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HOW DEMOGRAPHICS, KNOWLEDGE, AND PERCEPTIONS INFLUENCE OPINIONS OF A 1994 OREGON HUNTING BALLOT INITIATIVE: COMPARING VOTERS AND BLACK BEAR HUNTERS

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ABSTRACT: We conducted phone surveys of bear hunters (n=714) and randomly-selected registered voters (n=327) to compare how demographics, knowledge of black bear (*Ursus americanus*) biology, and perceptions about black bear populations in Oregon differed between the two groups and how these differences influenced personal opinions of a 1994 ballot initiative that banned two bear hunting techniques (Measure 18). Responses differed between voters and hunters for almost all questions. In contrast to respondents who disagreed with Measure 18, both hunters and voters who agreed with Measure 18 were less likely to belong to a hunting organization and tended to believe that black bear populations were increasing and that bears were dangerous or potentially dangerous. In addition, voters who were female and who obtained information primarily from television and newspapers were more likely to agree with Measure 18. Surveys of public knowledge, perceptions, and opinions can help wildlife managers identify issues, design ongoing public information campaigns, predict outcomes of ballot initiatives, and predict support for proposed management policy and regulation changes.

KEY WORDS: baiting, ballot initiative, black bears, dogs, hounding, Oregon, *Ursus americanus*, voter initiative

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INTRODUCTION

The issues surrounding black bear (*Ursus americanus*) management have become increasingly sociological in nature, with greater public involvement in management policy (Beck et al. 1995; Loker and Decker 1995). Recent increases in the use of ballot initiatives as legislative tools and controversy regarding bear hunting methods have resulted in initiatives affecting bear management policy in several states (Beck et al. 1995; Loker and Decker 1995; Loker et al. 1998; Minnis 1998; Whittaker and Torres 1998; Williamson 1998). These initiatives may limit the abilities of state wildlife agencies to effectively manage bear populations.

In 1994, Oregon residents voted on a ballot initiative (Measure 18) to ban the use of dogs to hunt black bears and cougars (*Felis concolor*) and the use of bait to hunt black bears. The measure was passed with 52% approval, primarily by voters in the densely populated and more urbanized Willamette Valley (Boulay et al. 2000). Minnis (1998) reported that similar measures have passed in Colorado (1992, 70% in favor), Massachusetts (1996, 64% in favor), Washington (1996, 63% in favor), but have failed in Idaho (1996, 40% in favor) and Michigan (1996, 38% in favor). In 1996, Oregon voters rejected a ballot initiative that would have repealed Measure 18 and given the Oregon Fish and Wildlife Commission exclusive authority to manage wildlife, thereby preventing future wildlife-related ballot initiatives (43% in favor).

Non-traditional stakeholder input into wildlife policy decisions is becoming a critical challenge for state fish and wildlife management agencies (Bennett 1998; deVos et al. 1998; Loker et al. 1998; Minnis 1998; Whittaker and Torres 1998). Although state fish and wildlife management agencies have several venues for traditional stakeholder communication, they have fewer venues and tools for communicating with non-traditional stakeholders

(Whittaker and Torres 1998). Understanding the differences in the demographics, knowledge, and opinions between traditional and non-traditional stakeholders may help agencies improve communication with non-traditional stakeholders, better incorporate all stakeholders' opinions into wildlife management decisions, and understand factors influencing votes on wildlife-related legislation.

Previous research has examined attitudes regarding bear management issues of different bear-hunting user groups (DuBrock 1978; Peyton 1989) and of randomly-selected voters (Loker and Decker 1995), but has not compared attitudes of bear hunters and voters on a single issue. This paper compares the demographics, knowledge, and opinions randomly-selected registered voters (n=327) and bear hunters (n=714) in Oregon and how differences between the two groups influenced their opinions on Measure 18.

