

Hunter Knowledge and Opinion of Louisiana Black Bear Restoration

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Abstract: Black bear (*Ursus americanus*) conservation and restoration in the southeastern United States have become conservation priorities in the past decade. The release of black bears into portions of their former range has been proposed in some states and initiated in others to re-colonize available habitats. To coincide with restoration of the federally threatened Louisiana black bear (*U. a. luteolus*) to public lands, we conducted hunter surveys ($N = 518$) at release sites and proposed release sites. Although public meetings were held with the region where bear restoration was proposed, < 60% of hunters were familiar with the plan to restore black bears to the areas they were using. However, approval of bear restoration was high (> 80%). Word-of-mouth was an effective way of disseminating information about the project, but there is concern about the trustworthiness of information the public receives. Public areas proposed as release sites for the Louisiana black bear are most commonly used by hunters, so opinions of these individuals is an important aspect to consider when determining suitability of a release site. Media resources (television, magazines, and newspapers) which can target a larger audience and disseminate factual information should be used to inform the public when performing wildlife restoration.

Key words: Louisiana black bear, restoration, hunter opinion

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Wildlife restoration is closely linked to social acceptance, especially when controversial species (i.e., protected species or large carnivores) are concerned (Reading and Kellert 1993, Lohr et al. 1996, Pate et al. 1996, Enck and Brown 2002). Specific to bears in the Southeast, successful reintroductions have occurred without information on public opinion, but Smith and Clark (1994) suggested incorporating the public into future management decisions. In Arkansas, Mississippi, and the Big South Fork region of Kentucky/Tennessee (BSF), extensive surveys of public opinion were conducted to determine suitability of black bear release sites prior to restoration (Peine et al. 1995, Bowman 1999, Fly 2001). Bowman (1999) surveyed private landowners and corporations around public lands considered as potential bear release sites. He determined that public acceptance of restoration in Mississippi was relatively high (> 50% of landowners and corporation supported restoration). Prior to black

bear restoration into BSF, public meetings were held by state and federal agencies to determine public opinion, help educate and inform about the project, and disseminate factual information about bear ecology (Eastridge 2000). Peine et al. (1995) surveyed visitors to BSF to determine acceptance of black bear restoration, and found that most (75%) visitors were in favor of the program, but that support was lower among local visitors ($\approx 60\%$). A separate telephone survey also indicated that most respondents knew about the proposed restoration program ($> 80\%$), with fewer supporting the restoration (57%).

The Red River Complex (RRC), a portion of eastern Louisiana, has been designated as containing suitable habitat for bear restoration. The RRC is comprised of five Louisiana Department of Wildlife and Fisheries (LDWF) Wildlife Management Areas [Red River (RRWMA), Three Rivers (TRWMA), Grassy Lake, Pomme De Terre, and Spring Bayou], two National Wildlife Refuges [Lake Ophelia (LONWR) and Cocodrie Bayou], and various types of private agriculture and forest lands (Van Why 2003). Prior to initiation of the bear restoration project in Louisiana, landowners adjacent to the RRC were sent information packets notifying them of the proposed program, and supplying them with educational and contact information. In addition, the U.S. Fish and Wildlife Service (USFWS) conducted a series of public meetings to inform and address concerns about the program (USFWS 2001). Overall support was considered high, with only 18% of attending individuals expressing negative comments.

During March 2001 and 2002, female black bears and their cubs were relocated to RRWMA. To further gauge public knowledge about bear restoration and disseminate educational information, we surveyed hunters at public areas within the RRC bear restoration zone. Our objectives were to provide LDWF, USFWS, and the Black Bear Conservation Committee with information on the success of their education programs, provide areas to target future educational campaigns, and determine the most effective methods to disseminate information.

