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Source: Wildlife Society Bulletin, 33(1):154-163. 2005.
Published By: The Wildlife Society
DOI: 10.2193/0091-7648(2005)33[154:TIOPAO]2.0.CO;2
URL: http://www.bioone.org/doi/full/10.2193/0091-7648%282005%2933%5B154%3ATIOPAO%5D2.0.CO%3B2

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Robert Meadow, Richard P. Reading, Mike Phillips, Mark Mehringer, and Brian J. Miller

Abstract Perhaps no species elicits more polarized opinions in the United States than the gray wolf (*Canis lupus*). Both proponents and opponents of wolf recovery use symbolic language in an attempt to persuade others to change their attitudes and values. We used structured phone interviews with 1,300 registered voters to examine the attitudes of people living in Arizona, Colorado, and New Mexico toward a proposed restoration of the gray wolf to the southern Rocky Mountains, and to examine the ability of persuasive arguments to change these attitudes. We found a high level of support for wolf restoration by residents of all 3 states; 64% of respondents favored reestablishing wolves in the southern Rockies, whereas 33% expressed opposition. Support was general across almost all demographic and other groups sampled, the exception being ranchers (44% in favor, 53% opposed). Persuasive arguments had little impact on respondents' attitudes toward wolves and their proposed restoration. Overall support for wolf reestablishment remained high and increased slightly after respondents heard persuasive arguments for and against wolf restoration. Yet most respondents (63.3%) did not change their level of support or opposition to the idea of reestablishing wolves after hearing persuasive arguments. Most people who did change their opinion increased the extremity of their responses, supporting attitudinal theory that predicts that people with strongly held attitudes will increase the extremity of their opinions after receiving more information. The attitudes people hold are critically important to the success of wolf restoration efforts. Although most of the public supports wolf restoration, polarization of the issue remains strong. This polarization poses a significant challenge to wildlife managers. If management agencies decide to pursue wolf restoration in the southern Rockies, efforts to mitigate strongly polarized positions should be given a high priority. Alternatively, if those agencies choose not to restore wolves, they likely will face significant controversy as unsatisfied wolf proponents make their feelings known.

Key words attitudes, *Canis lupus*, persuasion, restoration, southern Rockies, wolf

Perhaps no species elicits more polarized opinions in the United States than the gray wolf (*Canis lupus*). Some people love wolves and others loath them, but few people possess ambivalent or neutral feelings toward the species. This polarization complicates conservation and management of the

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species and often elicits strong responses from interest groups or stakeholders. Consequently, it is useful to examine public attitudes toward wolves and the implications of those attitudes to wolf recovery.

The large differences in attitudes and opinions toward wolves lead both proponents and opponents of wolf recovery to attempt to sway others. In their attempt to influence the attitudes and values of others, people use information and symbolic language they believe are persuasive. People use symbolic language as a shorthand method of referring and relating to wider belief systems, or worldviews, that exert a powerful influence on people who subscribe to (i.e., believe in) them (Lasswell and Kaplan 1950).

Some people simply provide information to others. Yet increased knowledge rarely leads to attitude and value change. Knowledge is only one of several factors influencing values and attitudes, and its influence often is relatively weak. The acquisition, comprehension, and retention of knowledge depend on exposure, receptivity, perception, interpretation, and memory (Petty et al. 1997). While knowledge is an important determinant of values and attitudes, and associated beliefs, its importance often is overestimated, especially among people who value knowledge greatly, like scientists and conservationists (Reading 1993, Kellert et al. 1996). When values and attitudes are strongly held, new knowledge often is selectively received, interpreted, and remembered (Tessler and Shaffer 1990, Olson and Zanna 1993). Because knowledge alone is usually insufficient to change values and attitudes, effective persuasion usually involves presenting the information along with symbolic language.

People on both sides of the wolf restoration issue use symbolic language in statements designed to persuade others to change their attitudes, opinions, behaviors, and values. Yet changing people's opinions, attitudes, behaviors, and especially values often is difficult, particularly when they are well developed. Opinions, or beliefs, are most easily changed because they lack an affective component and generally are based on only weak cognition (Rokeach 1972, Aronson 1977). Attitudes and values are more complex. A value is a preferred mode of conduct or end state of existence, while an attitude is an affinity or aversion to an object or situation based on beliefs (Bem 1970, Rokeach 1972). Attitudes and values contain cognitive, affective, and directional components (Aronson 1977, Conner and Becker 1979, Williams 1979), although the importance of the cognitive component of attitudes has been debated (Chaiken and Stangor 1987, Tessler and Shaffer 1990). Both are based on several beliefs and tied to a person's perception of their identity (Aronson 1977, Boninger et al. 1995). This greater complexity makes attitudes and values more difficult to change (Aronson 1977, Williams 1979).

