



Ranch Owner Perceptions and Planned Actions in Response to a Proposed Endangered Species Act Listing[☆]



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ARTICLE INFO

Article history:

Received 8 December 2014

Received in revised form 18 June 2015

Accepted 14 August 2015

Key Words:

conservation
Endangered Species Act
Gunnison sage-grouse
private land
ranching
rangeland

ABSTRACT

The Gunnison sage-grouse (GUSG) is an iconic species recently proposed for protection under the Endangered Species Act (ESA). In Colorado's Upper Gunnison River Basin, ranchers own the majority of water rights and productive river bottoms as well as approximately 30% of the most important GUSG habitat. This project used mixed-methods interviews with 41 ranch owners to document how ranchers perceive the proposed ESA listing and how they plan to respond to a listing decision. Results show that ranchers support on-the-ground GUSG conservation but are concerned about listing implications. Ranchers are most concerned about their ability to manage public and private lands productively and continue permitted grazing on public lands. If the species is listed, landowners plan to decrease participation in conservation strategies, including plans to adopt conservation easements, participation in conservation programs, and willingness to allow access to private lands for GUSG monitoring. Landowners also express plans for increased sales of land and water, which could have negative consequences for GUSG habitat. This research suggests that changes in the application of the ESA could lead to beneficial conservation outcomes. These changes include increased transparency, ability to exclude stable populations from listing under the ESA, and commitment to work with local bodies if the species is listed. This project demonstrates the importance of qualitative research for understanding the indirect and unintended effects of species protections in an increasingly interconnected world.

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Introduction

Private lands provide crucial habitat for the conservation of endangered species. Unfortunately, the potential for an Endangered Species Act (ESA) listing in the United States often creates concern and resistance to federal interference among landowners, even though they may be supportive of species conservation (Conley et al., 2007; Sheridan, 2007). What are landowners' reasons for negative interpretations of ESA listings, and how might these interpretations influence their conservation-relevant behavior? We interviewed members of active ranching families in the Gunnison Basin of southwest Colorado before the listing decision of the Gunnison sage-grouse (*Centrocercus minimus*) to gauge their perceptions of and planned actions in response to the proposed listing. Such research about social systems is critical for understanding the feedbacks between livelihoods and conservation in an increasingly interconnected world, as well as for designing more effective conservation policies (Sayre, 2004).

Since the passage of ESA legislation in 1973, ecological understanding has shifted from a paradigm of balance and equilibrium of nature to one of resilience, including thresholds and nonlinear dynamics (e.g., Scheffer, 2009). Climate change may modify ecological processes such that certain species become extinct despite designation as endangered species (Steffen et al., 2007; Thomas et al., 2004). The ESA, however, requires that listing decisions be based solely on biological information about the species, with no consideration of the social ramifications of these listings until the designation of critical habitat (United States Government, 1973). There is increasing recognition of the tight coupling and feedbacks between ecological and social systems (Chapin et al., 2009; Clark and Dickson, 2003). In this paper, we explore whether policies formulated to address ecological components (species) may have unintended consequences for human communities, whose individual or collective actions might then change ecosystem patterns (management practices, land and water use) and, in turn, affect the target species.

Almost all (90%) endangered species in the United States rely on private lands for habitat (General Accounting Office, 1994), and in the Gunnison Basin, > 30% of the important habitat for Gunnison sage-grouse (GUSG) is on private lands. Conversion from working ranches to small-acreage amenity properties is a threat to many wildlife species across the western United States (Gosnell and Travis, 2005; Gosnell et al., 2006). In the Gunnison Basin, two-thirds of the properties > 100 acres in size are owned by individuals whose primary residence is

[☆] Research was funded by Gunnison County, the City of Gunnison, the Upper Gunnison Water Conservancy District, the Resilience and Adaptation Program at the University of Alaska Fairbanks, and the Redd Foundation.

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outside the Basin, representing 48% of all private land (Gunnison County Assessor, 2012 and Saguache County Assessor, 2012). Shifts from ranching to other types of land use can have negative implications for biodiversity (Maestas et al., 2001) and habitat improvement projects (Plieninger et al., 2012). Fragmentation into smaller land units can affect GUSG directly (Oyler-McCance et al., 2001) or indirectly through an increase in predation by pets or creation of predator movement corridors (Haegen et al., 2002). Landowner decisions will therefore affect GUSG populations. To understand these potential feedbacks, this paper focuses on perceptions and planned actions of landowners before a listing decision.

Although they may view wildlife positively, long-time rural landowners often resist government regulation (Layden et al., 2003), particularly ESA listings, because some view it as a tool to remove grazing from public lands (Conley et al., 2007). Conley et al. (2007) found that opposition to ESA listings is correlated with negative perceptions of the federal government, rather than actual number of listed species on the allotments or potential for restrictions on those allotments. Despite incentives, a portion of landowners refuse to participate in conservation efforts due to normative pressure from their peers (Sorice et al., 2011). However, successful examples of programs that assist private landowners in managing for rare and at-risk species exist (e.g., Sorice et al., 2012; U.S. Fish and Wildlife Service [USFWS], 2008).

