
Attitudes toward a Proposed Reintroduction of Black-Footed Ferrets (*Mustela nigripes*)

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Abstract: *Sociological considerations are crucial to recovery efforts such as the proposed reintroduction of endangered black-footed ferrets (*Mustela nigripes*) into Phillips County, Montana. Many past reintroduction attempts have failed or been less successful because they neglected these concerns. This study examined knowledge, attitudes, and opinions of ranchers toward black-footed ferrets, prairie dogs (*Cynomys* spp.), and the proposed ferret reintroduction using informal, unstructured interviews and a mail sample survey. Ranchers within the proposed reintroduction site were antagonistic toward the program, the ferret, and especially the prairie dogs upon which black-footed ferrets depend for survival. Of six sample groups, local ranchers scored highest on negativistic, libertarian/dominionistic, and utilitarian attitude scales and lowest on moralistic, humanistic, and naturalistic/ecological attitude scales. Their attitudes were most similar to those of ranchers statewide, followed by residents of Phillips County, Montana, Billings, Montana, residents, and members of the Montana Wildlife Federation; they were least similar to attitudes of members of conservation organizations other than the Montana Wildlife Federation. Local ranchers perceived themselves as having little knowledge of black-footed ferrets, even though they received significantly higher scores on the black-footed ferret knowledge scales than did most other groups, and they perceived themselves as having great knowledge of prairie dogs, even though their scores on the prairie dog knowledge scales were no better than any other group. These results are useful for ranking*

Actitudes hacia una propuesta para la reintroducción del hurón de patas negras (*Mustela nigripes*)

Resumen: *Las consideraciones sociológicas son cruciales para la recuperación de esfuerzos tales como la propuesta de reintroducción del hurón de patas negras (*Mustela nigripes*) en peligro de extinción en el distrito territorial de Phillips, en Montana. Varios intentos de reintroducción en el pasado fracasaron o han sido poco exitosos por haber descuidado dichas consideraciones. Este estudio examina el conocimiento, actitudes y opiniones de los rancheros hacia los hurones de patas negras, los perros de las praderas (*Cynomys* sp.) y la propuesta de reintroducción del hurón utilizando entrevistas informales, no estructuradas y un modelo de encuestas por correo. Los rancheros dentro del área de reintroducción fueron antagónicos hacia el programa, el hurón y especialmente hacia los perros de las praderas de los cuales los hurones de patas negras dependen para sobrevivir. De 6 grupos de muestras, los rancheros locales tuvieron el puntaje más alto en escalas de actitud negativistas, libertarios/dominadores y utilitaristas y el resultado más bajo en cuanto a una actitud moralista, humanista y naturalista/ecologista dentro de la misma escala. Sus actitudes fueron más similares a la de los rancheros a lo largo del estado, seguidos por los residentes del distrito territorial de Phillips, Montana, los residentes de Billings, Montana, los miembros de la Federación de Vida Silvestre de Montana y fueron menos similares a los miembros de organizaciones conservacionistas diferentes de la Federación de Vida Silvestre de Montana. Los rancheros locales percibieron ellos mismos la falta de conocimiento sobre los hurones de patas negras, a*

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the suitability of reintroduction sites, for formulating policies, and for developing more effective public relations campaigns. The results highlight the need for education and public relations programs that do more than simply provide facts and information. Well-conceived public relations programs should use pressure, purchase, and persuasion to try to change or neutralize opposition and to develop, conserve, and strengthen support. Endangered species reintroduction and recovery programs will rarely succeed if they do not actively consider and incorporate the values, attitudes, behaviors, and desires of the local public.

pesar de que ellos recibieron un puntaje significativamente más alto en relación con otros grupos dentro de la escala de conocimiento sobre el hurón de patas negras. Ellos mismos también percibieron tener un gran conocimiento sobre los perros de las praderas a pesar de que su puntaje dentro de la escala de conocimiento de los perros de las praderas no fue mejor que el de cualquier otro grupo. Estos resultados son útiles para clasificar los sitios más convenientes para la reintroducción, para formular planes de acción y para desarrollar campañas de relaciones públicas más efectivas. Estos resultados ponen de relieve la necesidad de programas de educación y de relaciones públicas, los cuales proveen algo más que simples hechos e información. Los programas de relaciones públicas bien concebidos deben utilizar presión, movilizar y persuadir para tratar de cambiar o neutralizar oposiciones y para desarrollar, conservar y fortalecer el apoyo. La reintroducción de especies en peligro de extinción y los programas de recuperación difícilmente van a prosperar si no consideran e incorporan activamente los valores, actitudes, comportamientos y deseos de la comunidad local.

Introduction

As the number of endangered species grows, reintroduction as a conservation tool increases. Most reintroductions fail, however (Griffith et al. 1989). We propose that many of these failures occur because the socioeconomic and political aspects of reintroduction programs are not adequately addressed. Reintroductions of endangered species are especially problematic because of both real and perceived restrictions under the Endangered Species Act. Of particular concern is the impact on resource-dependent populations such as farmers, loggers, and miners by the presumption of restricted access to and use of natural resources on both private and multiple-use public lands.

In this paper we explore some of the social aspects of a proposed black-footed ferret (*Mustela nigripes*) reintroduction in Montana. The knowledge, attitudes, and opinions of ranchers within the proposed reintroduction site toward black-footed ferrets, prairie dogs (*Cynomys* spp.), and the proposed reintroduction are examined. Knowledge, attitudes, and opinions are discussed in relation to ranchers statewide, other residents of Phillips County, Montana, residents of Billings, Montana, and members of conservation organizations from Montana.

