dimension or value orientation. The CFA revealed whether item groupings reflected distinct patterns of scoring that were consistent with our hypothesized framework. We computed value-orientation scores in a two-stage process. First, we gave respondents a score for each belief dimension (e.g., caring), computed as the mean of all items within that dimension, and then we assigned the value orientation (e.g., mutualism) score by computing the mean of corresponding belief dimension scores.

We segmented respondents into types by comparing their scores on domination and mutualism simultaneously via a cross-tabulation procedure. This revealed four categories of people who could be classified on the basis of whether they scored high or low on each orientation (i.e., types: high-low, low-high, high-high, low-low).

High was defined by a score of >4.50 (median and scale midpoint for each mean composite), whereas low was defined by a score of ≤ 4.50 . We compared types on sociodemographic and lifestyle characteristics with one-way analyses of variance (ANOVA) and chi-square tests. For attitudinal comparisons, we correlated (Pearson's r , point biserial) attitude measures with value-orientation scales. For illustration purposes, we also compared value-orientation types on a subset of attitude items through a graphic display procedure known as the potential for conflict index (PCI; Manfredi et al. 2003). We used an alpha level of $p < 0.05$ to designate statistical significance and computed effect size measures to take into account a higher likelihood of finding statistical significance with a large sample size (Cohen 1988).

Results

We mailed 69,031 surveys, of which 12,673 were returned completed (over 400 per state) and 8063 were undeliverable (21% response rate, overall). The follow-up phone survey ($n = 7388$) revealed significant differences between respondents and nonrespondents on age and participation in wildlife-related recreation but only marginal variation (partial $\eta^2 < 0.01$, the level at which the effect size is defined as small [Cohen 1988]) on value orientations. Given these findings, data were weighted to adjust for underrepresentation of younger age groups and overrepresentation of certain forms of wildlife-related recreation within each state (Teel et al. 2005). For reporting at the regional level (all states combined), we also weighted data to account for state population sizes. We obtained population estimates for weighting from the U.S. Census Bureau (2002) and the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (U.S. Fish and Wildlife Service & U.S. Census Bureau 2001).

Value-Orientation Types

Reliability results indicated high internal consistency for belief-dimension and value-orientation scales (Nunnally & Bernstein 1994). Cronbach's alpha, a measure of inter-item consistency with scores of 0 to 1, ranged from 0.78 to 0.86 (Table 1). The CFA results offered further confirmation that hypothesized item groupings provided a good fit for the data (fit statistics for final two-factor solution: comparative-fit index [CFI] = 0.98, goodness-of-fit index [GFI] = 0.99; normed-fit index [NFI] = 0.98, root mean-square residual [RMR] = 0.05). Standardized factor loadings were all statistically significant at $p < 0.001$ and above the minimum criterion of 0.40 used to denote practical significance (Table 1).

Mean scoring on belief-dimension and value-orientation scales differed significantly across the four value-orientation types identified in our categorization procedures (Table 2). We assigned the following labels to these groups: traditionalists, mutualists, pluralists, and distanced individuals. Traditionalists scored high on domination and low on mutualism, which indicated they held an ideological view of human mastery over wildlife associated with prioritization of human well-being over wildlife and a positive regard for treatment of wildlife in utilitarian terms. Mutualists scored high on mutualism and low on domination, which indicated they viewed wildlife as capable of relationships of trust with humans and deserving of rights and care. Pluralists scored high on both scales, meaning they had both a mutualism and a domination orientation. Distanced individuals scored low on both scales, which indicated they did not advocate either a mutualism or a domination view. Their lack of a well-formed value orientation suggested less of a connection with wildlife and less interest in wildlife issues.