METHODS

An Oregon Department of Fish and Wildlife (ODFW) black bear population ecology research project required hunters to have their bear tags validated prior to hunting in two Wildlife Management Units that encompassed the research study area. The tag validation process was used to generate a list of Oregon bear hunters; non-resident hunters were excluded. A randomly-generated list of registered Oregon voters was obtained from a political consulting firm (Labels and Lists, Vancouver, Washington, USA). Research technicians conducted telephone interviews during day and evening hours from 22 November 1997 to 22 January 1998. The survey was designed using the Total Design Method (Dillman 1978). We attempted to contact each potential respondent three times. Hunters and voters were asked 26 and 21 questions, respectively. Both groups were asked identical questions on ten black bear ecology and management

issues and five demographic variables. Additionally, each respondent was asked whether they supported or opposed the ban for each bear hunting method.

All attempted contacts were included in response rate calculations (percent of contacts who completed the survey). Support and opposition was not homogenous for the two bear hunting methods. To evaluate opinions of Measure 18, only respondents who consistently supported or opposed both hunting methods were included in analysis. Chi-square analyses were performed on categorical data and mean ages of respondents in selected groups were compared using Student's t-test (SPSS 1993). Significance for all tests was established *a priori* at $P < 0.05$.

SURVEY RESULTS

Response Rates

The response rate was 99% (714 of 720) for bear hunters and 62% (353 of 569) for randomly-selected voters. The majority of voters (62%) supported the ban for both bear hunting methods, while the majority of hunters (52%) opposed it (Table 1). Responses from 496 hunters and 261 voters were analyzed.

Demographics

Voters and hunters differed for all demographic questions, including length of residency ($\chi^2=41.7$, $P < 0.001$), environment of influence ($\chi^2=28.4$, $P < 0.001$), level of education ($\chi^2=43.8$, $P < 0.001$), gender ($\chi^2=288.0$, $P < 0.001$), and average age ($t=-11.9$, $P < 0.001$) (Table 2). In contrast to voters, hunters tended to

be residents of Oregon for a longer period of time, were more likely to have lived most of their life in a rural or small town environment, were less likely to have finished college, were more likely to be male, and were younger. Among hunters, length of residency ($\chi^2=18.6$, $P=0.001$) and level of education ($\chi^2=17.4$, $P=0.002$) differed between hunters who agreed and disagreed with Measure 18; whereas, gender ($\chi^2=13.6$, $P < 0.001$) differed between voters who agreed and disagreed with Measure 18.

Information Sources and Knowledge of Black Bear Biology

Voters and hunters differed for all information source and knowledge questions, including membership in hunting or conservation organizations ($\chi^2=115.4$, $P < 0.001$), sources of information ($\chi^2=201.1$, $P < 0.001$), awareness of local black bear distribution ($\chi^2=177.4$, $P < 0.001$), knowledge of bear diet ($\chi^2=33.4$, $P < 0.001$), factors influencing bear populations ($\chi^2=47.6$, $P < 0.001$), and bear population trends ($\chi^2=246.5$, $P < 0.001$) (Table 3). In contrast to voters, hunters were more likely to belong to a hunting organization, tended to obtain information from ODFW and other sources rather than from television and newspapers, were more aware of the local distribution and diet of bears, were less likely to believe that human-caused habitat changes had the greatest influence on bear populations, and more likely to believe that bear populations were increasing in Oregon prior to Measure 18.

Table 1. Opinions of black bear hunters (n=496) and randomly-selected voters (n=261) on two hunting methods (bait and dogs) that were banned by Measure 18, the 1994 Oregon ballot initiative.

	Hunters	Voters
Supported the ban for both methods	17.8%	61.5%
Opposed the ban for both methods	51.8%	12.5%
Supported the ban for one method only	22.5%	13.9%
No opinion	7.8%	12.2%

Table 2. Demographics (percent) of bear hunters (n=496) and randomly-selected voters (n=261) in Oregon and influence on opinions of Measure 18, the 1994 Oregon ballot initiative that banned hunting bears with dogs and bait.