Sociology of Reintroductions

A generalized paradigm for the reintroduction of endangered species has been developed that includes socioeconomic variables (Reading et al. 1991). The paradigm

also involves the integration of science/technical, organizational, and political or power/authority variables. Traditionally, reintroduction plans have concentrated almost exclusively on the scientific and technical aspects. We assert that a more holistic reintroduction paradigm could provide managers and conservationists with a readily accessible framework for future species reintroductions, both expediting and rendering more effective the policy process (Kellert & Clark 1991). As Kellert (1985a:528) states, "A compelling rationale and an effective strategy for protecting endangered species will require recognition that contemporary extinction problems are [largely] the result of socioeconomic and political forces."

An examination of the socioeconomic aspects of reintroduction programs requires investigating values, attitudes, and perceptions held by people involved with and potentially affected by endangered species reintroductions. These considerations are usually lacking or insufficiently considered in endangered species management efforts (Kellert 1985a). Here we concentrate on the knowledge, attitudes, and opinions of local ranchers—one of several important socioeconomic aspects—to a proposed black-footed ferret reintroduction into Montana.

Local support is crucial to conservation efforts. As Carlton (1986:266) states, "Only when citizens perceive the protection of species as a public good, deserving of a cooperative effort . . . will a long-range, effective preservation program be possible." Assessing public views and knowledge of wildlife often permits development of pertinent and effective public relations cam-

paigns designed to develop support and to enable people to make more rational and intelligent decisions (Kellert & Berry 1980). If the local public is antagonistic, it is difficult to develop support, and disastrous consequences may result (for example, see Hook & Robinson 1982 and Belden et al. 1990).

For wildlife, important factors influencing attitudes toward reintroduction include many characteristics of the species (such as phylogeny, morphology, size, sentient capacity), the perceived worth of the animal, and its symbolic nature (Kellert 1980; Kellert & Berry 1980). It is far easier to garner support for species with high public appeal, the "charismatic megafauna," than for lesser-known, "lower" life forms (Eckholm 1978; Westman 1990). Attitudes toward predators are also often negative or hostile (Arthur et al. 1977; Kellert 1985*b*, 1986, 1990; Bath 1989). Several values influence the perceived worth of the animal, including aesthetic, ethical, ecological, biological, recreational, cultural, utilitarian, genetic, and unknown or undiscovered values of wildlife (Ehrlich et al. 1977; Pister 1979; Rolston 1981; Kellert 1983, 1986). The perceived worth of a species is often influenced by knowledge of the species, moral and ethical issues of animal rights, and traditional market values (pelt values). Local norms and customs can also play a strong role in shaping attitudes and values, especially in the absence of accurate knowledge (Rokeach 1972; Chaiken & Stangor 1987). Variations in norms and customs are often influenced by demographic and geographic factors.

Montana Black-Footed Ferret Reintroduction

Black-footed ferrets are medium-sized mustelids that formerly inhabited the American Great Plains from southern Canada to northern Mexico and are now thought to be extinct in the wild. Because black-footed ferrets are obligate associates of prairie dogs, upon which they prey and in the burrows of which they den and seek refuge, values and attitudes associated with prairie dogs are also important (Forrest et al. 1985; Clark 1989).

Attitudes toward endangered species, especially black-footed ferrets and their associated recovery efforts, are also critical considerations. Endangered species status under the Endangered Species Act often elicits negative attitudes associated with real and perceived restrictions and limitations to farming operations. This study thus focuses on achieving a better understanding of the attitudes, perceptions, and knowledge of affected people towards black-footed ferrets, prairie dogs, and reintroduction as a recovery strategy as an important step toward developing an effective species conservation program.

Methods

To analyze some of the social variables of the proposed black-footed ferret reintroduction, informal, unstructured meetings and interviews and a sample mail survey were utilized. The values, attitudes, opinions, and knowledge of local ranchers and Phillips County residents were examined and compared with those of ranchers state-wide, those of Billings residents, and those of members of wildlife and conservation organizations. Because they represent the group potentially most affected by a ferret reintroduction, particular attention was paid to local ranchers.

All ranch households within the proposed reintroduction site were given the opportunity to meet informally with a team of wildlife biologists from the Bureau of Land Management, the U.S. Fish & Wildlife Service, and the Montana Department of Fish, Wildlife, and Parks. Twenty-seven meetings were attended by 53 local ranchers during the summer of 1990. R. P. Reading attended the meetings as an observer and recorded all pertinent conversation. Agency personnel discussed the proposed black-footed ferret reintroduction and its implications, answered questions, and listened, recorded, and, where possible, responded to the concerns of the ranchers. Content analysis was performed on the data. Additional informal, unstructured interviews ($n = 25$) with local ranchers were performed during the summers of 1988–1990.