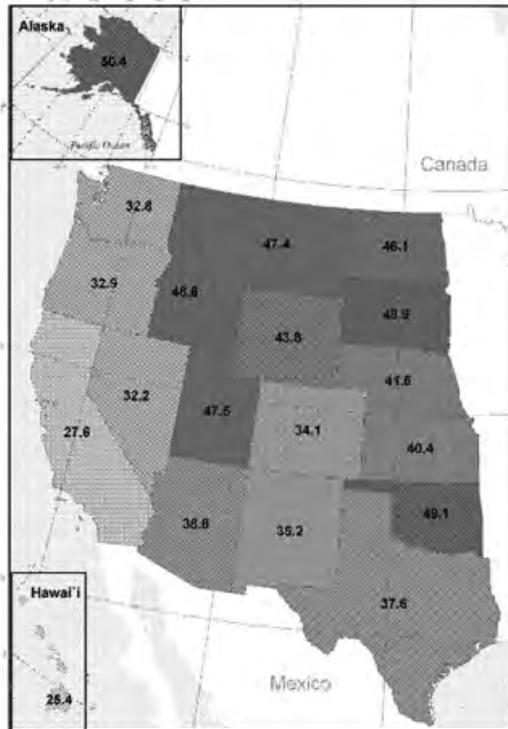
For the region, 34% of respondents were classified as traditionalists, 33% as mutualists, 20% as pluralists, and 13% as distanced. Across states, we identified 25–50% of respondents as traditionalists (Fig. 1). The highest percentages were in Alaska and South Dakota, and these states were followed closely by Oklahoma, Idaho, Utah,

Table 2. Scoring of wildlife value-orientation types on belief dimension and value-orientation scales from a 2004 survey of western U.S. residents.*

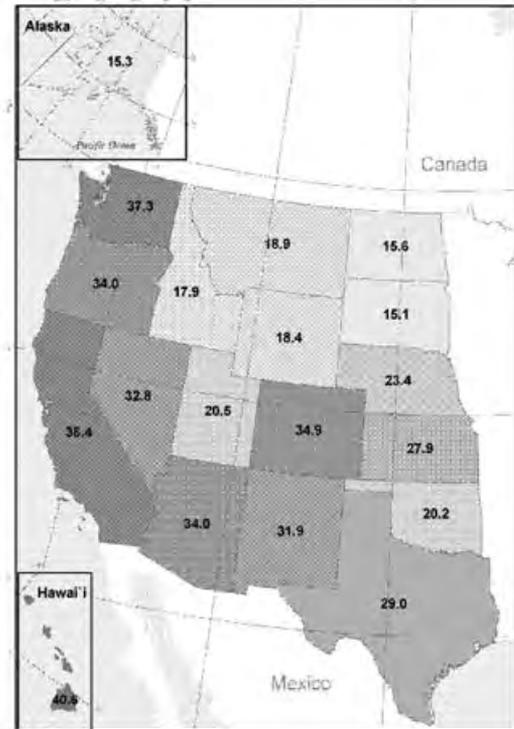
| Value orientation and belief dimension | Traditionalist | | Pluralist | | Mutualist | | Distanced | |
|--|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| | mean (SD) | median (SD) | mean (SD) | median (SD) | mean (SD) | median (SD) | mean (SD) | median (SD) |
| Domination | 5.65 (0.67) | 5.58 | 5.39 (0.59) | 5.25 | 3.32 (0.85) | 3.50 | 3.87 (0.57) | 4.00 |
| appropriate use | 5.53 (0.85) | 5.50 | 5.03 (0.93) | 5.00 | 3.16 (0.96) | 3.17 | 4.08 (0.90) | 4.17 |
| hunting | 5.78 (0.93) | 5.75 | 5.75 (0.92) | 5.75 | 3.47 (1.34) | 3.75 | 3.66 (1.00) | 3.75 |
| Mutualism | 3.42 (0.77) | 3.53 | 5.30 (0.59) | 5.18 | 5.68 (0.69) | 5.60 | 3.71 (0.65) | 3.85 |
| social affiliation | 3.30 (1.12) | 3.50 | 5.44 (0.88) | 5.50 | 5.91 (0.82) | 6.00 | 3.80 (1.01) | 4.00 |
| caring | 3.55 (0.96) | 3.60 | 5.16 (0.81) | 5.20 | 5.44 (0.92) | 5.60 | 3.63 (0.85) | 3.60 |

* Mean and median scoring reported for region-level data. Original response scales for items comprising the dimensions and orientations ranged from 1 (strongly disagree) to 7 (strongly agree). With one exception (comparing pluralists and traditionalists on the hunting belief dimension), all within-row means were statistically different ($p < 0.05$) as reported by Tambane's post hoc test, used due to a violation of the equal-variances assumption in analysis of variance.