Methods

We developed a one-page, 17-question survey to target sportsmen on RRWMA, TRWMA, and LONWR (Table 1). Questions were similar to other human dimensions surveys geared toward black bear restoration (Bowman 1999, Fly 2001), and were designed to determine number of individuals familiar with the restoration program, their activities on the area, knowledge about black bears, and basic demographic information. Surveys were administered by volunteers during periods of high area use (opening weekends of the deer and small game seasons, and during lottery hunts). On LDWF property, we visited sportsmen at camping and parking areas, whereas on LONWR sportsmen were asked to complete surveys while at mandatory check stations. Because RRWMA and TRWMA are treated as one management unit by LDWF and hunters may use both areas in the same day, they were treated as one unit for this survey and will be referred to as RRWMA. We sampled RRWMA in 2001 and 2002 during fall small game and deer hunting seasons (October–December), and LONWR during 2002–2003 winter muzzleloader hunts. Individuals unwill-

Table 1. Questions and possible answers (basis demographic questions excluded) from the bear restoration survey administered at Red River WMA, Concordia Parish, Louisiana, 2001 and 2002. A similar survey was administered at Lake Ophelia NWR, Avoyelles Parish, Louisiana, December 2002–January 2003.

Question		Answers				
Are you aware that female Louisiana Black Bears with cubs have been released on Red River WMA?	Yes	No				
Where was the first place you heard about this project?	Public meeting	State/Federal wildlife official	Newspaper	Sign or poster	This survey	
What is the primary species you are hunting today?	Small game	Deer (archery)	Deer (firearms)	Waterfowl	Hogs	
What other species do you hunt on Red River WMA	Small game	Deer (archery)	Deer (firearms)	Waterfowl	Hogs	
How do you feel about black bears being restored to this area?	Strongly agree	Agree	No opinion	Disagree	Strongly disagree	
Do you hunt in any other areas where black bears are present?	Yes	No				
Are you concerned about hunting in areas where black bears are present?	Yes	No				
Would you like to see more black bears in Louisiana?	Yes	No	No opinion			
Do you know that the Louisiana Black Bear is a Federally Threatened Species and protected by State and Federal law?	Yes	No				
What do you feel you may personally gain from black bear reintroductions in this area?	Personal viewing opportunities	Return to RRWMA	Louisiana's natural beauty enhanced	Legacy for children and grandchildren	No opinion	
What animals do you feel a black bear's eating habits most closely resembles?	Wolf (fresh meat only)	Otter (fish)	Deer (grass and twigs)	Raccoon (nuts, berries, and anything else it can find)	Other	

Table 2. Methods of disseminating information about the Louisiana black bear restoration program on Red River WMA (RRWMA) and Lake Ophelia NWR (LONWR), east-central Louisiana 2001–2003.

	Site		
	RRWMA 2001 (<i>N</i> = 228 ^a)	RRWMA 2002 (<i>N</i> = 183)	LONWR (<i>N</i> = 89)
Public meeting	1.9 ^b	1.1	3.4
State or Federal official	8.7	6.6	22.5
Newspaper	16.4	9.8	11.2
Sign	11.5	4.9	2.3
Word-of-mouth	28.4	25.7	23.6
This survey was first information	33.2	51.9	37.1

a. Total number of usable responses.

b. Percent of respondents.

ing to complete surveys were not recorded, so no response rate was calculated. Individuals stating that they had completed surveys during 2001 were counted, but not re-sampled during 2002 surveying on RRWMA. We used responses by these individuals in calculating prior knowledge about the project for RRWMA in 2002 only.

We summarized responses provided by hunters and compared them among RRWMA 2001, RRWMA 2002, and LONWR. We used a one-way analysis of variance (ANOVA) and chi-square tests to determine differences in knowledge about the project between years on RRWMA, and respondents on RRWMA during 2001 and LONWR (SAS 1999). By comparing data from surveys on RRWMA during 2001 and 2002, we were able to determine if knowledge about the project increased from attention given to bear releases during the second year, and determine effectiveness of the survey as an educational tool. LONWR was proposed as a release site for year 3 (2003) of the project by the USFWS and LDWF. By comparing survey results from LONWR to those from RRWMA 2001, we were able to compare knowledge and attitudes of hunters using state and federal properties, and compare two areas during the first phase of bear releases. We pooled data from the three surveys to determine if education programs initiated prior to bear releases were effective by comparing knowledge about the project in Concordia and Avoyelles Parishes (areas closest to the RRC) to other parishes in Louisiana).

