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Perceptions of wildlife damage and species conservation: lessons learned from the Utah prairie dog

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Abstract: The Utah prairie dog (*Cynomys parvidens*), a federally listed threatened species, causes damage to agricultural operations, yet little incentive exists for private landowners to conserve them. Therefore, we surveyed Utah residents to identify stakeholder attitudes regarding prairie dog management. We assessed how perceptions of wildlife damage affect respondent attitudes regarding conservation among agricultural producers, rural residents, and urban residents. Higher levels of perceived wildlife damage were reported for agriculture respondents (79%) than for urban (20%) or rural (45%) respondents. Compensation for damage caused by Utah prairie dogs was supported by those engaged in agricultural production but not by rural or urban respondents. Agricultural producers, rural residents and urban residents all stated a preference for private conservation organizations to fund damage compensation rather than a government agency. Most agricultural respondents (61%) and rural respondents (64%) believed that Utah prairie dogs should be only on public lands. Some agricultural respondents (23%) thought they should be on no land. Attitudes regarding the Utah prairie dog varied, with agricultural producers being the most negative and urban respondents the most positive. The negative attitude of rural residents and agricultural producers probably results from both the damage caused by Utah prairie dogs and land-use restrictions resulting from the species being listed as threatened. Acceptance of Utah prairie dogs by private landowners may be key to the recovery of the species, and our findings suggest that alleviation of damage issues may increase landowner acceptance of conservation measures to protect Utah prairie dogs.

Key words: *Cynomys parvidens*, Endangered Species Act, human dimensions of wildlife, human–wildlife conflict, stakeholder, Utah prairie dog, wildlife damage

The nature of human–wildlife interactions affects stakeholder perceptions and views about species. In general, the more negative the nature of the interaction, the less supportive stakeholders tend to be (Zinn and Andelt 1999). Additionally, the taxonomic level and the human associated values of the wildlife involved also may affect public support of managing a species. Stakeholders generally support conservation of large charismatic species more than unexceptional species such as rodents (Kellert et al. 1996), and support for control of problem wildlife likewise varies depending on the species being controlled (Messmer et al. 1999). Thus conservation of wildlife perceived as a source of damage or conflict may be less likely to receive public support, particularly if the species is unexceptional.

Kellert (1985) suggested there is a need to articulate and specify the values that society derives from endangered wildlife and, further, to define the trade-offs involved for different segments of the human population. As Stankey and Shindler (2006) describe, judgments about noncharismatic species are shaped by the intersection of a person's value system with cognitive factors (e.g., knowledge about a species' conservation status or its potential for causing damage) and more emotional factors (e.g., aesthetic judgments about the species or its impacts, or trust in the institutions involved in its conservation). Listing under the Endangered Species Act (ESA) of 1969 may actually hinder conservation of species that the general public does not deem "necessary," as Brook et al. (2003) reported with respect to Preble's meadow jumping mouse (*Zapus hudsonius preblei*). Brook et al. (2003) suggested that recovery efforts would benefit from, among other things, alleviating landowner economic concerns and offering assurances that landowners will not suffer hardship for management of their land to benefit endangered species.

The Utah prairie dog (*Cynomys parvidens*)

is a federally-listed species that, like Preble's meadow jumping mouse, may be viewed as unworthy of conservation. Human dimensions research on prairie dogs has largely focused on black-tailed prairie dogs (*Cynomys ludovicianus*) (Reading and Kellert 1993, Bekoff and Ickes 1999, Reading et al. 1999, Zinn and Andelt 1999, Lamb and Cline 2003). Reading et al. (1999) found differing levels of antagonism toward prairie dogs among conservation groups, urban residents, rural residents, and ranchers (in order of increasing antipathy). Colorado residents that were directly affected by prairie dogs held more negative opinions than those residents not affected (Zinn and Andelt 1999). Those affected were more knowledgeable about the species; therefore education was unlikely to increase positive feelings. This finding regarding knowledge was echoed in both a Montana study (Reading et al. 1999) and in a black-tail prairie dog range-wide study (Lamb and Cline 2003). Most agricultural producers in Wyoming that had black-tailed prairie dogs on their property felt that the species negatively impacted their operation (Wyoming Game and Fish Department 2001). The desired management practice was complete removal. However, there was strong interest in programs that could assist in managing damage to agriculture operations.

The Utah prairie dog currently inhabits 8 counties in southwestern Utah. The species was listed as an endangered species in 1973 pursuant to the ESA, but was down-listed to threatened status in 1984 after substantial numbers were found inhabiting private lands (U.S. Fish and Wildlife Service [USFWS] 1991). The decline in Utah prairie dog numbers is commonly attributed to large-scale habitat changes, drought, disease (most notably plague [*Yersinia pestis*]) long-term climatic changes, eradication efforts, and improper grazing by domestic livestock (USFWS 1991).