Effective persuasion requires that people both receive and acquiesce to a persuasive message (Olson and Zanna 1993). Receptivity to persuasion depends on several factors, including motivation, the identity of the messenger, the strength and frequency of the message, the clarity of the message, and the state of the recipient (Chaiken and Stangor 1987, Petty et al. 1997). Peer pressure can play a large role in maintaining or changing values, attitudes, and behaviors (Chaiken and Stangor 1987, Tessler and Shaffer 1990). In addition, changes are more likely to occur when alternative choices facilitate attitude or behavior change or permit people to reach the same or similar goals by a different route (Tessler and Shaffer 1990, Petty et al. 1997). For example, people are more likely to throw trash into a garbage can than on the street, when such containers are made easily available. When a value is strongly intertwined with other values or is the product of personal experience, it is more difficult to change (Williams 1979, Olson and Zanna 1993).

In this paper we examine attitudes of people living in Arizona, Colorado, and New Mexico toward a proposed restoration of the gray wolf to the southern Rocky Mountains. Furthermore, we examine the ability of persuasive arguments to change these attitudes.

Methods

Participants

Participants in the study included registered voters from Arizona, Colorado, and New Mexico. All samples were random-digit dial samples, meaning that every household with a telephone (no mobile phones) had an equal chance of being contacted. We purchased the phone list from Affordable Samples, Inc. of Connecticut. We interviewed only those who identified themselves as registered voters. We made calls until we reached our target numbers of 400 interviews from Arizona and New Mexico voters and 500 interviews from Colorado voters.

Survey

Subjects completed structured phone interviews about a proposed wolf reintroduction into the southern Rocky Mountains. We were interested in assessing general attitudes toward the proposed reintroduction and influence of persuasive arguments used by proponents and opponents of wolf reintroduction on those attitudes.

General protocol. We conducted interviews from Wednesday, March 7 to Friday, March 16, 2001. Interviewing hours were between 5:00 pm and 8:00 pm weekdays, 10:00 am and 2:00 pm Saturday, and 4:00 and 8:00 pm Sunday. The survey instrument included 90 questions; however, each interviewee was asked only 69 questions. Interviewers asked all respondents 48 questions; the remaining 42 questions were randomly assigned to 50% of participants (i.e., 21 additional questions per interviewee). Surveys took approximately 20 minutes to complete. A copy of the survey instrument is available upon request.

We specifically trained professional interviewers familiar with standard telephone interviewing procedures for this survey prior to beginning the interviews. We conducted all interviews from a central telephone facility in Arizona, and an on-duty supervisor observed interviews at all times. A supervisor verified at least 5% of the surveys. We dialed all phone numbers where there was no answer or an answering machine only 3 times before moving on to another phone number. We offered respondents the opportunity to reschedule an interview if there was insufficient time to complete the interview or if for any reason the time of first contact would prevent a respondent from completing the interview.

Initial attitudes. We asked respondents if they strongly favored, somewhat favored, somewhat opposed, or strongly opposed wolf restoration in the southern Rockies. Responses that respondents did not know or had no opinion were accepted, though not expressly offered. To assess other attitudes and opinions, we provided several as statements and asked respondents if they strongly agreed, somewhat agreed, somewhat disagreed, or strongly disagreed with each statement. Again, we accepted, though did not expressly offer, a response indicating that a respondent did not know or had no opinion.

Persuasive arguments. People make several arguments for or against wolf restoration. To assess the persuasiveness of each argument, we provided the most commonly invoked arguments of others (Lenihan 1987, Bath and Phillips 1990, Manfredo et al. 1993, Pate et al. 1996) (Tables 1 and 2) to respondents. Arguments with more persuasive content may exist either in favor of or opposition to wolf restoration that would yield more dramatic results, but if so, we are unaware of them. For these pro- and anti-wolf statements, we asked respondents if the statements were very persuasive, somewhat persuasive, somewhat unpersuasive, or very unpersuasive. We again accepted responses from respondents who said they did not know or had no opinion, although we did not expressly offer these options.

Because we were able to identify several arguments used by both opponents ($n = 5$) and proponents ($n = 10$) of wolf restoration, we asked only one-half of respondents (randomly selected) their opinions on several statements (Tables 1 and 2). This helped us better balance the number of pro- and anti-wolf restoration statements provided to each respondent and reduced the overall length of the survey. Still, we provided each respondent with 6 pro-restoration statements and only 4 anti-restoration statements. We rotated the group of pro-restoration arguments with the group of anti-restoration arguments so that half of respondents heard pro-restoration arguments first, followed by anti-restoration arguments, while the other half of respondents heard anti-restoration arguments first. This rotation was done to minimize any bias produced through more immediate recall, or due to respondents being exposed to either set of arguments first. We randomly changed the order in which arguments within each group of questions, pro- or anti-restoration, were asked for each respondent. After we exposed respondents to arguments made by proponents and opponents to wolf reintroduction, we again asked them if they favored or opposed reestablishing wolves in the southern Rockies.