Results

We surveyed 518 hunters from 2001–2003 (RRWMA 2001, *N* = 231; RRWMA 2002, *N* = 193; and LONWR, *N* = 94). Thirty individuals who had completed surveys the previous year were encountered on RRWMA during 2002 and not resurveyed. During 2001, 56% of hunters were aware that bears had been released on RRWMA, 33% during 2002 excluding individuals surveyed the previous year, and 55% were aware that bears were to be released on LONWR. Knowledge about bear restoration from RRWMA 2001 was different from RRWMA 2002 with ($X^2 = 9.11$, $P = 0.003$)

Table 3. Perceptions of personal gains by hunters to Louisiana black bear restoration on Red River WMA (RRWMA) and Lake Ophelia NWR (LONWR), east-central Louisiana, 2001–2003.

	Site		
	RRWMA 2001 (N = 368 ^a)	RRWMA 2002 (N = 237)	LONWR (N = 122)
See a black bear in the wild	33.4 ^b	37.1	43.4
Satisfaction of knowing bears are using the area again	13.6	14.3	7.2
An important part of the wildlife community has been restored and Louisiana natural history enhanced	14.4	15.2	10.7
My children or grandchildren may get to see a black bear in the area	19.3	13.9	10.7
There may again be a hunting season on bears in Louisiana	12.0	11.0	10.7
No opinion	6.5	8.0	9.8
Other	0.8	0.4	0.8

a. Respondents were able to choose more than one response.

b. Percent of total responses.

and without ($X^2_1 = 22.86, < 0.001$) individuals who completed surveys during 2001. Knowledge about bear releases was not different between RRWMA 2001 and LONWR respondents ($X^2_1 = 0.03, P = 0.863$). Residents of Concordia and Avoyelles parishes constituted 19% of hunters surveyed on all three sites. Knowledge about the project was higher (65%) in these parishes compared to individuals from other portions of the state (41%; $X^2_1 = 14.75, P = < 0.001$). Most individuals aware of the project prior to our survey indicated they initially heard about it by word-of-mouth. On LONWR, contact with a state or federal official also was a common method of learning about the releases (Table 2).

Although only approximately 50% of hunters surveyed were aware of the project, support for restoration was high (79.0% on RRWMA 2001, 85.3% on RRWMA 2002, 77.4% on LONWR). Hunters used the area most often for hunting deer (firearms and archery), small game, and wild hogs. Hunters on LONWR (51%) responded similarly to those on RRWMA during 2001 and 2002 (46% and 38%, respectively) when asked if they hunted in other areas with black bears. Few hunters surveyed were concerned about using areas where black bears were present (RRWMA 2001 = 21%, RRWMA 2002 = 26%, LONWR = 20%). Most hunters would like to see more bears in Louisiana (RRWMA 2001 = 79%, RRWMA 2002 = 84%, LONWR = 82%). Most hunters knew the Louisiana black bear was a protected species (RRWMA 2001 = 86%, 2002 = 80%, LONWR = 92%). Hunters indicated that the ability to see a black bear in the wild was the most important benefit from this restoration program (Table 3).

Table 4. Educational level of hunters responding to the black bear restoration survey administered 2001–2003 on Red River WMA (RRWMA) and Lake Ophelia NWR (LONWR), east-central Louisiana.

	Site		
	RRWMA 2001 (<i>N</i> = 229 ^a)	RRWMA 2002 (<i>N</i> = 192)	LONWR (<i>N</i> = 93)
Education			
Grade school (1)	4.8 ^b	6.8	2.2
High school (2)	49.8	52.8	50.5
Some college or post-high school (3)	19.7	19.3	20.4
Vocational or technical school (4)	15.7	13.0	10.8
Bachelor's degree (5)	7.9	5.7	9.7
Graduate degree (6)	2.2	2.1	6.5
Score \bar{x} (SD)	2.8 (1.1)	2.6 (1.1)	2.6 (1.1)

a. Total number of usable responses.

b. Percent respondents.

All hunters surveyed lived in Louisiana, were predominantly male (> 90%), and were of similar age (RRWMA 2001 = 35.0 ± 12.4 years, RRWMA 2002 = 34.4 ± 12.2 years, LONWR = 37.3 ± 10.2 years; $F_{2,439} = 0.61$, $P = 0.5436$) and hunting experience levels (RRWMA 2001 = 21.9 ± 12.7 years, RRWMA 2002 = 21.5 ± 11.4 years, LONWR = 26.4 ± 11.0 years; $F_{2,427} = 2.13$, $P = 0.121$). Hunters at both areas had similar educational backgrounds ($F_{2,440} = 1.27$, $P = 0.281$; Table 4), and were from similar community types ($F_{2,439} = 1.61$, $P = 0.200$). Of 64 Louisiana parishes, 36 were represented by sportsmen surveyed on the two areas.