A long-term Utah prairie dog recovery plan was approved by the USFWS in 1991 (USFWS 1991). The plan stipulated that only those populations that inhabit federal land could be counted toward recovery. This stipulation was put in place because of objections of communities and landowners. The negligible increase in Utah prairie dog numbers on public land has prompted the USFWS to reevaluate the conservation strategy identified in the Utah prairie dog recovery plan (Elise Boeke, USFWS, personal communication). Because >70% of Utah prairie dogs occur on private lands, the new plan may incorporate private lands into the recovery process (USFWS 1991). If this change in approach is to be successful, wildlife managers must be able to understand and address citizens' concerns. For private landowners, a chief concern is likely to be the potential for damage to crops, forage, and livestock. Accordingly, we surveyed landowners and members of the Utah general public to assess the influence of wildlife damage experiences on attitudes toward Utah prairie dog conservation.

Specifics on amounts and types of damage caused by the Utah prairie dog are unknown. Because of its foraging and burrowing and its status as threatened, the species may conflict with ranching, farming, and development. Information obtained from a survey of stakeholders can assist managers in identifying and implementing conservation actions that will embrace public concerns. This information could identify the incentives needed to conserve Utah prairie dogs on private land. In this study we surveyed landowners as the persons most affected by recovery activities plus 2 groups of citizens: those living within the limited range of the species and residents of a metropolitan center. The latter group was chosen because urban attitudes often influence decisions that affect mainly rural citizens because cities not only have more concentrated populations but they tend to be the home bases for politically influential interest groups.

Study area

Utah prairie dogs are found in 8 counties in southwestern Utah: Beaver, Garfield, Iron, Kane, Piute, Sevier, Washington and Wayne. Because of the limited distribution in Kane and Washington counties, we selected only Beaver, Garfield, Iron, Piute, Sevier, and Wayne counties for survey inclusion. Salt Lake County was chosen as the urban study area because it contains Utah's largest metropolitan area.

Methods

Survey development and administration

We developed 2 mail-back questionnaires to conduct this study, one for landowners and one for members of the general public. The survey was approved by the Utah State University Institutional Review Board (approval no. 1167). Questionnaires were developed after consultation and review with those involved in Utah prairie dog recovery efforts. Additionally, we used the results of public meetings held in 1996 by the Bureau of Land Management, and in 2005 by Utah Cooperative Extension. Interviews held in 1996 by Willaim Heyborne at Southern Utah University were also used to

guide questionnaire formation. Questionnaires were tested on multiple graduate students, researchers, and the general public to ensure clarity. During February 2005 we mailed questionnaires to a random sample of 600 agricultural producers who live within the historic range of the Utah prairie dog, 600 rural residents who live within the historic range of the Utah prairie dog, and 600 urban residents who live in Salt Lake County. We chose 600 for each population so ensure adequate sample size for analysis given recent concerns regarding low return rates for mail surveys (Connelly et al. 2003).

Prairie dog. (*Photo courtesy Steve Margison)*

Names, addresses, and telephone numbers for the urban and rural populations were obtained from a survey sampling firm (Survey Sampling Inc., Fairfield, Connecticut). The study population was therefore limited to households listed in telephone directories. We contacted the Farm Service Agency (FSA) to acquire names and addresses for agriculture producers within the range of the Utah prairie dog. Their list included all agriculture producers who had utilized any Farm Bill program—the most complete list available of agricultural producers for this area. However, we anticipated that some producers on this list had retired. The names for the rural, urban, and agricultural strata were randomly selected.

The general public questionnaire consisted of 23 questions with multiple subquestions. These questions were designed to examine respondents' knowledge, attitudes, and management of the species; attitudes toward the ESA; views of nature; wildlife damage assessment; and general demographics (Appendix, Section A). The agriculture sample received a more detailed questionnaire consisting of 36 questions with multiple subquestions (Appendix, Sections A and B). In addition to the general questions detailed above, this questionnaire contained questions regarding farm operations and details, levels of farm damage caused by the Utah prairie dog, and interest in conservation options.

Survey administration followed procedures recommended by Dillman (2000). An initial introductory letter was mailed to all survey recipients in February 2005. That month was chosen because in Utah it is typically a month with relatively low levels of outdoor agricultural activity, and research has shown that general public surveys mailed in late winter tend to have higher response rates than surveys mailed at other times of year (Connelly et al. 2003). The letter informed recipients that a mailback questionnaire would follow, the reasons for the survey, and contact information. A survey and a self-addressed, postage-paid envelope with a cover letter were mailed 1 week later. The cover letter again described the survey purpose. One week later a reminder postcard was sent to all survey recipients. A second survey was sent to all nonrespondents 3 weeks after the original mailing date (Dillman 2000).