	% Respondents		% Respondents by Opinions of Measure 18			
			Hunters		Voters	
	Hunters n=496	Voters n=261	Agree n=126	Disagree n=370	Agree n=217	Disagree n=44
<u>Length of Residency</u>						
<5 years	4	9	7	2	9	5
6-10 years	4	9	10	3	11	2
11-20 years	9	12	6	10	12	14
>20 years	20	31	21	20	32	5
lifetime	63	39	56	65	36	11
<i>P</i>	<0.001		0.001		0.098	
<u>Environment of Influence</u>						
Metro area (>100,000)	4	13	4	4	14	7
Suburban (50,000-100,000)	18	23	16	19	26	11
Large town (25,000-50,000)	5	5	10	4	5	5
Small town (<25,000)	26	22	26	26	22	23
Rural residential (acreage)	26	24	14	25	23	30
Rural (ranch or farm)	22	14	12	23	11	25
<i>P</i>	<0.001		0.257		0.061	
<u>Level of Education</u>						
<High school	5	4	7	4	4	7
High school graduate	41	25	30	44	24	30
Some college	32	35	38	30	34	40
College graduate	18	36	16	19	38	23
Still in school	4	0	9	3	0	0
<i>P</i>	<0.001		0.002		0.260	
<u>Gender of Respondent</u>						
Male	98	45	96	98	40	71
Female	2	55	4	2	60	30
<i>P</i>	<0.001		0.190		<0.001	
<u>Mean Age of Respondent</u>						
	39	51	38	39	51	52
<i>P</i>	<0.001		0.923		0.733	

Table 3. Information sources and knowledge (percent) of bear hunters (n=496) and randomly-selected voters (n=261), and influence on opinions of Measure 18, the 1994 Oregon ballot initiative that banned hunting bears with dogs and bait.

	% Respondents		% Respondents by Opinions of Measure 18			
	<u>Hunters</u> n=496	<u>Voters</u> n=261	<u>Hunters</u>		<u>Voters</u>	
			Agree n=126	Disagree n=370	Agree n=217	Disagree n=44
<u>Active member of a hunting or conservation organization</u>						
Hunting	39	5	24	44	2	21
Conservation	<1	7	0	<1	7	5
Neither	61	88	76	56	91	75
<i>P</i>	<0.001		<0.001		<0.001	
<u>Sources used by respondent to obtain information about black bear</u>						
Television/Newspaper	12	61	13	11	66	34
Nature Shows	2	13	3	2	13	11
O.D.F.W.	35	7	41	32	5	14
Hunting organizations	5	1	2	7	1	3
Outdoor magazines	18	6	10	21	5	9
Other	28	14	30	27	11	29
<i>P</i>	0.001		0.088		0.004	
<u>Respondent aware of current local black bear distribution</u>						
Yes	96	58	94	97	54	77
No/Don't know	4	42	6	3	46	23
<i>P</i>	0.001		0.059		0.005	
<u>Item respondent indicated was the most important part of black bear diet in Oregon</u>						
Vegetation	81	60	81	80	60	57
(Meat) ^a	7	3	6	7	3	2
(Fish)	3	25	5	2	26	20
(Garbage)	1	2	2	1	2	6
(Insects)	5	2	3	6	2	6
(Don't know)	3	8	4	3	8	9
<i>P</i>	<0.001		0.907		0.290	

Table 3. continued

	% Respondents		% Respondents by Opinions of Measure 18			
			Hunters		Voters	
	Hunters n=496	Voters n=261	Agree n=126	Disagree n=370	Agree n=217	Disagree n=44
<u>Factor respondent indicated had the greatest impact on black bear populations in Oregon</u>						
Human caused habitat change	29	52	31	28	55	37
<i>(Food availability)^a</i>	17	7	13	19	8	2
<i>(Legal hunting)</i>	17	9	21	17	7	14
<i>(Natural mortality)</i>	11	6	6	12	5	12
<i>(Poaching)</i>	16	11	20	15	12	2
<i>(Vehicle collisions)</i>	1	2	1	1	2	5
<i>(Don't know/no opinion)</i>	9	13	9	9	10	28
<i>P</i>	<0.001		0.520		0.030	
<u>Do you believe that bear populations in Oregon are:</u>						
Increasing	79	17	56	87	10	48
Stable	14	19	30	9	21	11
Decreasing	2	23	6	1	25	9
Don't know/no opinion	4	42	8	3	44	32
<i>P</i>	<0.001		<0.001		<0.001	

^aItems in *italics* and parenthesis were pooled to obtain chi-square values.