Data analyses

We converted responses to a 5-point Likert scale for statistical analyses. We coded "strongly agree-favor" and "very persuasive" responses as 1s; "somewhat agree-favor" and "somewhat persuasive" as 2s; "no opinion" and "don't know" as 3s; "somewhat disagree-oppose" and "somewhat unpersuasive" as 4s; and "strongly disagree-oppose" and "very unpersuasive" as 5s.

We examined all variables for normality and checked for homogeneity of group variance using

Table 1. Perceived persuasiveness of arguments made by proponents of reintroducing wolves into the southern Rockies in 2001. ↑ support = people who increased their support (or decreased opposition) and ↑ opposition = people who increased their opposition (or decreased support) after hearing all arguments favoring and opposing wolf restoration. Significant differences tested by ANOVA on mean scores (see methods);* $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$. Categories with the same letter differ significantly ($P < 0.05$) using the Bonferroni post hoc test.

Respondents question	Change in support or or opposition	Very or somewhat persuasive	Very or somewhat unpersuasive
All respondents			
There is little danger to humans since	↑ support[a]	79%	19%
there have been only a handful of	No change[a]	69%	29%
attacks on humans in the past 100	↑ opposition[a]	49%	44%
years.***	All	70%	7%
The presence of wolves helps to keep	↑ support[a]	89%	9%
the population of elk and deer healthy	No change[a]	81%	17%
by thinning out the sick and weak and	↑ opposition[a]	66%	29%
leaving the strong to reproduce.***	All	83%	15%
Group A (50% of respondents)			
Farmers and ranchers will be reimbursed	↑ support[a]	76%	22%
from private funds if they suffer	No change	69%	30%
financial losses from wolf attacks on	↑ opposition[a]	58%	35%
their livestock.*	All	70%	28%
We owe it to our children and grandchildren	↑ support[a]	89%	8%
to maintain the environmental health of this	No change[b]	82%	16%
region by keeping wildlife like wolves,	↑ opposition[a,b]	67%	32%
bears, and mountain lions alive and well.***	All	82%	15%
Wildlife biologists have proven that our	↑ support[a,b]	84%	12%
environment is degraded when species	No change[a]	71%	27%
native to the area, like wolves, bears,	↑ opposition[b]	59%	34%
and mountain lions are removed.***	All	72%	24%
Wolves are God's creatures that have	↑ support[a]	74%	24%
as much right to occupy the wilder-	No change	64%	34%
ness as ranchers or hikers.**	↑ opposition[a]	56%	32%
	All	65%	33%
Group B (50% of respondents)			
To reduce the possibility of wolves causing	↑ support	75%	23%
problems for ranchers, only public lands	No change	72%	23%
that support little or no domestic livestock	↑ opposition	66%	28%
will be used for reintroduction programs.	All	73%	22%
We owe it to our children and grandchildren to	↑ support[a]	91%	9%
be good stewards of our environment because	No change[a]	89%	18%
our children deserve a future with the same	↑ opposition[a]	69%	29%
scenic beauty and diverse wildlife, including wolves, bears, and mountain lions.***	All	82%	16%
We have a responsibility to reintroduce	↑ support[a]	77%	23%
wildlife to their natural areas since	No change	66%	33%
humans wiped them out in the first	↑ opposition[a]	56%	41%
place.**	All	69%	30%
A healthy population of bears, wolves,	↑ support[a]	68%	30%
and mountain lions is a sign our air is	No change[b]	67%	30%
clean, our forests are healthy, and nature	↑ opposition[a,b]	41%	50%
is in balance.***	All	66%	31%

Barlett's test. We compared multiple means using analysis of variance; we made pairwise comparisons using Bonferroni post-hoc analyses. Linear regressions or general linear models examined the influence of selected variables on responses. We compared count response data using Pearson's likelihood ratio chi-square tests and Fisher's exact for 2 × 2 comparisons. Unless otherwise indicated, we present all means ±1 SD. We set significance at $P < 0.05$.