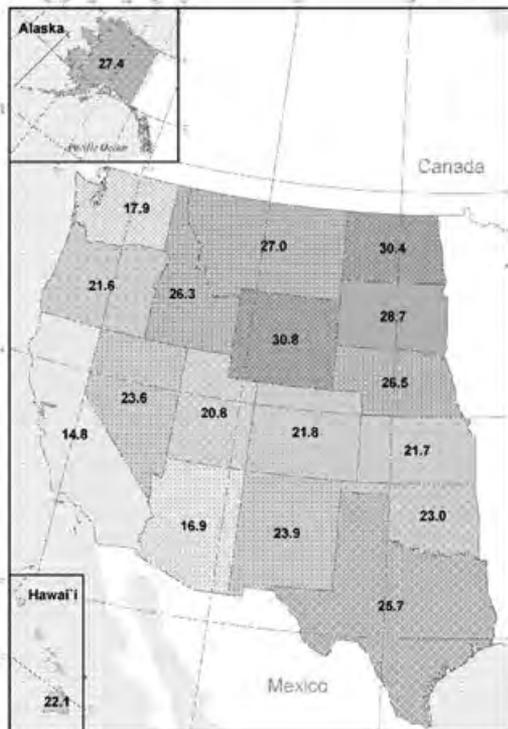
% traditionalists



% mutualists



% pluralists



% distanced

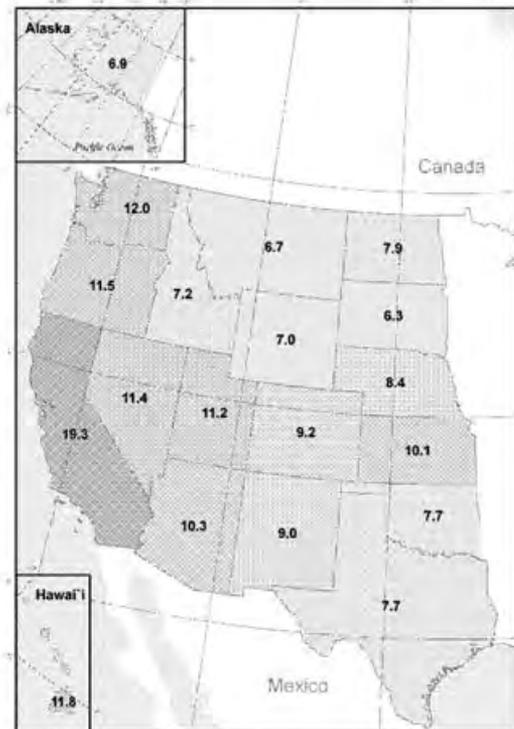


Figure 1. Distribution of wildlife value-orientation types across states from a 2004 survey of western U.S. residents (traditionalists, domination value orientation that prioritizes human well-being over wildlife and treats wildlife in utilitarian terms; mutualists, mutualism orientation, viewing wildlife as capable of relationships of trust with humans and deserving of rights and care; pluralists, both a mutualism and a domination orientation; distanced individuals, advocate neither mutualism nor a domination view and are less interested in wildlife and wildlife issues). Shading used to enhance visibility of distribution patterns. Darker shades signify higher percentages of the types. (Manfredro 2008, p. 158, reproduced with kind permission of Springer Science+Business Media).

Montana, and North Dakota. The lowest percentage was in Hawai'i, and this state was followed by California, Nevada, Washington, and Oregon. This pattern was reversed for distribution of mutualists, which ranged from 15 to 41% across states. Hawai'i, California, and Washington had the most mutualists, whereas South Dakota, Alaska, and North Dakota had the fewest. We classified 15–31% of respondents as pluralists. The states with higher percentages of pluralists were Wyoming, North Dakota, and South Dakota. The percentages of distanced individuals across states were relatively low (6–19%). California had the most distanced individuals, whereas South Dakota, Montana, and Alaska had the least.

Comparisons of the sociodemographics among types indicated traditionalists and pluralists had similar characteristics and were different from mutualists and distanced on certain variables (Table 3). The former were more likely males and older on average, and had lived in the state for longer. Types differed only slightly on education, income, and area of residence. With the exception of gender, which had a moderate effect size, the strength of association with sociodemographic variables was weak (Cohen 1988). We found more notable differences on participation in wildlife-related recreation (Table 3). Hunting, as indicated by effect sizes, had a stronger connection to value orientations than other activities we examined. Mutualists and distanced individuals were less likely to indicate past and current involvement in hunting and to express interest in hunting in the future. This trend was also evident, although to a lesser extent, for fishing. Mutualists were more likely than the other types to have recently participated in wildlife viewing.