A structured mail survey investigated the knowledge, values, attitudes, and perceptions about prairie dogs, black-footed ferrets, the black-footed ferret recovery program, and involved government agencies. The sample included 935 randomly selected individuals, consisting of 300 residents of Phillips County (which contains the proposed reintroduction site), 300 residents of Billings (the largest city in Montana), 150 ranchers in Montana, 150 members of conservation organizations from Montana, and residents of 35 ranches located within the proposed reintroduction site. Samples from Phillips County and Billings were randomly selected from telephone directories. Montana ranchers were randomly selected from a list provided by the Montana Stockgrowers Association. Five conservation organizations provided membership lists from which random samples were taken from two groups, the Montana Wildlife Federation ($n = 75$) and Montana members of the National Audubon Society ($n = 34$), The Nature Conservancy ($n = 30$), Defenders of Wildlife ($n = 8$), and the American Wildlands Association ($n = 3$).

An advance letter informed selected individuals about the purpose of the study and that they would soon receive a survey, and it requested their assistance in the survey's completion and prompt reply. The 121-question survey, along with an explanatory cover letter,

a question and answer sheet, a self-addressed, stamped return envelope, and a \$2 incentive, were mailed one week following the advance letter. A reminder postcard was mailed after an additional two weeks. A second survey was mailed to nonrespondents one month after the initial mailing. The overall response rate to the survey was 76%. Fifty surveys were undeliverable, giving a 80% return rate for deliverable surveys. Within the sample groups, overall response rates were 74% of the local ranchers, 85% of Montana ranchers, 76% of Phillips County residents, 64% of Billings residents, and 84% of the members of both the Montana Wildlife Federation and the other conservation organizations.

A five-point Likert format of response options was used for attitude and opinion questions. Six attitude scales were constructed based on principal component and factor analyses of the individual attitude questions. Scales were comprised of five to nine questions addressing a similar basic attitude toward prairie dogs and ferrets. Specific questions and scale procedures are available upon request. The scales, though conceptually based on a typology of basic attitudes toward wildlife developed by Kellert (1980) and using the same labels, consisted of question items unique to this study. Scale reliability was tested with Cronbach's Coefficient Alpha, which examines internal consistency based on correlations of items on a single scale. One-sentence definitions of the six basic attitude scales are found in Table 1.

Table 1. Black-footed ferret/prairie dog attitude scale definitions.

Attitude Scale	Definition	Cronbach's α^*
Negativistic	Strong dislike or indifference towards black-footed ferrets and prairie dogs and their conservation	0.878
Libertarian/ Dominionistic	Strong interest in individual rights and freedoms and in the mastery, control, and domination of wildlife	0.878
Utilitarian	Strong support for the direct utilization of wildlife and subordination of wildlife habitat for human use	0.887
Moralistic	Strong concern for the possible infliction of cruelty, harm, and exploitation of black-footed ferrets and prairie dogs	0.882
Humanistic	Strong emotional attachment to, and support for the existence value of, black-footed ferrets and prairie dogs	0.876
Naturalistic/ Ecologicistic	Strong interest in direct outdoor recreational contact with black-footed ferrets and prairie dogs and in their ecological value	0.882

* Cronbach's α is a measure of the scale's internal consistency. Interpretation is similar to that for a correlation coefficient ranging from 0 to 1.

Three knowledge scales (black-footed ferret knowledge, prairie dog knowledge, and overall knowledge) were developed from 10 questions about black-tailed prairie dogs (*C. ludovicianus*) and 13 questions about black-footed ferrets. Two points were awarded for a correct answer, one point was awarded if the respondent realized he or she did not know the answer to a question, and no points were given for an incorrect response. All knowledge and attitude scales were standardized on a 100-point scale.

Pearson chi-squared values were used to test for significant differences among individual attitude questions. Demographic group variation in opposition to ferret reintroduction was assessed using step-wise and multiple regressions. Means of paired scale scores were computed and compared using analysis of variance for all groups and Tukey's studentized range (HSD) test between groups.

Results

Fifty-six percent of the local ranchers within the proposed reintroduction site opposed black-footed ferret reintroduction (Table 2). Ranchers disliked both ferrets and prairie dogs. No local rancher indicated that he or she cared strongly or even moderately about black-footed ferrets (Table 3). Very few agreed that it would be a thrill to see a black-footed ferret in the wild (6%) or thought they were likely to make a trip to see ferrets if they were reintroduced (3%). Alternatively, equal percentages of local ranchers (28%) agreed and disagreed that black-footed ferrets have a right to exist.

Ranchers were even more strongly antagonistic toward prairie dogs. Every respondent considered prairie dogs to be pests and few respondents cared about them. Ninety-one percent thought ranchers should not have to accept losses due to prairie dogs on public lands, and the vast majority (97%) favored controlling prairie dog numbers.

Informal meetings and interviews supported the survey data. Local ranchers were clearly concerned about prairie dogs, particularly prairie dog control, and especially in relation to proposed black-footed ferret reintroduction. Concerns over continued prairie dog control were voiced at 25 of 27 meetings held with local ranchers, and in 11 meetings ranchers expressed concern over the loss of forage to prairie dogs that might result from black-footed ferret reintroduction. Typical comments included:

Personally I'm all for it [black-footed ferret reintroduction], but in 10 years if prairie dogs aren't controlled, I'll be against it because then you'll be hitting my pocket-book.

I'm not against the ferret, it's the prairie dog. I want to kill every last one.

Table 2. Attitudes toward black-footed ferret reintroduction.