Results

General trends

Participants in the study included 1,300 respondents comprised of 3 distinct samples: 400 completed interviews each among Arizona and New Mexico voters, and 500 completed interviews among Colorado voters. Exact data on response rate results were accidentally deleted and not retrievable. Thus, we are unable to report them here, but response rates and rates of contact differed little from typical surveys based on random digit dial samples, falling between 74–84%. The demographic makeup of respondents in this survey paralleled the demographic makeup of registered voter populations of the states studied (see http://www.msnbc.com/m/d2k/g/polllaunch.asp; June 2004), suggesting minimal, if any, bias due to response rate.

We found a high level of support for wolf restoration by residents of Arizona, Colorado, and New Mexico (Figure 1). During our initial query, 64% of all people surveyed

Table 2. Perceived persuasiveness of arguments made by opponents of reintroducing wolves into the southern Rockies in 2001. ↑ support = people who increased their support (or decreased opposition) and ↑ opposition = people who increased their opposition (or decreased support) after hearing all arguments favoring and opposing wolf restoration. Significant differences tested by ANOVA on mean scores (see methods); * $P < 0.05$, ** $P < 0.01$, and *** $P < 0.001$. Categories with the same letter differ significantly ($P < 0.05$) using the Bonferroni post hoc test.

Respondents question	Change in support or or opposition	Very or somewhat persuasive	Very or somewhat unpersuasive
All respondents			
Having predators like wolves and grizzly bears in the Southern Rockies will be dangerous and threaten wilderness recreation such as hunting, fishing, hiking, or using off-road vehicles.***	↑ support[a]	33%	63%
	No change[b]	40%	57%
	↑ opposition[a,b]	58%	39%
	All	40%	57%
We should not waste taxpayer dollars on a program to reintroduce wolves to the region.***	↑ support[a]	41%	56%
	No change[b]	45%	54%
	↑ opposition[a,b]	57%	40%
	All	44%	54%
Reintroducing wolves and other species into the region will hurt hunting by reducing available elk and deer populations.**	↑ support[a]	31%	65%
	No change[b]	34%	64%
	↑ opposition[a,b]	42%	51%
	All	33%	64%
Group A (50% of respondents)			
Wolves attack and can kill domestic livestock such as cattle and sheep and lead to financial losses for ranchers and farmers.*	↑ support[a]	62%	35%
	No change	69%	30%
	↑ opposition[a]	78%	20%
	All	67%	30%
Group B (50% of respondents)			
If wolves are reintroduced into wilderness areas, they will wander into populated areas, killing pets and humans.***	↑ Support[a]	37%	62%
	No change[a]	50%	48%
	↑ Opposition[a]	63%	31%
	All	48%	51%

strongly or somewhat favored reestablishing wolves in the southern Rockies, whereas only 33% expressed opposition. Support was general across all 3 states, and it crossed all demographic groups we sampled (including people of all income classes, races, and ages) as well as most other groups, including people with different political party affiliations, hunters, and nonhunters (Figure 1). However, support was relatively weaker (≤60 %) among people ≥65 years old (51%), people who identified themselves as being primarily Republican (55%), people from small towns (57%), and, to a lesser extent, hunters (59%) and people from rural areas (60%) (Figure 1). The only group of people who expressed greater opposition to (53%) than support for (44%) wolf restoration was ranchers.

Persuadability

Persuasive arguments had little impact on respondents' attitudes toward wolves and their proposed restoration. Overall support for wolf reestablishment in the southern Rockies remained high and increased slightly (from 64–70%) after we provided respondents with persuasive arguments for and against wolf restoration into the southern Rockies (Figure 2, Table 3).

Most (53%) people who did change their opinion increased the extremity of their responses (Figure 3). In other words, people moved from moderate to strong positions in favor of or opposition to wolf restoration after hearing the persuasive arguments. This change was significant ($\chi^2 = 41.98$, df = 4, $P < 0.001$). Very few people shifted from favoring to opposing wolf reintroduction or vice versa. Only 48 people (3.7%) changed from favoring to opposing wolf reintroduction after hearing persuasive arguments, and only 84 people (6.5%) changed from opposing to favoring reintroduction. Of people originally undecided, only 14 (1.1%) moved to opposing reintroduction and 26 (2.0%) changed to favoring it.

The increase in support for wolf reestablishment was significant ($t = 5.80$, df = 1,299, $P < 0.001$). Yet the magnitude of the difference was small; overall, mean scores before and after respondents heard the persuasive arguments differed by only 0.16 (95% CI = 0.10-0.21), or 4% of the possible range of responses (Table 3). And most respondents (63.3%) did not change their level of support or opposition to the idea of reestablishing wolves in the southern Rockies after hearing persuasive arguments. Of the 36.7% of people who changed their position, most (24.4%) increased their level of support (or decreased their level of opposition), while only 12.3% increased their opposition (or decreased their support).