Attitudes toward Wildlife Issues

Out of 473 attitudinal measures included on the survey, 71% (337 items) were statistically related to domination, whereas mutualism was correlated with attitudes 59% (279 items) of the time. Of those that were statistically significant, 32% (107) of domination correlations and 31% (87) of mutualism correlations were ≥ 0.30 , indicating a moderate to large effect (Cohen 1988). Value orientations were significantly related to attitudes across a diverse array of issues and in particular explained variation on issues involving harm to wildlife and trade-offs between wildlife protection and human interests (T.L.T. & M.J.M., unpublished paper). Graphic displays created with the PCI statistic for a subset of issues provided further evidence of the role of value orientations in explaining attitudinal differences (Fig. 2). The PCI provided an indication of the amount of dispersion around the mean, with a larger value signifying a greater amount of within-group variability or "potential for conflict" (Manfredo et al. 2003). For each issue, the PCI was higher for the public as a whole than for the four value-orientation types,

which indicated our categorization scheme effectively explained variation in public response to these topics. Mutualists were more likely than traditionalists to favor wildlife protection over human interests and to oppose harmful actions. They agreed, for example, with the need to reduce logging to protect wildlife, despite impacts on local economies. Mutualists also had high within-group consensus in regard to opposition to controversial predator-management techniques, including reduction of wolf (*Canis lupus*) numbers to enhance hunting opportunities and use of dogs to hunt cougars (*Felis concolor*). Traditionalists, though more divided on the wolf issue, were accepting of these actions on average and favored property rights and economic considerations in their evaluations of wildlife-protection measures. With the exception of the wolf issue, on which groups were more polarized, pluralists and distanced individuals tended to be less extreme than the other types. Mutualists and distanced individuals had similar patterns of response, whereas pluralists were for some issues more aligned with traditionalists.

Discussion

Our intention with this investigation, launched cooperatively with 19 agencies in the western United States, was to provide a better understanding of the different wildlife-related interests of today's society because such understanding is a necessary first step toward ensuring more adequate representation of diverse viewpoints in wildlife decision making in the future. Our approach centered on a theory of wildlife value orientations, which offers a framework for exploring these interests in a parsimonious way. It was designed to overcome certain limitations of prior research on wildlife values (King 1947; Kellert 1976; Bryan 1980; Shaw 1987; Purdy & Decker 1989) that, although critical to advancing consideration of the human dimension in wildlife management, has largely been empirically driven and constrained by the lack of a clear conceptual foundation (Bryan 1980; Manfredo 2008). Such a foundation is necessary to distinguish among the various types of cognition (values, ideology, attitudes) that form the basis for human behavior and to bring about the recognition that each of these concepts has different implications for conservation. Specifically, values and their orientations are stable and enduring; they change gradually over time across generations as opposed to within individuals, whereas attitudes are more transitional in nature and therefore may be more easily influenced by communication strategies and other conservation interventions. And yet, these concepts have been used interchangeably in the wildlife-values literature, contributing to confusion over the actual topic of investigation and its implications for management (Manfredo 2008). By striving for greater conceptual clarity, our

Table 3. Comparison of wildlife value-orientation types on sociodemographic and lifestyle characteristics from a 2004 survey of western U.S. residents.