Although there is concern that the threat of ESA listings may lead landowners to destroy habitat to prevent increased regulation (Bean and Wilcove, 1997), landowner responses to listings have rarely been studied. One study shows that after listing of the Preble's meadow jumping mouse (*Zapus hudsonius preblei*) in 1998, landowners were split about their willingness to manage for conservation and were less likely to allow monitoring (Brook et al., 2003). Our study expands prior analyses to explore how a listing decision may impact land and water sales, as well as conservation actions. It combines qualitative and quantitative methods to explore the context-specific reasons why ranchers might oppose a listing decision. We also explore ranchers' baseline perceptions of their livelihood to better understand the contribution of potential GUSG listing to general livelihood stressors.

Site Description and Methods

Site Description

GUSG are currently found south of the Colorado River in Colorado and Utah in seven discrete populations (Fig. 1). GUSG are sagebrush obligates that depend on sagebrush for winter forage and rely on sagebrush cover year-round. They have habitat needs that vary by season and lifestage. For instance, they have high fidelity to breeding sites, require mesic areas for brood-rearing, and use exposed sagebrush areas during winter. Between 1958 and 1993, an estimated 20% of sagebrush-dominated landscapes on which GUSG depend were lost (Oyler-McCance et al., 2001). The largest remaining GUSG population (estimated 4799 grouse) resides in the Upper Gunnison River Basin (Jackson and Seward, 2015). This current estimate is an increase of 801 birds from 2014 (Jackson and Seward, 2014). Although this population has been stable for the past 12 years, the USFWS has expressed concern about the other smaller satellite populations due to interacting threats including fragmentation, land conversion, and increased predators (USFWS, 2013a). Since completion of this study, the USFWS listed the GUSG as threatened under the ESA. The decision to list as threatened, rather than endangered, was partially a result of their consideration of local efforts (USFWS, 2014).

The Gunnison Basin has a long history of GUSG conservation efforts, first organized under the Gunnison Basin Local Working Group formed in 1994 and later incorporated into the Gunnison Basin Sage-Grouse Strategic Committee in 2005. The community has created local and regional conservation plans (Gunnison County Sage-grouse Local Working Group, 1997; Gunnison Sage-grouse Rangewide Steering Committee, 2005),

helped to bring in more than \$30 million for direct conservation actions (J. Cochran, personal communication, July, 2012), and adopted land-use regulations to protect and conserve GUSG and their habitats. In addition, many local ranchers have changed grazing management practices, fenced riparian areas, and placed conservation easements on > 50 000 acres in the Gunnison Basin (Gunnison Ranchland Conservation Legacy, 2015). Many of these actions have been taken in an effort to preclude the need to list the GUSG under the ESA.

The primary land use in this region is cattle ranching, which occurs on 96% of private lands and 89% of national forest lands (Cheng, 2006). Private ranchlands are typically lower elevation pastures that are irrigated during the spring and summer to produce hay used to overwinter cattle. Ranchers rely on public lands during the spring and summer, and cattle return to private lands in the fall after haying. The average ranch size is 900 acres (Gunnison County, 2013), while the average public land used by each operation is > 17 000 acres (Bureau of Land Management, 2012; United States Forest Service, 2012). Large private parcels, which often abut public land, provide critical GUSG habitat. Grouse use the margins of hay fields during brood-rearing, and several large breeding areas are on hay meadows. Ranchers also own the majority of water rights (F. Kugel, personal communication, 2012). The cumulative decisions of individual ranchers may impact GUSG populations that rely on these landscapes. In two prior studies in this region, we assessed vulnerability of land-based livelihoods to climate change (Knapp, 2011) and documented local knowledge of GUSG from both formal and observational experts (Knapp et al., 2013). During the first study, many ranchers spoke of potential land and water sales based on the increased difficulty of ranching in the area if the grouse were listed (Knapp, 2011). Since this study was conducted, GUSG has been listed as threatened under the ESA (USFWS, 2014). In the discussion section, we address the results of this study in light of recent events.

Methods

We were interested in speaking with local owners of large ranches in the Gunnison Basin. We obtained a list of landowners who owned > 100 acres from the County Assessor and removed landowners with addresses > 60 miles outside the Basin's borders. We checked the resulting list with several individuals familiar with the ranching community to remove individuals not actively involved in agricultural production. We were interested in speaking with local agricultural owners as they have the vast majority of public land grazing permits and are economically dependent on land in the basin and thus may be most impacted by a listing decision. This process resulted in 89 potential participants.