Hunters who agreed and disagreed with Measure 18 differed in memberships to a hunting or conservation organization ($\chi^2 = 16.0$, $P < 0.001$) and knowledge of bear population trends ($\chi^2 = 54.7$, $P < 0.001$). Voters who agreed and disagreed with Measure 18 differed in memberships to a hunting or conservation organization ($\chi^2 = 23.8$, $P < 0.001$), source of information ($\chi^2 = 17.4$, $P = 0.004$), knowledge of local bear distribution ($\chi^2 = 7.9$, $P = 0.005$), factors influencing bear populations ($\chi^2 = 4.7$, $P = 0.030$), and bear population trends ($\chi^2 = 38.6$, $P < 0.001$).

Personal Experiences and Opinions

Voters and hunters differed in personal encounters with black bears ($\chi^2 = 163.4$, $P < 0.001$), opinions on how bears should be managed in Oregon ($\chi^2 = 254.6$, $P < 0.001$), and opinions on the effects Measure 18 had on bear populations ($\chi^2 = 237.8$, $P < 0.001$) (Table 4). Hunters were more likely than voters to have encountered bears, agree with the current management classification of bears as game animals, and believe that Measure 18 was causing an increase in bear populations. Hunters who agreed and disagreed with Measure 18 differed in opinions of whether bears were dangerous ($\chi^2 = 48.9$, $P < 0.001$) and effects of Measure 18 on bear populations ($\chi^2 = 15.3$, $P = 0.002$). Voters who agreed and disagreed with Measure 18 differed on opinions of how bears should be managed ($\chi^2 = 38.7$, $P < 0.001$), whether bears were dangerous ($\chi^2 = 22.2$, $P < 0.001$), and effects of Measure 18 on bear populations ($\chi^2 = 19.8$, $P < 0.001$).

DISCUSSION

There are some limitations to this analysis. First, we did not examine interaction between variables; thus, there may be complex relationships between demographics, knowledge, experiences and perceptions for both hunters and voters. Second, by including only respondents who consistently agreed or disagreed with both sections of Measure 18 regarding bear management, this analysis did not examine the interaction among the different components of the measure (using bait for bears, using dogs for bears and cougars). However, differences in the experiences and values between distinct bear-hunting user groups strongly influence hunter opinions of bear management (DuBrock et al. 1978; Peyton 1989; ODFW, unpublished data). Thus, voter and hunter knowledge and perceptions may influence opinions on the two hunting methods differently. Third, randomly-selected registered voters may not necessarily represent the opinions of non-voters because less educated, less financially secure, minority, and younger people are often under-represented in voting populations (Cronin 1989). However, it is important to examine the characteristics of registered voters to determine factors that influence voter support of ballot initiatives targeting resource management policy. Lastly, in a few cases where a large majority of respondents stated one categorical response, small sample size in the remaining categories may have resulted in a poor approximation of χ^2 values (e.g., hunter opinions of bear population status and management classification). The small sample of voters who disagreed with Measure

18 may have similarly influenced χ^2 values for some variables.

Demographics

Bear hunters represent a distinct demographic group from randomly-selected voters. Demographic variables such as place of residence (rural versus urban), level of education, income, race, age, and gender all may influence public opinion of legal hunting (Shaw 1977; Kellert 1978; Duda and Young 1998; Mankin et al. 1999). However, state demographics have been considered of limited value in predicting the outcome of animal protection ballot initiatives (Jones 1996 as cited in Minnis 1998). In this study, demographics influenced hunters' and voters' opinions of Measure 18 differently. Hunters who agreed with Measure 18 tended to reside in Oregon for fewer years and have slightly more education; however, these variables did not appear to influence voters' opinions of Measure 18. Place of residence and education levels influenced voter opinion of a similar 1992 initiative banning spring bear hunting and using bait or dogs to hunt bear in Colorado (Loker and Decker 1995).

Respondent gender was the only demographic trait that significantly influenced voters' opinions of Measure 18, with a higher percentage of women supporting the ban than men. Similarly, women were more likely to agree with Colorado's bear hunting initiative (Loker and Decker 1995). In public surveys, respondent gender is often one of the most important variables influencing attitudes towards hunting as a recreational sport, due to differences in how men and women are socialized (Shaw et al. 1977; Kellert 1978; Kellert and Berry 1987; Duda and Young 1998; Mankin et al. 1999). Kellert and Berry (1987) found that women had lower knowledge of animals and vastly different attitudes toward animals than did men. State fish and wildlife agencies have recently increased outreach efforts targeting women (Jackson et al. 1989; Thomas and Peterson 1993; Connelly et al. 1996). These efforts have focused primarily on increasing women's participation in consumptive uses of fish and wildlife. Although such programs have been successful in recruiting women as stakeholders (Thomas and Peterson 1993; Connelly et al. 1996), there remains a need to increase outreach efforts to a broader female population.