| Variable | Wildlife value-orientation type ^a | | | | χ^2 or F ^b (df) | ES ^c |
|--|--|-----------|-----------|-----------|---------------------------------|-----------------|
| | traditionalist | pluralist | mutualist | distanced | | |
| Age (\bar{X}) | 47.21a | 50.49b | 43.84c | 42.66c | 113.72 (3, 12,412) | 0.16 |
| Length of in-state residence (\bar{X}) | 30.33a | 32.45b | 25.98c | 23.50d | 96.97 (3, 11,829) | 0.16 |
| Gender (%) | | | | | 1139.09 (3) | 0.30 |
| male | 64.90 | 62.80 | 31.20 | 45.40 | | |
| female | 35.10 | 37.20 | 68.80 | 54.60 | | |
| Education (%) | | | | | 232.15 (12) | 0.08 |
| less than high school | 1.50 | 2.80 | 1.30 | 1.30 | | |
| high school diploma or GED ^d | 22.30 | 27.50 | 17.80 | 20.20 | | |
| at least some college | 20.80 | 22.20 | 20.40 | 14.70 | | |
| college or advanced degree | 55.40 | 47.60 | 60.50 | 63.80 | | |
| Income (%) | | | | | 210.64 (24) | 0.08 |
| less than \$10,000 | 3.30 | 2.30 | 2.30 | 3.40 | | |
| \$10,000-\$29,999 | 14.90 | 16.00 | 19.30 | 17.70 | | |
| \$30,000-\$49,999 | 19.90 | 26.20 | 24.20 | 24.50 | | |
| \$50,000-\$69,999 | 20.10 | 20.60 | 16.70 | 15.60 | | |
| \$70,000-\$89,999 | 15.60 | 12.90 | 13.70 | 7.90 | | |
| \$90,000-\$109,999 | 9.80 | 10.20 | 8.40 | 14.80 | | |
| \$110,000-\$129,999 | 5.00 | 3.70 | 5.10 | 4.40 | | |
| \$130,000-\$149,999 | 3.40 | 2.00 | 2.50 | 2.90 | | |
| \$150,000 or more | 7.90 | 6.10 | 7.90 | 8.80 | | |
| Area of residence | | | | | 310.46 (21) | 0.09 |
| large city (250,000 or more) | 33.80 | 33.20 | 43.90 | 42.20 | | |
| city (100,000-249,999) | 13.10 | 14.60 | 15.30 | 16.30 | | |
| city (50,000-99,999) | 13.60 | 14.90 | 12.50 | 16.60 | | |
| small city (25,000-49,999) | 11.40 | 11.00 | 10.10 | 11.60 | | |
| town (10,000-24,999) | 10.10 | 8.20 | 7.30 | 4.80 | | |
| town (5000-9999) | 6.00 | 6.60 | 5.10 | 3.60 | | |
| small town (<5000) | 5.50 | 5.30 | 2.60 | 3.40 | | |
| farm or rural area | 6.50 | 6.30 | 3.20 | 1.50 | | |
| Wildlife-related recreation (%) ^e | | | | | | |
| past fishing | 85.30 | 84.00 | 74.80 | 79.80 | 270.01 (3) | 0.15 |
| past hunting | 50.40 | 51.40 | 16.10 | 17.50 | 1601.41 (3) | 0.36 |
| past viewing | 52.00 | 59.70 | 62.80 | 44.80 | 200.28 (3) | 0.13 |
| current fishing | 21.90 | 22.40 | 9.20 | 8.70 | 391.56 (3) | 0.18 |
| current hunting | 9.70 | 9.90 | 0.80 | 1.30 | 449.36 (3) | 0.19 |
| current viewing | 24.20 | 30.30 | 37.50 | 21.20 | 238.90 (3) | 0.14 |
| future fishing | | | | | 851.97 (9) | 0.15 |
| not at all interested | 30.00 | 27.40 | 50.10 | 47.60 | | |
| slightly interested | 26.90 | 25.50 | 26.70 | 29.10 | | |
| moderately interested | 20.70 | 21.50 | 14.60 | 15.60 | | |
| strongly interested | 22.40 | 25.60 | 8.70 | 7.70 | | |
| future hunting | | | | | 1766.07 (9) | 0.22 |
| not at all interested | 55.10 | 52.70 | 89.20 | 85.00 | | |
| lightly interested | 18.90 | 18.10 | 6.70 | 7.40 | | |
| moderately interested | 11.10 | 11.70 | 2.50 | 5.30 | | |
| strongly interested | 14.90 | 17.50 | 1.60 | 2.30 | | |
| future viewing | | | | | 575.02 (9) | 0.12 |
| not at all interested | 24.20 | 16.90 | 11.80 | 20.20 | | |
| slightly interested | 26.50 | 24.10 | 18.20 | 28.10 | | |
| moderately interested | 26.80 | 27.90 | 26.80 | 26.90 | | |
| strongly interested | 22.50 | 31.00 | 43.20 | 24.80 | | |

^aNumbers denote means or overall percentages obtained from region-level data. In some cases, percentages within groups do not add up to 100 due to rounding. Means with different letters denote statistical difference ($p < 0.05$) as reported by Tamhane's post hoc test, used due to a violation of the equal-variances assumption in analysis of variance (ANOVA).