We mailed an introductory letter and followed with two phone calls or, if phone was unavailable, a postcard to set up interviews. Of the 89 potential participants, we were unable to find accurate contact information for 12 and 5 declined to speak with us. When asked why they declined, they said that they were not in town (2), did not enjoy interviews (2), or were busy (1). From this population (72), we wanted to obtain a sample that was representative of size and type of operation, while prioritizing those with public lands permits and larger private land ownership. We prioritized these individuals because they may be most affected by a listing decision, and their responses to the listing may also have the largest impact on regional land and water dynamics. Individual interviews from this potential population were chosen on the basis of these criteria (representativeness, while prioritizing larger landowners), their response to our contacts, and their availability. We conducted 41 in-person interviews in November 2012 that ranged from 40 minutes to an hour and a half and stopped conducting interviews when new interviews were no longer providing additional information. Our effective sample size represents 57% of potential participants and is broadly representative of the ranching community in the Upper Gunnison Basin in terms of size and type of operation (Table 1). We conducted a nonresponse bias survey with a subset (10) of the population (31) that we were unable to speak with and found that nonrespondents did not

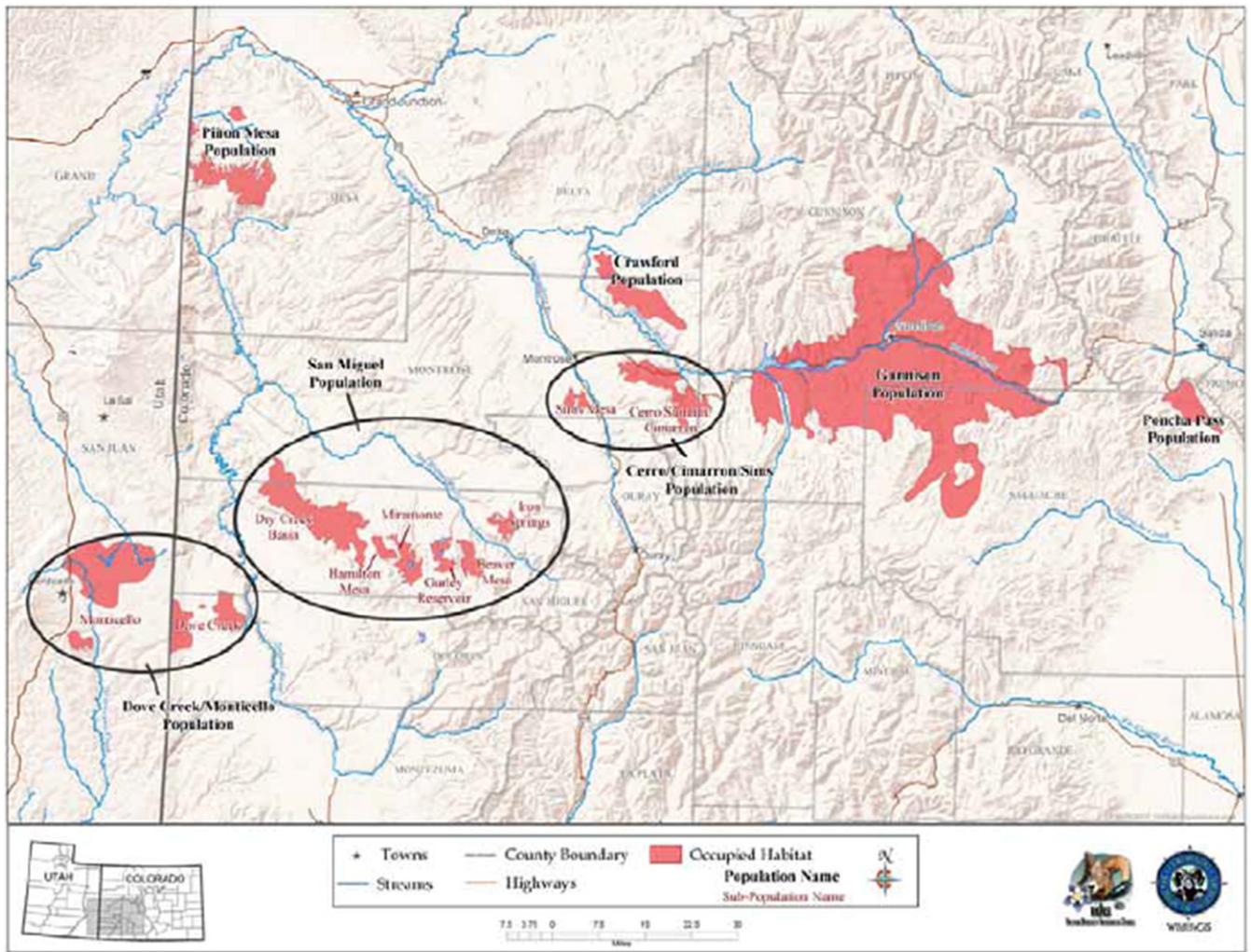


Fig. 1. Locations of current Gunnison sage-grouse populations. (Gunnison Sage-grouse Rangewide Strategic Steering Committee 2005).

significantly differ from respondents in their responses to a subset of research questions.