Data analysis

We used descriptive statistics and cross-tabulations to examine responses. For nominal data, Chi-square tests were conducted (Conover 1999). Ordinal responses were examined using measures of association so that both the strength and the direction of relationships could be determined. Somers' *d* was used as a measure of association in instances with 1 ordinal variable and 1 nominal variable (Somers 1962). When both variables had ordinal responses, the *gamma* measure was most applicable because it is a symmetric test and does not assume that 1 variable is independent (Goodman and Kruskal 1979). For all measures of association, the asymptotic standard error (ASE) is reported. In instances with 1 ordinal variable and 1 nominal variable that contained more than 2 levels, ridit analysis was used (Agresti 1984). This test generates the Cochran Mantel-Haenszel test statistic and an associated *p*-value. Tests between the 3 survey groups were conducted using the Kruskal-Wallis test. SAS was used to generate all statistics (SAS Institute, Inc. 1999). Responses of "Not Sure" and "No Opinion" were excluded from calculations of means or inferential tests involving means. We considered all inferential tests with $P < 0.05$ to be significant.

Results

Response rate

Urban residents returned 196 questionnaires; 82 were undeliverable and 10 unusable, resulting in an adjusted response rate of 46% based on the number of people that actually received a questionnaire. Rural residents returned 276 questionnaires; 89 were undeliverable and 9 unusable, resulting in an adjusted response

rate of 61%. Agriculturists returned 296 questionnaires; 59 were undeliverable and 12 unusable, resulting in an adjusted response rate of 59%. These response rates exceed the average for recent surveys on specialized natural resource topics (Connelly et al. 2003), and response rates approximately 50% are typical for unsolicited, multiple-page surveys (Neuman 1994). In addition, persons willing to take time to respond to such a survey are those most likely to take political action to influence decisions with respect to the survey topic (Groves et al. 1992), and thus their responses are especially relevant to wildlife managers (Messmer et al. 1999). For these reasons no follow-up survey was conducted to obtain responses from nonrespondents.

Attitudes and opinions

Respondent groups differed in their attitudes toward Utah prairie dog protection. Agriculture respondents held the most negative views; urban respondents the most positive. Rural and agriculture respondents were more likely to support protection if prairie dogs did not interfere with their livelihood. Urban residents were more likely to believe prairie dogs should receive at least some protection (Table 1). The agricultural respondents differed from both the rural (χ^2_1 = 15.70, P < 0.0001) and the urban respondents (χ^2_1 = 112.10, P < 0.001) on how they viewed the Utah prairie dog. Urban and rural respondents also differed from each other (χ^2_1 = 54.94, P < 0.001).

The survey asked respondents to rate themselves on a 6-point scale describing their beliefs about the proper relationships between wild animals and human society, where 1 = "human needs should always be first" and 6 = "wildlife preservation should always be considered first." Human needs were rated as more important by agriculture respondents ($\bar{x}$= 2.58, SE = 0.09, n = 252) and rural residents ($\bar{x}$= 2.8, SE = 0.08, n = 268), while urban respondents were nearly neutral in their beliefs ($\bar{x}$= 3.3, SE = 0.1, n = 180).

Most agriculture (61%) respondents thought that Utah prairie dogs should be on public land only, and 23% thought they should be on no land. Most rural (64%) respondents likewise believed prairie dogs should be on public land only, while 23% thought they should be on both private and public lands. Urban (58%) respondents tended to believe Utah prairie dogs should be on both private and public land, while 39% thought they should only be on public land.

Most agriculture (66%) respondents believed that landowners who had prairie dogs should be compensated for damages, while rural respondents were equally split. The urban respondents were largely opposed, with 68% saying no compensation should be provided. Most agriculture (74%) and rural (50%) respondents, and 33% of urban respondents felt that if such compensation were provided, then conservation/environmental groups should fund it (Table 2).

We examined whether personal or family involvement in agriculture operations influenced support for compensation programs. Family members' involvement in agriculture did not affect urban respondents' beliefs regarding compensation (χ^2_1 = 0, P = 1.0), but it did influence rural respondents' views (χ^2_1 = 4.2, P = 0.04). Both agriculture and rural respondents' views on compensation were related to whether or not they currently were

Table 1. Percentage of urban, rural, and agriculture respondents who expressed different beliefs regarding the Utah prairie dog, 2005.