^bAll values were significant at $p \leq 0.001$.

^cEffect size measures. Cramer's V was used for chi-square analysis, and η was used for ANOVA.

^dGED: General educational development (high school diploma equivalency).

^ePast participation defined by an indication of having ever participated in the activity (yes or no); current participation defined by an indication of participation in the past 12 months (yes or no).

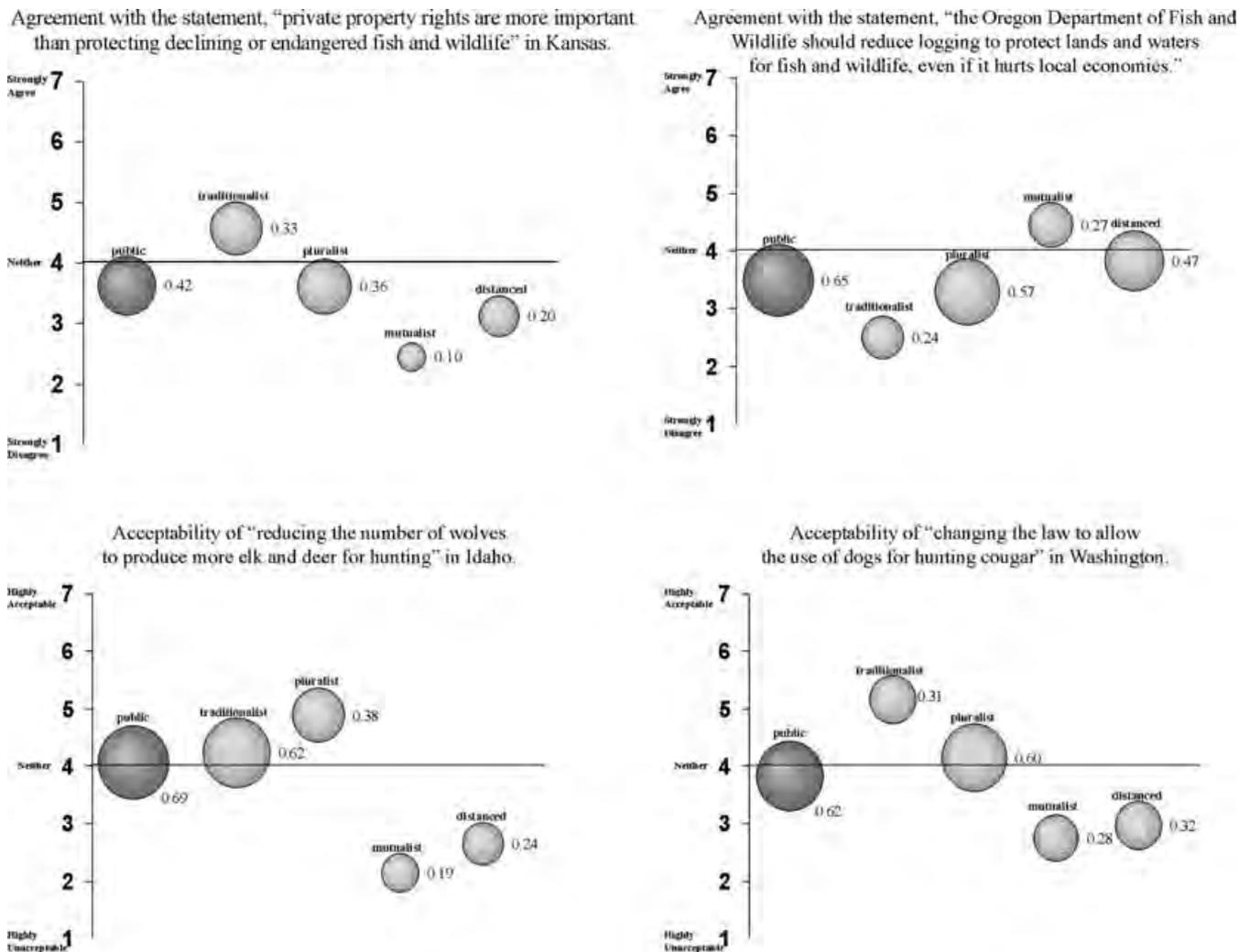


Figure 2. Comparison of wildlife value-orientation types (defined in Fig. 1 legend) on attitudes toward selected wildlife-related issues from a 2004 survey of western U.S. residents. Graphs report mean levels of agreement or acceptability (bubble center plotted against y-axis) by value-orientation type and for the public as a whole. Numbers alongside bubbles denote potential for conflict index (PCI) statistics (bubble size) which range from 0 to 1, with higher values indicating greater within-group response variability around the mean (Manfredo et al. 2003).