Question Sample Group	Strong or Moderately Agree	Neither Agree Nor Disagree	Strongly or Moderately Disagree	n
I oppose black-footed ferret reintroduction				
Local Ranchers	56%	16%	28%	25
Statewide Ranchers	42	23	35	124
Phillips County Residents	32	25	43	224
Billings Residents	8	29	63	190
Montana Wildlife Federation Members	11	19	70	61
Other NGO ^a Members	7	8	85	61
I would be willing to donate \$5 to support the establishment of black-footed ferrets in Phillips County, Montana				
Local Ranchers	4%	4%	92%	26
Statewide Ranchers	9	10	81	127
Phillips County Residents	13	22	65	221
Billings Residents	33	29	38	188
Montana Wildlife Federation Members	40	34	26	62
Other NGO Members	67	14	19	63

^aNGO = non-governmental organization.

The endangered status of the ferret elicited fears of restrictions to ranching operations, of loss of control over public and private lands, and of increased interference from people from outside the area (Table 4). Local ranchers strongly favored private control of ranching operations, especially on private lands, and were fearful of restrictions if black-footed ferrets were reintroduced. Ranchers were also afraid that black-footed ferret reintroduction would lead to restrictions on hunting (77%). Nearly all local ranchers (97%) believed that if black-footed ferrets were reintroduced, environmentalists would use them to try to restrict ranching, and 56% believed that federal agencies were reintroducing ferrets to increase their control over grazing.

Content analysis supported the findings from the survey. Fear of restrictions and strong libertarian attitudes were evident. In seven meetings, ranchers expressed concern that the reintroduction would lead to ranching restrictions, and in eight meetings they demonstrated a distrust of government agencies. In eight meetings,

ranchers voiced concerns over outside interference and influence on ranching and lifestyles, especially from environmental groups. Typical comments included:

I'm worried about increasing government control. Our lifestyle is in danger.

Ferrets give the environmentalists a way to get in and try to take over.

I don't mind the ferrets coming back, but it's all the restrictions that come with it.

These findings demonstrate the concern of local ranchers toward loss of control over public and especially private lands in Phillips County, and they demonstrate ranchers' distrust of people, agencies, and ideas from outside the region.

A step-wise regression of the variation in opposition to ferret reintroduction by all respondents led to the inclusion of six individual attitude questions in a multiple regression model (Table 5). This model was highly significant ($f = 57.72, p < 0.001$, adjusted $r^2 = 0.325$), and it suggests that lack of support for reintroduction

Table 3. Local ranchers' attitudes toward black-footed ferrets and prairie dogs.

Question	Strongly or Moderately Agree/Care/Favor	Neither Agree/Disagree Care/Not Care Favor/Oppose	Strongly or Moderately Disagree/Not Care/Oppose
How much do you care about black-footed ferrets?	0	24	76
It would be a real thrill to see a black-footed ferret in the wild.	6%	45%	49%
If black-footed ferrets were introduced into Phillips County, Montana, I would probably make trip to seem them.	3	25	72
Black-footed ferrets should be conserved because they have a right to exist.	28	44	28
Prairie dogs are pests.	100	0	0
How much do you care about prairie dogs?	9	3	88
Ranchers should accept losses due to prairie dogs as a part of the costs of raising cattle on public lands.	3	6	91
How much do you favor or oppose using poisons to control prairie dog numbers?	97	0	3

Table 4. Responses of local ranchers toward selected libertarian questions.

Question	Strongly or Moderately Agree	Neither Agree Nor Disagree	Strong or Moderately Disagree
I would be more supportive of endangered species if they did not restrict what you can do on private land.	79%	15%	6%
I am concerned that the reintroduction of black-footed ferrets would limit application of fertilizers.	52	25	13
I am concerned that the proposed reintroduction of black-footed ferrets would restrict hunting.	77	13	10
I believe that if black-footed ferrets are reintroduced, environmentalists will use them as an excuse to restrict ranching.	97	3	0
The rancher who leases grazing land should be allowed full control over its management.	50	22	28
The main reason the federal agencies want to reintroduce the black-footed ferret is to gain more control over grazing.	56	25	19
Ranchers exert too much influence on the management of public lands.	3	12	85

stems most of all from (1) low affinity for black-footed ferrets, (2) strong dislike for prairie dogs, and (3) presumptions about restrictions to hunting, mineral extraction, grazing, and access to public lands associated with black-footed ferret reintroduction.

The fears and concerns of local ranchers were also expressed in results derived from the attitudinal scales developed from the mail survey questions. Local ranchers were at the extremes of each of the six attitude scales. They had the highest mean scores on the negativistic, libertarian/dominionistic, and utilitarian scales and the lowest scores on the moralistic, humanistic, and naturalistic/ecologicistic scales (Fig. 1). These results reveal a clear pattern of rancher hostility toward black-footed ferrets and prairie dogs, and an associated view of these animals as having little ecological or ethical value. Scale scores of all other sample groups differed significantly from local ranchers, except for Phillips County residents on the moralistic scale and ranchers statewide on all but the negativistic scale (Table 6).

Table 5. Questions incorporated in a regression model explaining the variation in opposition to black-footed ferret reintroduction.

Question	Cumulative R ²
How much do you care about Black-footed ferrets?	0.240
I am concerned that releasing black-footed ferrets would prevent oil, gas, and mineral exploration in the area.	0.294
I am concerned that the proposed reintroduction of black-footed ferrets would restrict hunting.	0.310
Prairie dogs significantly reduce the number of cattle that can be raised on a plot of land.	0.322
Ranchers exert too much influence on the management of public lands.	0.328
Prairie dogs are pests.	0.331

F = 57.723, p < 0.001, adjusted R² = 0.325.