Statement	Urban	Rural	Agriculture
The only good prairie dog is a dead prairie dog.	1	17	28
They are OK as long as they don't interfere with my life.	10	29	31
Live and let live.	30	19	18
They should be protected to some degree.	50	31	23
They should be protected at all costs.	9	4	0

Table 2. Percentage of urban, rural, and agriculture respondents who express different beliefs about which groups should pay for damage caused by Utah prairie dogs, 2005.

Groups	Urban	Rural	Agriculture
Private Insurance	11	3	4
State Government	23	17	24
Federal Government	22	23	36
Conservation/Environmental	33	50	74

active in agriculture (χ^2_1 = 5.9, P = 0.015 and χ^2_1 = 7.6, P = 0.006).

Wildlife damage

Most agriculture respondents indicated that Utah prairie dogs were present on land that they ranched or farmed (62%), and half of those (34%) perceived that the prairie dogs affected their operations. Respondents who reported that Utah prairie dogs had affected their operation had more negative opinions regarding protection of the species (Somers' d = -0.3093, ASE = 0.0764). Additionally, beliefs on compensation (χ^2_1 = 7.45, P = 0.006) and beliefs regarding where the species should be in southern Utah (χ^2_2 = 13.76, P = 0.001) were related to whether prairie dogs had affected the respondent's operation. Landowners affected by the Utah prairie dog were more likely to believe the species should not be on private lands and that landowners should be compensated for losses. The wildlife/human scale score was not related to effect on operation (Somers' d = -0.04, ASE = 0.078).

We asked respondents to indicate if they experienced damage from wildlife during the preceding 5-year period. This question did not specify what species of wildlife caused the damage. Those that experienced damage were then asked to indicate what types of damage. They could select more than 1 option, and the choices were not necessarily mutually exclusive because a vehicle collision could also have caused personal injury. Categories were stated in brief but precise terms to avoid ambiguity (Appendix 1). Twenty percent of urban, 45% of rural, and 79% of agriculture respondents reported they had experienced damage caused by wildlife within the past 5 years. Urban and rural respondents most frequently indicated property damage, vehicle collision, and damage to plants as the type of damage (Table 3).

Table 3. Percentage of respondents who reported that they experienced different types of human-wildlife conflicts within the previous 5-year period for urban, rural, and agriculture respondents in Utah, 2005.

Type of conflict	Urban	Rural	Agriculture
Property Damage	15	20	54
Vehicle Collision	11	21	30
Plant/CropDamage	10	24	68
Livestock/Pet Injury	3	5	21
Personal Injury	1	2	6
Quality of Life	0	2	10

Damage to plants and property were cited most frequently by agriculture respondents (Table 3).

We tested to see if perceived damage history affected how respondents viewed themselves on the wildlife/human scale, and how they felt about protection of Utah prairie dogs. For the urban respondents there was no correlation for either question (Somers' d = -0.01, ASE = 0.099 and Somers' d = 0.45, ASE = 0.1, respectively). Likewise for the rural respondents there was no correlation for either question (Somers'd = -0.09, ASE = 0.07 and Somers' d = 0.0024, ASE = 0.07, respectively). For the agriculture respondents there was no correlation between the human versus wildlife scale and perceived damage history (Somers' d = 0.048, ASE = 0.087). However, there was a slight correlation between perceived damage history and how they felt about prairie dog protection (Somers' d = -0.21, ASE = 0.084). Those that had not experienced wildlife damage were more inclined to view the Utah prairie dog positively.

Damage assistance and conservation options

The last series of questions for the agriculture producers dealt with conservation and management options regarding the Utah prairie dog. Only 8% of the respondents had received assistance in managing Utah prairie dog conflicts. While only 8% had received help in the past, 27% were interested in assistance to compensate losses caused by prairie dogs (either financial or technical). Another 23% were not sure. Interest in receiving assistance was related to the species' reported effect on operation (χ^2_1 = 17.61, P < 0.001) and on past assistance history (χ^2_1 = 7.47, P = 0.006). Those who were affected by the species and who had received assistance in the past were more likely to be interested in assistance to compensate for losses. Because recovery efforts are likely to include collaboration between landowners and conservation advocates, we also asked which organizations agriculture respondents were most interested in working with to deal with conflicts surrounding the Utah prairie dog. All government agencies scored similarly (Table 4). The 2 conservation groups scored worse. Nearly 74% and 68% of respondents had no interest in working with these groups. Utah Farm Bureau Federation and Utah State University Extension Service had nearly identical ratings, with 48% and 47% very willing to work with them respectively (Table 4).