Table 3. Change in attitudes toward wolf reintroduction into the southern Rockies after hearing persuasive arguments by proponents and opponents. Attitudes measured using scores on a scale of 1 to 5, where a 1 indicated greatest support and a 5 greatest opposition for the reintroduction.

	Mean score (± SD)					
Group	Before	After	Difference	*t*-score	*P*	df
All	2.52 ± 1.42	2.36 ± 1.49	–0.16	2.72	0.01	2598
State						
Arizona	2.43 ± 1.36	2.26 ± 1.48	–0.16	1.64	0.10	798
Colorado	2.45 ± 1.36	2.26 ± 1.40	–0.19	2.09	0.04	998
New Mexico	2.70 ± 1.55	2.59 ± 1.29	–0.11	1.01	0.31	798
Rancher or not						
Rancher	3.19 ± 1.56	3.02 ± 1.64	–0.17	0.87	0.38	246
Not rancher	2.44 ± 1.39	2.29 ± 1.46	–0.15	2.61	0.01	2348
Hunter or not						
Hunter	2.74 ± 1.51	2.62 ± 1.59	–0.12	1.14	0.25	888
Not hunter	2.40 ± 1.36	2.22 ± 1.42	–0.18	2.59	0.01	1706
Size of Town						
Rural	2.72 ± 1.51	2.64 ± 1.62	–0.08	0.62	0.54	564
Small town	2.76 ± 1.50	2.58 ± 1.54	–0.18	1.46	0.14	622
Medium town	2.49 ± 1.40	2.26 ± 1.45	–0.23	1.54	0.13	350
City	2.27 ± 1.31	2.11 ± 1.36	–0.16	1.94	0.05	1048
Gender						
Men	2.52 ± 1.44	2.41 ± 1.52	–0.11	1.32	0.19	1218
Women	2.51 ± 1.41	2.32 ± 1.47	–0.19	2.50	0.01	1378
Political Affiliation						
Democrat	2.06 ± 1.24	1.88 ± 1.27	–0.18	1.94	0.05	706
Independent	2.46 ± 1.44	2.32 ± 1.49	–0.14	1.33	0.19	802
Republican	2.90 ± 1.43	2.75 ± 1.53	–0.15	1.54	0.12	910
Race						
White	2.54 ± 1.42	2.38 ± 1.49	–0.16	2.49	0.01	2038
Hispanic	2.25 ± 1.35	2.16 ± 1.47	–0.09	0.54	0.59	288
Other	2.63 ± 1.51	2.44 ± 1.50	–0.19	0.30	0.76	82
Age						
18–39 yrs	2.23 ± 1.32	2.04 ± 1.31	–0.19	2.01	0.04	808
40–64 yrs	2.52 ± 1.41	2.34 ± 1.48	–0.18	2.34	0.02	1314
65+ yrs	3.02 ± 1.51	3.01 ± 1.64	–0.01	0.06	0.95	438
Income						
<$40,000	2.50 ± 1.46	2.32 ± 1.53	–0.18	1.95	0.05	1024
$40–80,000	2.49 ± 1.39	2.37 ± 1.46	–0.12	1.26	0.21	944
>$80,000	2.48 ± 1.39	2.31 ± 1.43	–0.17	1.26	0.21	410

All demographic groups increased their support for wolf restoration after hearing the arguments except people 65+ years old, who remained about the same (Figure 2, Table 3). However, differences again were relatively small and mostly not significant. A majority of ranchers, the only group that displayed initial opposition to wolf restoration, now supported (52%) rather than opposed (46%) reestablishing wolves, but this difference was not significant (Figure 2, Table 3).

Respondents indicated that arguments of proponents (mean score = 2.30 ± 0.07 S.E. on 1–5 scale, where a 1 is most persuasive and 5 is least persuasive) were significantly more persuasive than the arguments of opponents (mean score = 3.11 ± 0.13 SE) of wolf restoration ($t = 4.51$, df = 5.6, $P < 0.01$). Indeed, on average 73.2 ± 2.1% SE of respondents found the arguments of proponents persuasive, while only an average of 46.4 ± 5.7% SE respondents thought statements of opponents were persuasive (Tables 1 and 2). Respondents believed the most persuasive arguments of proponents addressed responsibilities to future generations (82% of respondents) and keeping elk (*Cervus elaphus*) populations healthy (83%) (Table 1). The least persuasive statements argued that wolves indicate that nature is in balance (66%) or that wolves have as much right to occupy the wilderness as ranchers or hikers (65%) (Table 1). According to respondents, the argument that wolves can cause financial losses to ranchers was most persuasive for opponents (67% of respondents) (Table 2). All other arguments by opponents were unpersuasive to a majority of respondents, with the potential for wolves to negatively impact hunting being the least persuasive; only 33% of respondents found this argument compelling (Table 2).