approach was intended to respond to these concerns and thereby contribute to more broadly generalizable explanations of human thought and behavior in a wildlife context.

Application of our theory in the western United States resulted in a four-group typology classified on two primary value orientations toward wildlife. These orientations were defined to represent broad, cultural ideologies, suggested by earlier research to play a role in human-nature and human-animal relationships in the United States (Wildavsky 1991; Schwartz 2006). Traditionalists have a domination orientation, which reflects an ideology of human mastery over wildlife; mutualists have a mutualism orientation that is more reflective of an egalitarian ideology. Thus, although traditionalists view

the world as one in which wildlife should be used and managed for human benefit, mutualists are defined by their greater sense of caring and desire for companionship that they express toward wildlife. Pluralists hold both a domination and a mutualism view. Drawing upon Tetlock's (1986) "value pluralism model," this circumstance of possessing two conflicting viewpoints with different evaluative implications is explained by how the orientations are likely manifested; which of the orientations plays a role in influencing one's thinking and action depends on the situation. Although further research is necessary to more fully examine this phenomenon, our findings suggest a situational contingency. Pluralists expressed attitudes consistent with traditionalists for certain issues, yet for others they were more similar to

mutualists in their response (Fig. 2; Teel et al. 2005). Distanced individuals did not hold either a mutualism or a domination orientation, and their responses to certain survey items suggested less interest in wildlife and wildlife issues (Teel et al. 2005).

Categorizing people in this way on the basis of how they think about wildlife offers advantages over alternative means of classification, including, for example, defining population subgroups by their sociodemographic characteristics. Our results suggest that such a superficial approach fails to reveal basic underlying differences in how people relate to wildlife. As is typical in examining the relationship between sociodemographics and psychological constructs (e.g., Donnelly & Vaske 1995), we found few substantively meaningful differences among value-orientation types on these characteristics. The main exception was that groups differed on gender, a finding in line with previous research on wildlife value orientations (Zinn & Pierce 2002). Our approach may also offer advantages over traditional classifications that define groups on the basis of their wildlife-related recreation participation. Findings indicate, for example, that although hunting is associated with a domination orientation, many hunters have both a mutualism and a domination view (Table 3). The interests of these pluralist hunters are likely quite different from those of traditionalists, who have a more extreme utilitarian view of wildlife, which suggests the need to consider additional variables like wildlife value orientations in defining population segments.

In addition to enhancing understanding of different wildlife-related interests, our approach may serve several more-specific purposes: structuring public involvement, understanding the wildlife profession and its institutions, anticipating and responding to stakeholder conflict, facilitating collaborative partnerships, and envisioning and planning for the future.

By knowing more about the composition of people in their state as a result of this study, participating agencies are in a better position to identify underrepresented groups that need more adequate consideration in future decisions and outreach efforts. Our findings offer a guide for structuring public involvement in that they identify the types and relative proportions of wildlife-related interests that should be considered and included in public meetings and other stakeholder processes. As an illustration, our results provided participating agencies with email addresses matched to wildlife value-orientation types to help ensure representation of the four groups in future attempts to obtain public input. South Dakota Department of Game, Fish and Parks recently used this information, combined with state-specific data on the distribution of value-orientation types, to test an "email focus group" approach for gathering input on controversial issues (Gigliotti & Teel 2008).

Another important use of our approach is in considering a potential disconnect between wildlife-agency cul-

ture and public values. Our findings offer a context for discussions about the wildlife profession and its institutions and a data-comparison point should agencies choose to explore the topic empirically. During the pilot phase of this study, North Dakota Game and Fish Department pursued such a comparison following an internal assessment of agency value orientations (Gigliotti & Harmoning 2003). Results revealed significant differences in value-orientation scores between agency staff and the public, and these results facilitated thinking about how the disparity could be affecting agency-public interactions.