Discussion

Although agencies often incorporate public opinion into decisions about wildlife restoration, their methods are often inappropriate or inadequate in design (Enck and Bath 2001). Success of wildlife restorations can be hindered by a lack of community acceptance, even when positive attitudes and initial support appears high (Lohr et al. 1996, Enck and Bath 2001). Support for wildlife restoration from land-owners and sportsmen is extremely important, because of potential restrictions in land use directly affecting their activities (Reading and Kellert 1993, Bowman 1999, Brooks et al. 1999, Enck and Bath 2001).

Only 46% of hunters surveyed were aware of the proposal to restore bears to the RRC. In areas where public meetings were held and information packets distributed (Avoyelles and Concordia parishes) knowledge was higher, but these two parishes accounted for < 20% of hunters to public areas surveyed. A study from BSF indicated that > 80% of respondents were familiar with the proposed bear reintroduction prior to the attempt. Although knowledge about restoration programs was low, even in areas where education programs had been initiated, support was high (> 75% in

all areas). These results are similar to other areas where bear reintroductions have been proposed (Peine et al. 1995, Bowman 1999, Fly 2001). However, a high level of support does not always indicate continual support for restoration and project success. Bear restoration in BSF was suspended due to public opposition after initiation (Clark et al. 2001), even though public meetings were positive and two independent surveys indicated that 57%–77% of visitors approved (Peine et al. 1995, Eastridge 2000, Fly 2001).

Positive attitudes toward a species do not always translate into social acceptance of a species restoration, as attitudes are often temporary and change when the public obtains more information (Lohr et al. 1996, Enck and Brown 2002). In this study, most hunters were informed about the restoration project by word-of-mouth. Fly (2001) also found that this was a common way for respondents to gain information about black bear restoration in BSF. Although word-of-mouth may be an effective way of disseminating information, it does not always distribute correct information.

Printed media (newspapers and magazines) can be an effective method of disseminating information (Reading and Kellert 1993, Fly 2001). In this study, information in local newspapers was either written by individuals present at the release or articles had information supplied by cooperating agencies. Information distributed to the public in this manner was likely more reliable because the original source was directly related to the restoration program. With most uninformed respondents coming from areas outside the RRC, media outlets like newspapers, magazines, and television may be best in distributing information to a wider audience. Hunters could be targeted by including information in the state hunting regulation manual, regional outdoor magazines, outdoor-oriented television programs, and potentially on internet sites visited by Louisiana sportsmen.

Although mandatory registration at check stations is required on both state and federal properties in Louisiana, signs posted at check stations on our study sites were not effective in notifying hunters of the bear restoration program. Furthermore, on LONWR more hunters first heard about the program from a wildlife official than on RRWMA. This may have been because concern about the lack of knowledge on RRWMA during the initial year prompted USFWS personnel to become more aggressive in informing the public. Meetings also were found to be ineffective at notifying hunters of bear restoration, probably because of low turnout (≈ 55 total individuals in attendance; USFWS 2001) and the fact that they were only held in areas surrounding the RRC ($> 80\%$ of respondents were from counties outside this area). Because many hunters using public lands are often from other portions of the state, outreach should not only be targeted towards the local community, but throughout the region. For instance, newspaper, radio, and television outlets could all be used to notify hunters of activities occurring on public lands; each of these outlets provide opportunities for information dissemination throughout large regions of a respective state.

Management Implications

Although support for restoration of the Louisiana black bear appears high, further efforts to educate and inform the public are warranted. A more in-depth study of attitudes and knowledge of landowners and Louisiana residents may be required to further gauge suitability of release sites. Because attitudes are dynamic, continual monitoring of public attitudes should be conducted to determine if shifts in public opinion occur. Because hunters and local landowners are the two main groups that may be impacted by black bear restoration to public lands, care should be taken to better inform individuals and address concerns prior to release attempts. Methods which address a larger audience should be used to inform hunters of proposed restoration sites and to address their concerns. Additionally, the use of methods which present accurate, timely information (i.e., informative papers, progress reports of research activities) should be encouraged. Although negative attitudes may change suitability of release sites, accurate information on public opinion is important to increase success of wildlife restoration.

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