Of the groups sampled, local ranchers displayed the greatest hostility toward black-footed ferrets and prairie dogs and the strongest interest in individual rights and freedoms and in the subordination and control of wildlife and wildlife habitat (Table 6; Fig. 1). The mean score for the negativistic attitude scale among local ranchers (64.2) was over 33% greater than ranchers statewide, the next closest scoring group, and over eight times higher than the negativistic scores of conservation organization members other than Montana Wildlife Federation members (7.9). Differences between local ranchers and other sample groups were almost as great as on the libertarian/dominionistic and utilitarian attitude scales.

Similar results were revealed on the moralistic, humanistic, and naturalistic/ecologicistic attitude scales, with local ranchers scoring lowest of all the sample groups (Fig. 1; Table 6). Local ranchers had a score of 4.2 on the humanistic scale, over 12 times lower than the highest scoring group—members of conservation organizations not including the Montana Wildlife Federation. A similar pattern of results occurred on the moralistic and naturalistic/ecologicistic attitude scales. Members of wildlife and conservation organizations, therefore, revealed the greatest concern for the protection, recreational value, and ecological and ethical worth of black-footed ferrets and prairie dogs. Attitudes of local ranchers were most similar to those of ranchers statewide, followed by those of residents of Phillips County, and were most dissimilar from those of residents of Billings and members of conservation organizations.

Attitudes toward the proposed black-footed ferret reintroduction among the different groups closely paralleled the attitude scale results (Table 3). Sample groups most hostile to black-footed ferrets and prairie dogs (those scoring highest on the negativistic, libertarian/dominionistic, and utilitarian attitude scales) were the most antagonistic towards the proposed reintroduction.

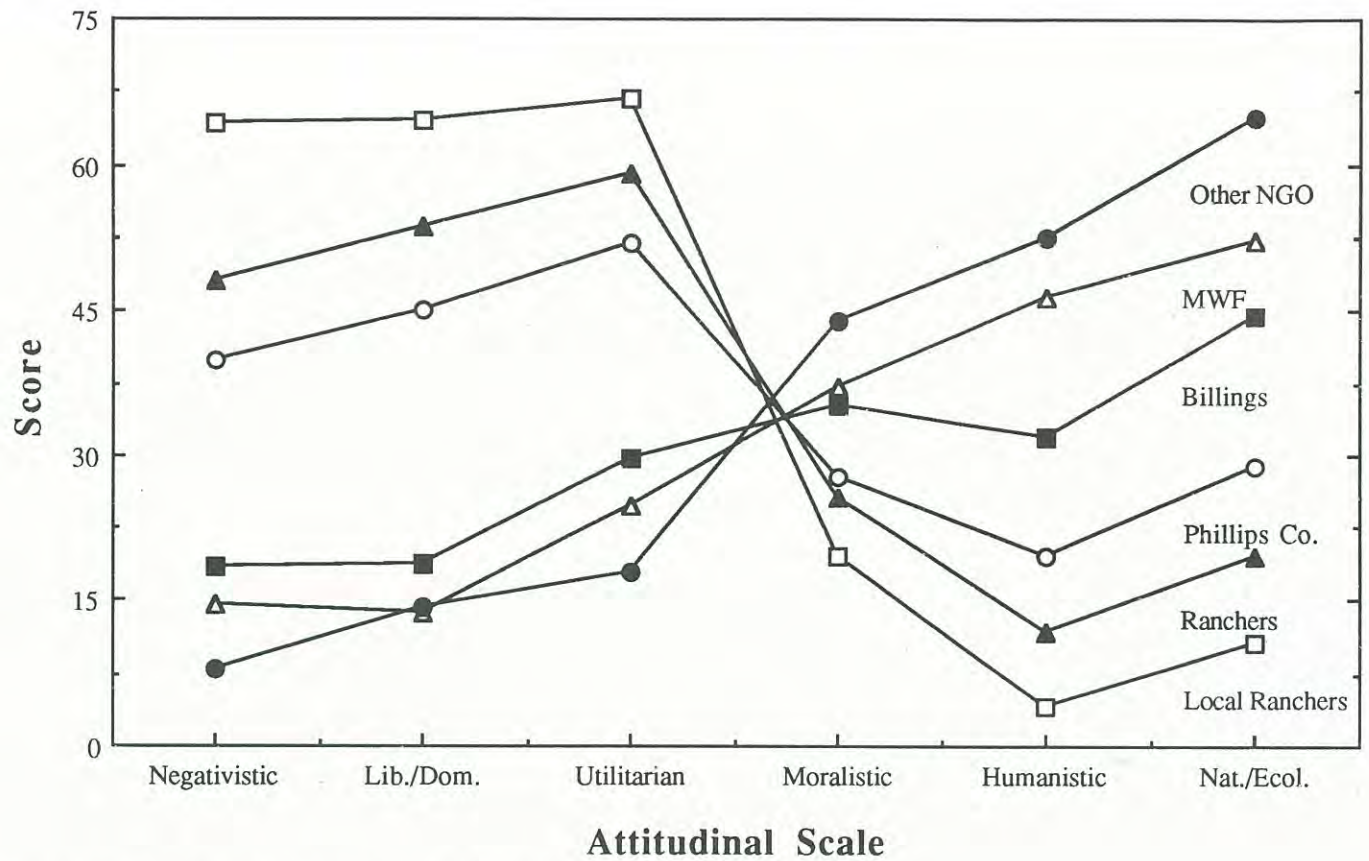


Figure 1. Mean attitude scale scores of the six sample groups.