We asked what types of assistance would be most beneficial to the agriculture respondents. They could choose more than 1 option. Killing

Table 4. Degree (in %) that agriculture respondents were willing to work with various organizations to manage conflict caused by Utah prairie dogs, 2005.

Groups	Very willing	Somewhat willing	Not willing
Utah Division of Wildlife Resources	28	38	36
U. S. Fish and Wildlife Service	19	31	50
Bureau of Land Management	22	37	42
U. S. Forest Service	19	35	46
Natural Resources Conservation Service	22	40	38
Wildlife Services	20	38	42
Environmental Defense	10	16	74
Nature Conservancy	10	22	68
Utah Farm Bureau	48	34	19
Utah State University Extension	47	37	16

Table 5. Percentage of agriculture respondents who preferred various types of assistance for dealing with problems caused by Utah prairie dogs, 2005.

Assistance	%
Killing all prairie dogs	33[a]
Killing some prairie dogs	40
Relocate all prairie dogs	26
Relocate some prairie dogs	24
Forage/crop loss compensation	38
Equipment damage compensation	28
Livestock injury compensation	30
Technical advice	19
Fencing of colonies	8
Range improvements	24
Relief from regulations	40
Conservation easements/tax relief	11

[a]More than 1 option could be selected.

prairie dogs, damage compensation, and regulatory relief were the preferred measures (Table 5).

When asked if they were interested in enter-ing some of their land into a conservation easement, 89% said no, 6% were somewhat willing, 1% very willing, and 4% were not sure. Only 4% were willing to allow Utah prairie dogs to be relocated on their land in exchange for financial compensation, with another 10% not sure. We also asked whether the fear of restrictions under the ESA hindered their willingness to receive aid or assistance. Approximately 70% indicated it did. Another 34% admitted that they had in some way attempted to discourage Utah prairie dogs on their land to avoid regulatory problems.

Discussion

The results of our study show similar patterns as previous research in that those more affected by Utah prairie dogs (rural and agriculture respondents) were more knowledgeable about the species and aspects of its management and more opinionated (Reading et al.1999, Zinn and Andelt 1999, Lybecker et al. 2002, and Lamb and Cline 2003). Rural and agriculture respondents tended to have more negative feelings regarding the species. This was expected because issue salience causes individuals to have stronger opinions and feelings and be less neutral regarding an issue (Manfredo et al. 1992).

Urban residents would be expected to have a more positive attitude towards Utah prairie dogs because they do not personally have to deal with problems caused by the species (Lamb and Cline 2003). Manfredo et al. (1992) found that at higher levels of experience and discussion of an issue, attitudes became more extreme. From these studies, we would expect agriculture respondents to be more opinionated and hold deeply entrenched ideas regarding the species. Other reasons that might cause urban residents to view the Utah prairie dog more favorably are the charismatic appeal of the species. Kellert (1979) has shown that emotions (affective) may be more related to positive feelings about wildlife than is knowledge (cognitive).

We found that perceived wildlife damage rates varied greatly between respondent groups. Most agriculture respondents reported wildlife damage, fewer rural respondents reported wildlife damage, and even fewer urban respondents reported wildlife damage. The urban respondents had similar levels of support for wildlife damage compensation (20% versus 24%) to those measured in a previous nationwide study (Reiter et al. 1999). Therefore, fewer urban respondents reported wildlife damage, and this group had the lowest level

of support for wildlife damage compensation. This again substantiates the theory that those who do not have direct exposure to a problem would be expected to have less awareness of damage issues (McIvor and Conover 1994), and highlights the need to find ways to alleviate landowner damage issues to increase acceptance of Utah prairie dog recovery and management on private lands.

Compensation for wildlife damage on private lands does not appear to have broad acceptance from those outside of the agriculture community (Kellert 1979, McIvor and Conover 1994, Reiter et al. 1999). We found similar results. While the majority of agriculture respondents agreed with the concept, only half of the rural respondents did, and less than one-third of the urban residents did. Further tests showed that there was a strong association with participation in agriculture and acceptance of compensation programs. Therefore, those individuals not directly impacted by Utah prairie dogs did not favor this strategy.

Czech and Krausman (1999) found that the public did support compensation of landowners who were negatively affected by ESA implications. Our survey question did not mention ESA burdens, but rather damage caused by prairie dogs. Therefore, it is possible that Utah residents not involved with agriculture would be more supportive of compensation to address regulatory burdens on landowners. Bulte and Rondeau (2005) suggested that compensation programs may lead to more damage issues and reliance on payments. Targeting payments toward conservation outcomes rather than only compensating losses would therefore be more beneficial to species recovery. These conservation payments should have strong landowner incentives to gain acceptance within the agricultural community.