Not surprisingly, people who expressed increased levels of support for (or reduced opposition to) wolf reestablishment after hearing the arguments found the statements of proponents more persuasive than did other respondents (Table 1). They also

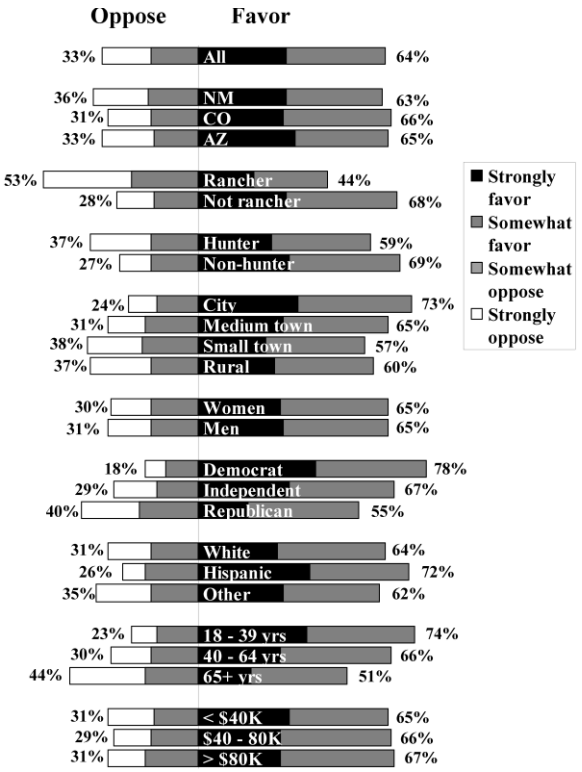

Figure 1. Initial level of support or opposition to reestablishing wolves in the southern Rockies in 2001. Responses to: "Do you strongly favor, somewhat favor, somewhat oppose, or strongly oppose re-establishing endangered wolves into the National Forests and wilderness areas in the southern Rockies of your state?" Note: NM = New Mexico; CO = Colorado; AZ = Arizona; K = 1,000.

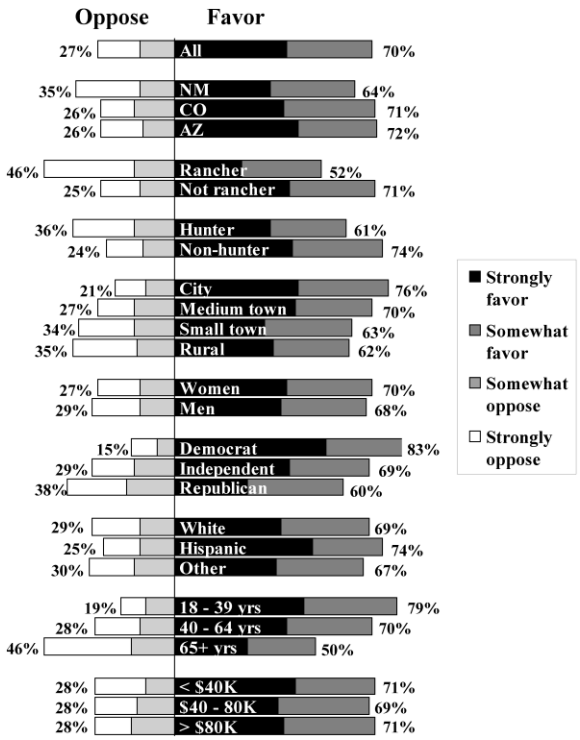

Figure 2. Final level of support or opposition to reestablishing wolves in the southern Rockies in 2001. Responses to the following question made after respondents were asked to rate the persuasiveness of statements made by opponents and proponents of wolf restoration: "Now that you know more, let me ask again, do you strongly favor, somewhat favor, somewhat oppose, or strongly oppose reestablishing endangered wolves into the National Forests and wilderness areas in the southern Rockies of your state?" Note: NM = New Mexico; CO = Colorado; AZ = Arizona; K = 1,000.

found the arguments of wolf restoration opponents less persuasive than did other people (Table 2). Similarly, respondents who expressed elevated levels of opposition to (or reduced support for) wolf reestablishment after hearing the arguments found statements of proponents less persuasive and arguments of opponents more persuasive than did other respondents (Tables 1 and 2). Differences among means were relatively large and were significant for all but 1 statement (Tables 1 and 2).