Knowledge of Black Bear Biology and Information Sources

Agency communication with both traditional and non-traditional stakeholders should be continually evaluated and strengthened. Current educational tools (brochures, agency magazines, public meetings, speaking at civic group meetings) tend to be most effective at reaching the traditional stakeholder. Hunters were more likely to obtain information from multiple sources, particularly ODFW, yet their opinions of Measure 18 were less influenced by the source of information. ODFW may not have influenced opinions because it is limited by state statute from taking an advocacy position on ballot initiatives and can only provide unbiased, factual data during initiative campaigns (Boulay et al. 2000). Hunters

Table 4. Personal experiences and opinions (percent) of bear hunters (n=496) and randomly-selected voters (n=261), their perceptions about black bear populations and management in Oregon, and influence on opinions of Measure 18, the 1994 Oregon ballot initiative that banned hunting bears with dogs and bait.

	% Respondents		% Respondents by Opinions of Measure 18			
	<u>Hunters</u> n=496	<u>Voters</u> n=261	<u>Hunters</u>		<u>Voters</u>	
			Agree n=126	Disagree n=370	Agree n=217	Disagree n=44
<u>Have you ever encountered a wild black bear in Oregon (not when bear hunting)?</u>						
Yes	82	36	79	83	34	46
No	18	64	21	17	66	55
<i>P</i>	<0.001		0.362		0.136	
<u>Do you believe that bears in Oregon should be managed as a:</u>						
Game animal	91	51	95	90	45	77
Nuisance	5	2	2	6	1	7
Protected	0	40	0	0	47	2
Trophy animal	4	4	3	4	3	9
Don't know/no opinion	<1	4	0	<1	4	5
<i>P</i>	<0.001		0.146		<0.001	
<u>Respondent belief that black bears in Oregon are:</u>						
Dangerous	4	5	0	5	2	18
Potentially dangerous	50	45	27	57	44	50
Not dangerous	46	50	73	37	54	32
<i>P</i>	0.484		<0.001		<0.001	
<u>How do you believe Measure 18 is affecting statewide bear populations?</u>						
Increase	85	33	76	88	28	61
Decrease	1	4	2	1	4	2
No effect	10	22	18	8	23	18
Don't know/no opinion	3	41	3	4	45	18
<i>P</i>	<0.001		0.002		<0.001	

also often cited their own experience or that of their friends as major information sources (included under "other"). Further research is needed to determine if ODFW educational efforts influence hunter knowledge, perceptions and opinions or if other factors, such as personal experience, are more important.

The source that voters used to obtain information strongly influenced their opinions of Measure 18. Voters who agreed with Measure 18 obtained their information primarily from television and newspapers. The campaigns for and against Measure 18 used television commercials to influence public opinion, and there was high media interest in the issue. Newspapers in the three largest media markets (Portland, Eugene, and Salem) had editorials supporting Measure 18. Voters may feel informed if they watch television, read the newspaper, and read the voter's pamphlet. However, these information sources rarely include biological data or rationale for management policies, and are subject to emotional, over-simplified, and exaggerated arguments by special interests on both sides of an issue.

Few voters obtained information on black bear management from ODFW, confirming that ODFW has not effectively reached non-traditional stakeholders regarding this issue. Although ODFW regularly uses press releases and feature newspaper articles in outreach efforts, it should increase use of mass media due to the heavy reliance on television and newspapers by the voting public (Mankin et al. 1999). Because voters differ from hunters in demographics, knowledge about wildlife, and perceptions regarding wildlife management, educational efforts directed at the nonhunting public may require different approaches in the methods, content, and tone of presented information than traditionally used for hunters. Whittaker and Torres (1998) suggested that educational campaigns should be incorporated into the daily operations of fish and wildlife agencies and that education should be directed at both traditional and non-traditional stakeholders.