An interesting note is that all 3 respondent groups felt that conservation/environmental groups should be responsible for any compensation if it occurs. Private insurance was the least acceptable for all 3 groups. This is contrary to previous research that found 41% of respondents supportive of private insurance paying for compensation and only 18% of respondents supportive of conservation/environmental groups funding compensation (Reiter et al. 1999). We suspect this reflects a view that endangered species management is driven by outside special interest groups. We heard this sentiment expressed in numerous personal contacts in southern Utah.

Results of this study suggest that perceived damage caused by Utah prairie dogs is prevalent and appears to be a source of negative attitudes regarding the species. We found low interest in conservation options for the Utah prairie dog. Additionally, there is fear among agricultural producers of regulatory burdens associated with ESA restrictions. Finding ways to alleviate damage issues may be more productive than attempting to change longstanding views regarding this species. Urban residents might be more inclined to sympathize with landowners dealing with Utah prairie dog damage if they were made aware of the extent and impact of the damage that agricultural producers face, as well as their fear of regulatory burdens under the ESA. It appears that for our urban respondents attitudes presently are derived primarily from wildlife values and not from either direct or indirect impacts.

The respondents in all 3 groups tended to be more educated and older than the populations from which they were sampled. These biases are likely due to more available free time for older persons and greater familiarity with surveys about complex topics among more educated persons. Also, responses were highly skewed toward males for all groups. This is likely a consequence of males predominately listed as head of household and as land ownership contacts. Similar bias has been reported in other studies (Reiter et al. 1999). Thus, our results may not be completely indicative of the populations from which they were derived.

One potential management consideration concerns the fact that the average age of agriculture producers is nearly twice the county average. While members of this group were not very open to conservation measures for prairie dogs, they will be turning over farm operations to their children or the land ownership will change within the next 10–20 years. Thus, a new generation of operators will soon be in control of vast acreages of agricultural land. How this new generation's views regarding Utah prairie dogs will differ is difficult to predict. It would be beneficial to repeat this survey for the agricultural subgroup in another decade to evaluate potentially changing views.

Management implications

Reducing damage caused by the Utah prairie dog and alleviating fear among landowners would likely increase acceptance of conservation and management actions that are necessary for recovery of Utah prairie dogs on private lands. Where damage compensation is necessary, nongovernment sources of revenue should be sought so that landowners will be

more responsive. However, implementation of damage compensation should be conducted by trusted sources such as the Utah Farm Bureau or Utah State University Extension Service and not directly by the funding source. It has become obvious that private lands are necessary in the recovery of this species. We encourage the Utah prairie dog recovery team to carefully consider landowners in the recovery process. Steps should be taken so that incentives are in place that are adequate to outweigh damage incurred.

We believe that much antagonism could be alleviated if certain high-conflict areas could be managed to resolve damage issues. Areas such as cemeteries, golf courses, hospitals, and existing homes have been identified as areas where tolerance of damage is particularly low. Tight restrictions under the ESA continue to aggravate residents of affected communities. Every effort should be made in these areas to reduce damage issues so that landowners will be more receptive to future recovery efforts. From a conservation standpoint, whether the damage is real or perceived is inconsequential. An effort must be made to address the concerns of local stakeholders before attitude change toward conserving this species can be expected.

The fear generated by ESA regulation is a poor motivator for species conservation on private lands. Rather, incentive based approaches that consider the needs of landowners are more likely to result in species conservation over the long term. If several successful case studies are carried out in each recovery area, we anticipate increased landowner interest in conservation measures that can benefit the Utah prairie dog. Initial contacts should be targeted to those landowners that have received assistance in the past, since they are more likely to be responsive. Many Farm Bill programs exist that could be used to benefit Utah prairie dogs and landowners simultaneously. These programs need to be brought to the attention of landowners in affected areas. Additionally, the USFWS program Safe Harbor should be further explored for application in this area.

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Appendix

A copy of our Utah Prairie dog public opinion survey appears below. Section A was sent to all respondent groups, while Sections A and B were sent to agricultural producers.

SECTION A

1. Prior to this survey were you aware that the Utah prairie dog is considered a separate species of prairie dog?
___ Yes
___ No

2. Do you believe that the Utah prairie dog should be considered a separate species of prairie dog?
___ Yes
___ No
___ Not Sure

3. Prior to this survey were you aware that the Utah prairie dog is listed as a threatened species under the Endangered Species Act?
___ Yes
___ No

4. Do you believe that the Utah prairie dog should be listed as a threatened species?
___ Yes
___ No
___ Not Sure

5. What is your overall opinion of Utah prairie dogs?
___ The only good prairie dog is a dead prairie dog.
___ They are OK as long as they do not interfere with my life.
___ Live and let live.
___ They should be protected to some degree.
___ They should be protected at all costs.