Respondents' initial position on wolf restoration significantly influenced how they viewed the persuasive arguments of wolf proponents and opponents. Mean scores for pro-wolf positions were positively correlated with the degree to which respondents favored wolf restoration (F=637.97, df =1, 1298, P<0.001, adj. R^2=0.33). Similarly, mean scores for anti-wolf arguments correlated with the degree to which respondents opposed wolf restoration (F=442.49, df=1, 1298, P<0.001, adj. R^2=0.25). Individual pro-wolf and anti-wolf statements were all highly significant (P<0.001), with adjusted R^2 values ranging from 0.04–0.27 (mean=0.16±0.073) for pro-wolf statements and from 0.09–0.26 (mean =0.14±0.060) for anti-wolf statements.

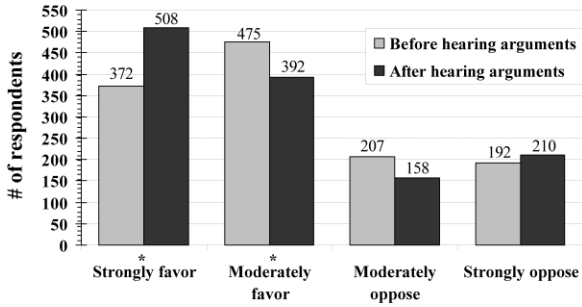

Figure 3. Increase in extremity of support and opposition to wolf restoration in the southern Rockies in 2001 after respondents from AZ, CO, and NM heard arguments used for and against restoration. Overall difference was significant using Pearson log likelihood ratio test: χ^2 = 36.16, df = 3, P < 0.001. Pairwise comparisons made using Fisher's exact test, with significant differences (P < 0.05) indicated by an asterisk (*).

Discussion

The attitudes people hold are critically important to the success of wolf restoration efforts. These attitudes are affected by level of knowledge, human–animal relationships, personal experience with the species, real and perceived impacts of the species on economies or lifestyles, amount and type (positive or negative) of media coverage, and the species' economic or cultural value (Reading 1993, Kellert 1995, Enck and Brown 2002, Williams et al. 2002). When opinions about a species are highly polarized, challenges faced by a recovery program are heightened (Reading 1993, Kellert 1995, Enck and Brown 2002). While we found polarity in attitudes, we also found general support for the idea of reestablishing wolves in the southern Rockies. Similar to our results, past research found that the American public generally supports wolf conservation and restoration (see summary in Williams et al. 2002).

Importantly, despite finding widespread support for wolf restoration in the southern Rockies, a large minority of those surveyed opposed the idea. Opponents, especially if they are motivated to act, need not comprise a majority to effectively prevent wolf restoration or at least severely alter, delay, or otherwise impact such an initiative. For example, a program to restore lynx (*Lynx canadensis*) to Colorado enjoyed even wider public support, but failure to explore and address concerns of opposed ranchers, loggers, and animal rights activists resulted in the expenditure of substantial resources later in the program. As such, we recommend understanding attitudes and concerns of all key interests.

Persuadability

We found that most people did not change their position after being provided with arguments for and against wolf restoration. Of the respondents who did change their position, most simply expressed stronger opinions (i.e., somewhat to strongly favor or somewhat to strongly oppose). In addition, people who initially favored wolf restoration generally found the arguments of proponents more persuasive, while those who initially opposed restoration found opponents' arguments more persuasive.

The arguments commonly used by proponents and opponents to wolf restoration seemingly had little impact on most people, thus making them, in fact, not "persuasive" arguments in the sense of changing attitudes, but rather "good" or "bad" arguments. Nonetheless, they had the effect of strengthening support for or opposition to wolf restoration, with an overall small but significant increase in support. The greater number of pro-restoration ($n = 6$), as opposed to anti-restoration ($n = 4$), arguments may have affected this result. However, the increase in support likely was trivial, and we doubt these effects would persist over a longer time period (several days or weeks), although we did not test this.

Previous research found it difficult to change attitudes of people already opposed to wolves and wolf restoration. Bath and Phillips (1990) provided 3 scenarios to people in the northern Rockies: livestock losses were kept under 1%, ranchers were financially compensated for those losses, and wolves stayed in the park or surrounding wilderness areas. They found that 3 out of 4 people who did not favor wolf reintroduction would not change their opinions. Similarly, Thompson (1991) found that only 14% of those opposed to wolf restoration would change their opinions if there were a compensation program. These results illustrate the difficulty of persuading people with strongly held or well-thought-out opinions to change their positions.

Alternatively, people with weaker, less-developed attitudes change their attitudes more easily (Petty et al. 1997, Bright and Barro 2000, Williams et al. 2002). Williams et al. (2002) found that the general public's attitudes toward wolves often are poorly developed, permitting susceptibility to change in the presence of outside influences. For example, attitudes toward wolves and wolf restoration among people living in and near a potential wolf reintroduction site in upstate New York dropped following largely negative media coverage of the issue (Enck and Brown 2002). In our study the public's attitudes toward wolves likely were better formulated (and thus more resistant to influence, see below) as wolf restoration programs are ongoing in the target or adjacent states, increasing exposure to the issue and inducing attitude development.