Hunters and voters who agreed with Measure 18 were less likely to belong to a hunting organization than those who disagreed. Many Oregon hunting organizations opposed Measure 18. Organization positions may have influenced the attitudes of their members (DuBrock 1978; Peyton 1989; Duda and Young 1998). Membership may also signify high dedication to hunting in general, thus members may show less support for any limitation of hunting privileges (DuBrock 1978; Peyton 1989).

Bear hunters were much more likely than voters to believe that bear populations were increasing, both before and after Measure 18 passed, which may be related to information sources used by hunters. Hunters were more likely to use ODFW as an information source than were voters, and ODFW data indicated increasing bear populations in Oregon prior to Measure 18. Bear hunting experience also may have influenced hunter perceptions of bear populations. For example, Peyton (1989) found that hunter perception of bear population trends was related to hunting success. For both hunters and voters, perceptions regarding bear population trends influenced their opinions of Measure 18. Respondents were more likely to support Measure 18 if they thought that bear populations were stable or decreasing, as opposed to increasing. Voters

who agreed with Measure 18 were more likely to believe that habitat changes had the greatest influence on bear populations. There may have been interaction between these two variables if voters believed that bear populations were being negatively affected by human-caused habitat changes, thus efficient hunting methods such as using dogs or bait were neither necessary nor desirable.

Personal Experiences and Perceptions

Hunters and voters differed in their experience with black bears, but encounters with bears did not affect opinions of Measure 18. Other personal perceptions of bears and bear management had a stronger influence on opinions of Measure 18. Both hunters and voters who disagreed with Measure 18 were more likely than those who agreed with it to believe that bears were dangerous, so supported the methods that facilitated bear hunting. Hunters and voters disagreed on how bears should be managed in Oregon. Hunters overwhelmingly supported the current classification of bears as game animals, but approximately half of voters thought bears should be protected from hunting. Other factors may also influence voters, such as opposing hunting in general or, conversely, being a hunter or having a family member who hunts (Loker and Decker 1995; Stedman and Decker 1996).

State agencies can use voter knowledge and opinion surveys to form effective public information campaigns (Loker et al. 1998). Information about wildlife population trends and factors affecting those trends may influence public opinion regarding management of those populations. Human dimensions research can identify issues and determine if specific opinions are based in concerns for wildlife populations (e.g., "bear populations are decreasing"), so can be influenced by agency outreach information, or are value-based (e.g., "bears shouldn't be hunted"), thus less likely to be influenced by outside information (Shaw 1977; Bennett 1998; deVos et al. 1998; Loker et al. 1998). Because state wildlife agencies are usually prohibited from advocating a position on ballot initiatives and because divisive political debates rarely include reliable biological data, wildlife ecology information needs to be distributed to the public on a continual and proactive basis.

Human dimensions research, including public opinion surveys, can be used by agencies to identify controversial issues and proactively address them before they become ballot initiatives (Loker et al. 1998). Once an issue becomes an initiative, survey data can be used to forecast ballot results (Loker et al. 1998) so managers can formulate policy, regulatory, and logistic responses to incorporate new legislation into management planning. Survey data also can be used as a predictive tool for anticipating public reaction to proposed management policy and regulation changes. For example, changing the bear management status from "game species" to "nuisance species" might not be supported by hunters since almost all hunters agreed with the current designation of "game species" and might be actively opposed by the general public since half of the voters thought that bears shouldn't be hunted.

Sociological changes such as increasing urbanization, aging of the American population, and changes in family structure will continue to affect public attitudes towards wildlife management issues (Heberlein 1991). Whittaker and Torres (1998) suggested that agencies should monitor opinions of all stakeholders as rigorously as they monitor changes in wildlife populations. Monitoring public opinion is particularly important for issues that are potentially controversial and divisive, involve charismatic species such as large predators, and involve concerns about pain and suffering of animals (Loker and Decker 1995; Bennett 1998; Minnis 1998). To achieve this, some of the current emphasis of research will need to be shifted from documenting animal life history traits to examining human sociologic trends and evaluating public perceptions and support for wildlife management (Beck et al. 1995).

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