6. What is your opinion of the Endangered Species Act? Please circle a number between 1 (disagree) and 3 (agree) to indicate how you feel about each statement.

	Disagree	**Do Not Know**	**Agree**
The original intent was good.	1	2	3
It is being misused.	1	2	3
It threatens private property rights.	1	2	3
It should be revoked.	1	2	3
It should be maintained as is.	1	2	3
The act has been a success.	1	2	3

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7. Do you believe that the Utah prairie dog has a place in southern Utah?
___ Yes, on private and public lands
___ Yes, on public lands only
___ No

8. For the following statements about prairie dogs, please circle a number between 1 (disagree) and 3 (agree) to indicate how you feel about each statement.

	Disagree	Do Not Know	Agree
Prairie dogs compete with cattle for forage.	1	2	3
Prairie dogs are beneficial to the soil.	1	2	3
Prairie dogs spread disease.	1	2	3
Prairie dogs change the plant community.	1	2	3
Prairie dogs cause livestock injury.	1	2	3
Prairie dogs are necessary for other wildlife.	1	2	3

9. The Utah prairie dog was listed because the populations had significantly declined? What do you believe contributed to this decline? Please circle a number between 1 (not important) and 4 (not sure) to indicate how you feel about each possible cause of decline.

	Not Important	Somewhat Important	Very Important	Not Sure
Shooting	1	2	3	4
Poisoning	1	2	3	4
Habitat Loss/Development	1	2	3	4
Overgrazing	1	2	3	4
Climatic Change	1	2	3	4
Disease	1	2	3	4
Predation	1	2	3	4

10. How effective do you feel the following agencies have been in dealing with prairie dog conflicts? Please circle a number between 1 (not effective) and 4 (no opinion) for each agency.

	Not Effective	Somewhat Effective	Very Effective	No Opinion
Utah Division of Wildlife Resources	1	2	3	4
U.S. Fish and Wildlife Services	1	2	3	4
Bureau of Land Management	1	2	3	4
Private Conservation Groups	1	2	3	4
Utah State University Extension Service	1	2	3	4

11. Do you believe the Utah Division of Wildlife Resources Utah prairie dog counts are accurate?
___ Yes
___ No
___ Not Sure

12. Do you believe ranchers or farmers who allow Utah prairie dogs to live on their private lands should be compensated?
___ Yes
___ No
___ Not Sure

13. Who do you think should pay for the cost of compensation? Please check all that apply.
___ Private Insurance
___ State Government
___ Federal Government
___ Conservation/Environmental Groups
___ Other (please specify) _____
___ No compensation should be provided

14. Different people have different ideas about the proper relationship between wildanimals and human society. Using the scale below how would you describe your ideas on this topic? Please circle a number that best represents your views.

1------2------3------4------5------6

Human needs should always be considered first. — Wildlife preservation should always be considered first.

15. Within the past 5 years have you personally experienced damage caused by wildlife?
___ Yes
___ No

If yes, in what forms?
___ Vehicle Collision
___ Damage to Plants or Crops
___ Livestock or Pet Injury
___ Personal Injury
___ Property Damage
___ Loss of Personal Security or Quality of Life
___ Other (please specify) _____

*16. Are you currently engaged in agricultural production?
___ Yes
___ No

If you answered yes, please complete section B and C, if you answered no please complete section C only. Thank you.

SECTION B

*1. Which of the following describes your operation? Please check all that apply.
___ Cattle Ranching
___ Sheep Ranching
___ Dairy
___ Small Grain
___ Row Crop
___ Alfalfa or Hay
___ Fee Hunting
___ Other (Please specify) _____

*2. What percentage of the land in your agricultural operation falls under the following categories? Please circle a number between 0 (None) and 4 (76-100%) for each category that you have agricultural land in.

	None	1-20%	21-50%	51-75%	76-100%
Deeded Land	0	1	2	3	4
Leased Private	0	1	2	3	4
Forest Service	0	1	2	3	4
BLM	0	1	2	3	4
State	0	1	2	3	4
Other	0	1	2	3	4

*3. About how many acres of land do you ranch and/or farm on (including land you lease)?
___ 1-50
___ 51-300
___ 301-1000
___ > 1000

*4. How long have you been involved in agricultural production?
___ 1-5 years
___ 6-15 years
___ 16-25 years
___ > 25 years

*5. Do you have Utah prairie dogs on land that you ranch or farm?
___ Yes
___ No

If so, Please check the land category(s) that Utah prairie dogs occupy.
___ Deeded Land
___ Leased Private
___ Forest Service
___ BLM
___ State
___ Other