In marked contrast, groups with sympathetic attitudes toward these animals (those scoring highest on the moralistic, humanistic, and naturalistic/ecologicistic attitude scales) were the most supportive of ferret reintroduction. The group order of antagonism/support for reintroduction was identical to that displayed on most of the attitude scales (Table 3; Fig. 1).

These results also illustrate important differences between rural and urban attitudes. Attitude scale scores of Billings residents, the largest city in Montana, differed significantly from residents of Phillips County, a rural county with a population density of less than 0.4/km², on all but the humanistic scale (Table 6; Fig. 1).

Differences in scores on the knowledge scale were less striking and consistent (Fig. 2; Table 7). While significant differences occurred among sample groups with respect to knowledge of the black-footed ferret, prairie dog knowledge scores were surprisingly similar. Local ranchers obtained significantly higher scores on black-footed ferret knowledge than all other groups, with the exception of members of conservation organizations other than the Montana Wildlife Federation. No group had significantly higher scores on prairie dog knowledge, as less than five percentage points separated them all.

Perceived knowledge results are indicated in Table 8.

Table 6. Comparison of mean attitude scale scores among sample groups.

Group	Scale					
	Negativistic	Libertarian/ Doministic	Utilitarian	Moralistic	Humanistic	Naturalistic/ Ecologicistic
Local Ranchers	64.18	64.56†	66.83†	19.44†	4.23†	10.71†
Ranchers	47.95 ^c	53.52†	59.08† ^c	25.61†	11.95†	19.64†
Phillips Co.	39.80 ^c	45.08	52.03 ^c	27.70†	19.61	28.79
Billings	18.46*	18.79*	29.72 ^b	35.13 ^b	31.82	44.53 ^b
Montana Wildlife Federation	14.48*	13.83*	24.80 ^{a*}	37.21 ^{a*}	46.35*	52.15 ^{a*}
Other NGOs	7.94*	14.40*	17.86*	43.92*	52.54*	64.85*

Scores in the same column with the same symbol are not significantly different ($p < 0.05$) using Tukey's Studentized Range (HSD) Test.

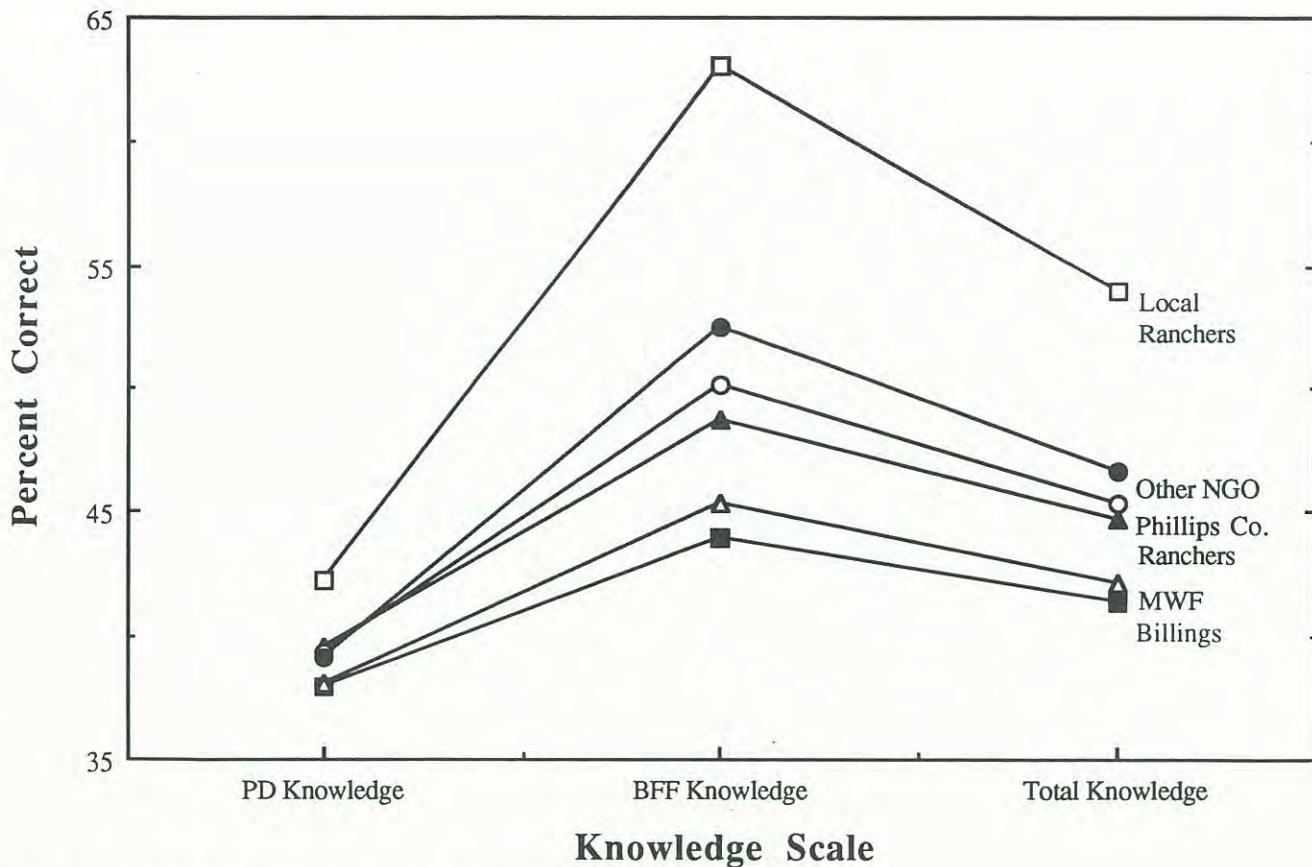


Figure 2. Mean knowledge scale scores of the six sample groups.