Our results also offer promise in addressing the challenge of increasing social conflict on wildlife issues. The dissention is likely rooted in conflicting value positions that affect how people respond to these issues. We showed how attitudinal differences across a host of topics could be explained by wildlife value orientations. Consequently, categorizing people at this foundational level can allow for more effective identification of the potential for conflict, but also for consensus, among groups on agency decisions. We would expect greater stakeholder conflict, for example, in places with a greater mix of opposing value orientations (e.g., 50% traditionalists, 50% mutualists) compared with areas that are more homogeneous. Furthermore, study findings revealed that states with higher percentages of mutualists had greater resistance to more-traditional forms of management (e.g., lethal control). To illustrate, 68% of residents in North Dakota, a more-traditionalist state, identified hunting as an acceptable response to nuisance bears, whereas only 32% of California and Hawai'i residents, states with higher proportions of mutualists, thought hunting was an acceptable response (Teel et al. 2005). This kind of information, particularly when collected at finer degrees of resolution (e.g., communities, counties), can be helpful in anticipating public reactions to agency actions and in considering where communication may be particularly important for conflict prevention and mitigation.

Just as values information collected for a given locale can inform conservation decisions at that level, knowledge of how wildlife-related interests are distributed in a broader geographic context can contribute to improved region-level initiatives and can facilitate collaborative partnerships. The collaborative nature of our investigation allowed for cross-state comparisons, enhancing the agencies' ability to realize the potential for effective cooperation. States with a similar composition of people may be able to learn from one another's past experiences with the public and cooperate in development of multistate conservation or communication strategies. Results indicate, for example, that coastal states, including Hawai'i, California, Washington, and Oregon, have a similar public defined by higher percentages of mutualists compared with other western states. In contrast, many of the Rocky Mountain and Plains states have higher percentages of traditionalists.

Our final note about the utility of this type of investigation elaborates on the importance of scale in applications of the value-orientation concept. We make an important distinction between individual-level and broader, societal phenomena that has implications for envisioning and planning for the future of wildlife conservation. Our findings revealed a weak relationship between value orientations and sociodemographics at the individual level. Nevertheless, when examining these relationships in a broader context, the distribution of value-orientation types appeared to be related to certain state-level demographic variables (e.g., higher percentages of mutualists found in states with higher levels of urbanization; Fig. 1), which suggests that demographic changes occurring in the western United States could have implications for the mix of value orientations evident across states. As reported in a separate paper (Manfredo et al. 2009), we have conducted analyses that provide support for this contention. Results of that study revealed that although demographic variables remained weak predictors of value orientations at the individual level, their influence as state-level predictors was significant—accounting for between 43% and 77% of the variance in mean value-orientation scoring across states. These findings are consistent with the argument that societal forces associated with modernization, including urbanization and improved economic well-being, are contributing to an intergenerational shift away from emphasis on a domination orientation toward wildlife in the United States. Furthermore, our results document a strong connection between wildlife value orientations and wildlife-related attitudes and behaviors, suggesting that continued erosion of this more traditional view of the resource could result in further declines in hunting and declines in public acceptance of certain management actions, such as lethal control. It is also likely that this shift could result in growth in demand for the provision of different types of wildlife-related programs and recreational opportunities such as wildlife viewing.

The future of the wildlife profession depends on its ability to respond and adapt to such changes. Recognizing a need to better understand and represent emerging public interests in the face of these changes, the state wildlife agencies that participated in this study have taken an important step. Their efforts have resulted not only in the provision of baseline information, but also in the development of a theoretical and methodological approach that can be replicated over time and across geographic scales to help agencies better prepare for the future. It is worth noting, however, that future applications should consider ways to address certain limitations of our approach. Our methods, for example, may be restricted to postindustrialized nations and may have to be adapted for use in other settings, as we have begun to do in exploratory assessments of wildlife value orientations cross-culturally (Teel et al. 2007). Similarly, an underrepresentation of

certain racial and ethnic groups in our sample (Teel et al. 2005) suggests a need to explore alternative forms of data collection and barriers to participation for these groups in the United States. An expansion of this type of collaborative investigation to overcome such limitations offers great potential for informing a broader outlook on the social aspects of conservation.

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