Approximately how many acres do they occupy?
___

*6. Do Utah prairie dogs affect your operation?
___ Yes
___ No

If you answered yes to the above question, in what forms of loss?
Please check all that apply
___ Equipment Damage
___ Forage Loss
___ Livestock Injury
___ Horse Injury
___ Loss of Public AUMs
___ Loss of Economic Opportunity
___ Other (Please specify) _____

*7. For the past 5 years, what is your estimated **annual** loss due to Utah prairie dogs for the following categories (if applicable)?
___ Equipment Damage (in dollars)
___ Forage Loss (percentage)
___ Livestock Injury (number of events)
___ Horse Injury (number of events)
___ Loss of Public AUMs (in AUMs)
___ Loss of Economic Opportunity (in dollars)
___ Other (Please specify) _____

*8. Have you received assistance from the Utah Division of Wildlife Resources in dealing with Utah prairie dog conflict?
___ Yes
___ No

If so, what types of assistance? Please check all that apply.
___ Technical Advice
___ Prairie Dog Removal
___ Prairie Dog Take Permits
___ Habitat Modification

*9. Would you be interested in financial or technical assistance provided to compensate losses caused by Utah prairie dogs?
___ Yes
___ No
___ Not Sure

*10. Which of the following organizations would you be most willing to work with to reduce Utah prairie dog impacts to your operation? Please circle a number between 1 (not at all) and 3 (very willing) for each of the following organizations.

	Not At All	Somewhat Willing	Very Willing
Utah Division of Wildlife Resources	1	2	3
U.S. Fish and Wildlife Services	1	2	3
Bureau of Land Management	1	2	3
U.S. Forest Service	1	2	3
Environmental Defense	1	2	3
Nature Conservancy	1	2	3
Farm Bureau	1	2	3
Utah State University Extension	1	2	3
Natural Resource and Conservation Service	1	2	3
USDA Wildlife Services	1	2	3

*11. What types of aid or assistance would be most beneficial to you in dealing with Utah prairie dogs? Please check all that apply.
___ Kill some prairie dogs.
___ Kill all prairie dogs.
___ Relocation of some prairie dogs
___ Relocation of all prairie dogs
___ Compensation for forage/crop loss
___ Compensation for equipment damage
___ Compensation for livestock injury
___ Technical advice on minimizing conflict with prairie dogs
___ Fencing prairie dog colonies
___ Range improvement in areas occupied by prairie dogs
___ Conservation easement or other type of tax relief.
___ Relief from negative consequences of regulations.

*12. How willing would you be to enter some of your land into a conservation easement for Utah prairie dog management?
___ Not at all
___ Somewhat Willing
___ Very Willing
___ Not Sure

How much would you need to be paid to encourage you to enter into a conservation easement?
___ $10-25/acre/year
___ $26-50/acre/year
___ $51-100/acre/year
___ >$100/acre/year
___ Not Applicable

Ideally, how long would the easement be?
___ 5-10 years
___ 11-25 years
___ 26-50 years
___ Perpetuity
___ Not Applicable

How many acres of your land would you be willing to enroll?
___ 10-40
___ 41-160
___ 161-640
___ >640
___ Not Applicable

*13. Would you be willing to allow Utah prairie dogs to be relocated onto your land in exchange for financial compensation?
___ Yes
___ No
___ Not Sure

If you answered yes to the above question, how much compensation would you require?
___ $10-25/acre/year
___ $26-50/acre/year
___ $51-100/acre/year
___ >$100/acre/year
___ Not Applicable

*14. Does the fear of restrictions under the Endangered Species Act hinder your willingness to receive aid or assistance?
___ Yes
___ No

*15. Have you attempted in some way to discourage Utah prairie dogs on your land to avoid regulatory problems?
___ Yes
___ No

SECTION C

Questions in this final section help us more fully understand peoples' views anc opinions. All responses are strictly confidential.

*1. Are you currently actively engaged in farming or ranching?
___ Yes
___ No

*2. Do you have family members who are actively engaged in farming or ranching?
___ Yes
___ No

*3. Has your family been actively engaged in farming or ranching within?
___ Current Generation
___ 1 Generation
___ 2 Generations
___ Not Applicable

4. Which of the following best describes the community in which you grew up?
___ Urban Area
___ Small Town
___ Suburban Area
___ Rural Area

5. Which of the following best describes your education?
___ Some High School
___ High School Completed
___ Some College
___ College Completed

6. Are you?
___ Male
___ Female

7. What is your age?
___

8. Is there anything else you would like to tell us about how you feel about the Utah prairie dog?

* Questions were included in the agriculture strata only.

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