Enck and Brown (2002) suggested providing factual information to help people adequately assess their attitudes toward wolves. Education is important and we support such efforts, but it also is important to acknowledge the limitations of simply providing information. Since knowledge is only one of several factors influencing attitudes, information often exerts little influence over attitudes, especially those that are strongly held (Rokeach 1972, Brown and Manfredo 1987). Factors such as personal experience (e.g., watching wolves kill elk in Yellowstone Nation Park or livestock on your ranch)

and attitudes of liked and disliked reference groups (e.g., what do your friends, peers, and enemies think?) usually are more important and lasting (Chaiken and Stangor 1987, Tessler and Shaffer 1990, Boninger et al. 1995, Petty et al. 1997). Thus, Bright and Barro (2000) suggested that knowledge is necessary but insufficient when attempting to help people recognize the legitimacy of more than one side of an issue. In addition, attitudes influence knowledge (not just vice versa), especially if information is poor, ambiguous, complex, or attitudinally extreme (Chaiken and Stangor 1987, Tessler and Shaffer 1990). People often selectively receive, interpret, and remember new information that is consistent with their attitudes (Olson and Zanna 1993, Petty et al. 1997, Bright et al. 2001). Information that is factual in nature may not be viewed as factual by some stakeholders. They also may distort incongruent information to make it more congruent (Olson and Zanna 1993). Thus, new information can provide people with additional motivation and ability to defend current attitudes (Petty et al. 1997).

Indeed, for both wolves (Bath 1989, Kellert 1990) and black-footed ferrets (*Mustela nigripes*) (Reading 1993), the 2 groups of people who scored highest on general knowledge of the species had diametrically opposed attitudes. Conservation groups and ranchers both scored well on knowledge of both species, but conservation groups most fervently supported conservation of those species, whereas ranchers most strongly opposed conservation (Reading 1993). Similarly, Bright and Manfredo (1996) found no significant relationship between knowledge and attitudes toward a proposed wolf reintroduction when factors such as value orientations, perceived outcomes, and emotional responses to the proposal were included in the analysis.

Changing attitudes

Changing attitudes is difficult, particularly when those attitudes are strongly held, as they are for the wolf. The difficulty of changing attitudes, particularly strongly held attitudes, does not mean that effective public relations programs are unimportant. First, public relations sometimes do change attitudes, particularly if they are not strongly held. As we mentioned previously, a wolf reintroduction campaign in upstate New York was sidetracked by extensive and negative publicity (Enck and Brown 2002). Second, it also is important to maintain and strengthen support among those who already support a policy. Effective public relations programs target key and influential individuals and groups for persuasive campaigns, use spokespeople within or trusted by the target groups, integrate human and ecological concerns, work with the media, and design species-specific education initiatives (Duda and Young 1995, Kellert et al. 1996, Enck and Brown 2002). People who are both pro- and anti- wolf use these tactics.

Since all opponents to a policy cannot be swayed to change their attitudes, another important facet to public relations is neutralizing the effectiveness of opposition. One tactic to neutralize opposition is financial incentives. While positive incentives can help change management practices, we strongly urge linking incentives directly to the cause of a problem, particularly if incentives are designed to catalyze a change in attitudes. Legal sanctions also provide an incentive, albeit a negative one. However, we caution that using such "sticks" often increases conflict; we should, therefore, apply pressure rarely, judiciously, and usually as a last resort.

Although most of the public supports wolf restoration, polarization of the issue remains strong among stakeholders. This polarization poses a significant challenge to wildlife managers and a threat to the success of any wolf restoration program. Given that adverse social reaction can cause a biologically sound program to fail, managers should assess the social feasibility of such a program in addition to the biological feasibility (Enck and Brown 2002). If management agencies decide to pursue wolf restoration in the southern Rockies, efforts to manage strongly polarized positions to reduce unproductive conflict should be given a high priority. Alternatively, if those agencies choose not to restore wolves, they likely will face significant controversy as unsatisfied wolf proponents make their feelings known.

Acknowledgments. Funding was provided by The Wildlife Network, Summerlee Foundation, Turner Endangered Species Fund, Sinapu, McCune Foundation, The Wildlands Project, Sierra Club, National Wildlife Federation, Decision Research, the Predator Conservation Alliance, and the Denver Zoological Foundation. We thank R. Edward for his assistance. The paper benefited greatly from the recommendations of 2 anonymous reviewers and C. Nilon.

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