With the exception of Billings residents, the groups sampled had similar perceptions about their knowledge of black-footed ferrets. Local ranchers did not recognize their greater knowledge of ferrets. The situation was quite different with respect to knowledge of prairie dogs. Sixty-two percent of Phillips County residents, 61% of statewide ranchers, and 88% of local ranchers perceived themselves as knowing a great deal about prairie dogs, although none of these groups actually had significantly different scores on prairie dog knowledge (Table 8; Fig. 2).

Table 9 indicates where people believe they obtained

Table 7. Comparison mean knowledge scale scores among sample groups.

Group	Scale		
	Prairie Dog	Ferret	Total
Local Ranchers	42.23	63.02†	53.98†
Ranchers	39.52	48.70 ^{c*}	44.71 ^{c*}
Phillips Co.	39.27	50.06*	45.37*
Billings	37.86	43.98 ^{c*}	41.32 ^{c*}
Montana Wildlife Federation	37.97	45.35 ^{c*}	42.14 ^{c*}
Other NGOs	39.05	52.43†*	46.61†*

Scores in the same column with the same symbol are not significantly different ($p < 0.05$) using Tukey's Studentized Range (HSD) Test.

information about black-footed ferrets and prairie dogs. A majority of all groups asserted that they had obtained information about prairie dogs from personal experience. This was particularly true for ranchers. Other important sources of information included books and articles, newspapers, and, to a lesser extent, friends, relatives, and television. In addition, a large percentage of Phillips county residents, including local ranchers, acknowledged receiving information from the Bureau of Land Management.

Personal experience was not an important source of information concerning black-footed ferrets for most people. Books and articles, newspapers, and, to a lesser extent, friends, relatives, and television were important (Table 9). Again, many Phillips County residents, especially local ranchers, reported receiving information from the Bureau of Land Management.

Data from informal meetings and interviews supported these findings. Typical quotes include:

I'm not sure we ever had ferrets, I've been living here all my life and I've never seen one.

I don't believe the results of those studies [prairie dog-cattle experiments] over in South Dakota. Sure my cows prefer to graze on [prairie dog] towns, but they have to leave them to fill up.

You've been out on those [prairie dog] towns, you know

Table 8. Perceived knowledge about black-footed ferrets and prairie dogs.

Question Sample Group	Know Little (1 & 2)	Medium Knowledge (3)	Know A Lot (4 & 5)	n
On a scale of 1 to 5, how much do you know about black-footed ferrets?				
Local Ranchers	46%	35%	19%	26
Statewide Ranchers	57	26	16	124
Phillips County Residents	59	21	20	224
Billings Residents	69	20	11	191
Montana Wildlife Federation Members	65	17	18	63
Other NGO Members	52	25	23	60
On a scale of 1 to 5, how much do you know about prairie dogs?				
Local Ranchers	0%	12%	88%	26
Statewide Ranchers	21	18	61	124
Phillips County Residents	21	17	62	224
Billings Residents	38	35	27	190
Montana Wildlife Federation Members	44	25	30	63
Other NGO Members	28	43	28	60

Note: Some rows' percentages do not add to 100 due to rounding.

how devastating they [prairie dogs] can be. I don't care what those studies say. It's just different here.

Discussion

Sociological factors must be considered as a means of increasing the likelihood of successful species reintroduction programs. Of particular importance are public attitudes, especially the attitudes of those most likely to be affected by the reintroduction programs. Attitudinal data is useful for ranking the suitability of reintroduction sites, for devising socially acceptable policies, and for developing more effective public relations campaigns (Cutlip & Center 1964; Arthur et al. 1977).

In this study, local residents, especially ranchers, were found to be especially antagonistic toward prairie

dogs, black-footed ferrets, and the proposed reintroduction of black-footed ferrets into Phillips County, Montana. The attitudes present a significant challenge to the reintroduction program. Local ranchers are most antagonistic toward prairie dogs, which they perceive as competitors with livestock for forage, despite recent research that questions the extent of such competition and the economic justifications of prairie dog control (O'Melia et al. 1982; Collins et al. 1984; Uresk & Paulson 1989). Because black-footed ferrets are known to survive only on prairie dog colonies (Clark 1989), the necessity of maintaining prairie dogs as black-footed ferret prey is a main issue preventing more favorable attitudes toward black-footed ferret reintroduction.

Local ranchers also fear that a black-footed ferret reintroduction would restrict ranching and farming oper-

Table 9. Sources of information about black-footed ferrets and prairie dogs.

Question Sample Group	Personal Experience	T.V.	Books & Articles	Newspapers	Friends & Relatives	BLM
From where do you get most of your information about prairie dogs?						
Local Ranchers	85%	15%	35%	27%	31%	31%
Statewide Ranchers	70	7	34	18	23	5
Phillips County	66	12	31	28	38	21
Billings	54	19	24	32	15	3
Montana Wildlife Federation Members	59	11	41	22	13	3
Other NGO Members	51	21	60	33	14	8
From where do you get most of your information about black-footed ferrets?						
Local Ranchers	4%	12%	27%	35%	15%	58%
Statewide Ranchers	13	13	8	38	14	9
Phillips County	12	20	32	44	25	22
Billings	9	34	25	55	9	1
Montana Wildlife Federation Members	11	19	49	38	8	3
Other NGO Members	11	24	67	48	6	5

Note: More than 1 answer was possible, so rows add to over 100%.

ations, result in a loss of control over grazing lands, and affect their rural, western lifestyle. These concerns certainly have some justification. In recent years, western livestock producers have witnessed a gradual erosion of power over public grazing lands that they traditionally controlled and increasing regulation of farming and ranching practices (Culhane 1981; Clark & McCool 1985). Reintroduction of an endangered species represents an additional threat to the ranchers' traditional power and prerogatives, and fear and resistance to change are common among individuals living in rural, western livestock areas (Carlson et al. 1981).

Other studies of rural residents dependent upon natural resource extraction—such as farmers, ranchers, fishers, miners, and loggers—have revealed similar results (Bath 1989; Kellert 1990, 1992). People employed in such natural resource extraction industries are typically very conservative and libertarian in their views toward government control, and inclined to assert a strong attitude toward the mastery and utilitarian exploitation of wildlife. They are also often the most affected by wildlife conservation, especially endangered species restoration programs. Not surprisingly, these views often collectively result in antagonism toward endangered species programs among resource-dependent groups. Addressing local opposition, especially among such groups, is one of the greatest challenges facing the field of conservation biology.

Decreasing opposition and developing a supportive public are clearly desirable objectives. Traditional education programs, however, are often inadequate because of a tendency to stress simplistically the provision of additional information and knowledge about a species and recovery program as a presumed basis for altering traditional values and attitudes. Although public relations and education programs have been successful in developing support for some reintroduction programs (see Kleiman et al. 1990), they are rarely successful at changing attitudes and values, especially if they are strongly held (Rokeach 1979; Chaiken & Stangor 1987). As the data on prairie dogs suggest, personal experiences and the perceptions drawn from them may be the most important factors influencing attitudes (Cutlip & Center 1964; Tessler & Shaffer 1990). If people perceive themselves as possessing knowledge of an issue, it is typically difficult to change their attitudes or convince them of information with which they do not agree, especially if their knowledge is derived from personal experience (Chaiken & Stangor 1987; Tessler & Shaffer 1990). Indeed, the local ranchers in this study were contacted extensively and educated about ferrets and the ferret recovery program, and although they received the highest scores on ferret knowledge of all sample groups, they were the most antagonistic toward the proposed reintroduction. Similar results have been

obtained in other studies of wildlife and endangered species (see Arthur et al. 1977; Kellert 1986, 1990).

These results highlight the difference between knowledge and attitudes. The implications for public relations programs are significant: simply providing more facts and information will not necessarily result in more supportive public attitudes because knowledge is only one of several factors influencing attitudes (Rokeach 1972; Sinden & Worrell 1979; Brown & Manfredi 1987; Kellert 1992). Education programs may be important for people with low knowledge and poorly developed attitudes and values, but for people with strongly held attitudes and values, effective public relation programs require more than simply education.

Public relations programs should seek (1) to change or neutralize opposition, (2) to develop support among uninformed or undecided individuals, and (3) to conserve and strengthen supporters (Cutlip & Center 1964; Anonymous 1991). Cutlip and Center (1964) suggest three basic methods for accomplishing these goals: pressure, purchase, and persuasion. Ideally, all three methods should be employed in a coordinated, carefully planned public relations program. First, power and authority, in the form of law enforcement, control over access to and use of resources, and penalties can be used to apply pressure. The prohibitive aspects of the Endangered Species Act represent a potentially powerful use of authority, but they should be very carefully and cautiously applied.

To be truly successful, public relations programs will require carrots as well as sticks. Programs should attempt to entice or purchase support using financial or other incentives. For example, Miller et al. (1990) suggest redirecting federal dollars from prairie dog control operations to black-footed ferret and prairie dog conservation efforts in the forms of incentives, compensation, or conservation easements.

Finally, public relations programs should seek to persuade people to support species reintroduction, or at least not actively oppose it. Receptivity to persuasion depends on several factors, including social setting, relevance, style of presentation, number of independent sources of information, direct experience, and the strength, salience, clarity and source of the message (Chaiken & Stangor 1987; Tessler & Shaffer 1990). Using people with similar cultural and socioeconomic characteristics to convey the message can often help. Phillips County ranchers may be more receptive to information presented by ranchers from other reintroduction sites. Public relations programs should also research the most effective methods of conveying information. For example, the results of this study suggest that newspapers, books, and articles, and, to a lesser extent, television and certain federal and state agencies may provide the best venues for a public relations program.

Persuasive messages should provide information, but they should also stress the possible benefits of reintroduction as well as the program's responsiveness to the needs, desires, and opinions of the local public. The latter requires an expanded public relations program that researches and addresses the values, attitudes, behaviors, and desires of the local community. Such programs are rare, although endangered species recovery programs will rarely succeed if they do not actively consider and incorporate those views that are the basis for local support.

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