Interviews were conducted in person at either the Upper Gunnison River Water Conservancy District Office or at the participants' home when more convenient. Interviews included both quantitative survey questions and qualitative open-ended questions. We used an electronic tablet to collect quantitative answers in a digital survey interface, which allows for efficient data entry. Questions about beliefs used a 5-point Likert scale to gauge the level of agreement with each statement. This scale was chosen to suggest both level and intensity of agreement from strongly agree to strongly disagree. Interviews were also audio recorded and transcribed to fully collect qualitative answers, as well as provide a backup for survey data. Quantitative results were compiled and analyzed in Statistical Product and Service Solutions, whereas qualitative data were transcribed and coded in NVivo, a qualitative data-

analysis program. Quantitative analysis included descriptive statistics and χ^2 tests to compare prelisting and postlisting scenarios.

Results

Participant Characteristics

The average age of participants was 60 years (range: 48–85), and most had spent most of their lives ranching in the Gunnison Basin (average: 44 years [range: 22–60 years]). The majority of respondents were men (66%: 27), but we also spoke with women (22%: 9) and couples or families (12%: 5). More than 75% of participants had some post-high school education. Over half made the majority (>50%) of their income from ranching and had been in the area for more than three generations. Less than half (43%: 18) expected their children to continue ranching

Table 1
Comparison of total and sampled ranching population by size of private landholdings.

	Total population N = 89	Interviews N = 41	Composition of sample	Sample as percent of operation size
Private Landholdings				
100–499 acres	41	12	29%	29%
500–999 acres	24	12	29%	50%
1000–1999 acres	7	5	12%	71%
2000–4999 acres	14	10	24%	71%
≥5000 acres	3	2	5%	66%
TOTAL	89	41	100%	

when they retire. The vast majority (92%: 38) of participants owned at least one parcel that was adjacent to public land. Two-thirds (66%: 27) of the participants had leases or permits to graze on land in addition to their private holdings. These participants had both federal permits (93%: 25) and private leases (81%: 22). The average size of private land owned by participants was 1452 acres, ranging from 100–6900 acres. All participants were engaged in some type of conservation practice, including adaptive management as defined by participants (64%: 26), allowing monitoring of grouse (61%: 25), participation in Natural Resource Conservation Services (NRCS) programs (61%: 25), conservation easements (61%: 25), changed management for GUSG (52%: 21), and participation in the Candidate Conservation Agreement with Assurances (CCAA) Program (29%: 12). Participants had adopted a range of management changes to benefit the grouse including fencing off riparian areas and springs, adjusting stocking rates, interseeding, and habitat improvements. The CCAA Program, facilitated by the Colorado Division of Parks and Wildlife and the USFWS, protects landowners from additional regulatory actions postlisting if they agree to specific management practices before listing (USFWS, 2006).

Perceptions of Agriculture

Ranchers presented a complex picture of their current assessment of agriculture before a listing. Ranchers listed numerous existing stressors to their livelihoods, including high input costs and low profitability, increased recreational use in the region and conflict with recreationists, increased regulation on public lands, limited spring range for grazing, and a need for restoration. Their views on the future of agriculture and their individual and collective ability to deal with it varied widely. A multiple-question index (Cronbach's alpha = .789) showed that equal proportions of the population held positive (34%: 14), neutral (32%: 13), and negative (34%: 14) views on the future of agriculture. This index looked at the level of agreement with three statements including: I would encourage my kids to pursue ranching in this area; Agriculture has a good future in this area; and 10 years from now, agriculture will be an important economic driver in this county. Ranchers were nearly unified in their concern about the survival of ranching in the future (88%: 36) and agreed that it was increasingly challenging to make a living in agriculture (85%: 35). Despite this, most ranchers (63%: 26) believed that their ranch would be thriving in 10 years, but only 37% (15) said that the agricultural community in the Gunnison Basin would be thriving in 10 years.

Opinions About Listing

The majority of ranchers said it was important for GUSG to survive in the future (90%: 37); however, only 5% (2) said that they should be listed under the ESA. This opinion can be partially explained by perceived impacts, understanding of listing impacts, and potential alternatives (described in the next sections).

Perceived Impacts

Ecological Impacts

Participants believed listing the grouse would have little positive impact on the habitat and numbers of GUSG (Table 2). They stated that the listing would be more negative on private land than public land due to potential shifts in grazing pressure from public to private land. A majority of respondents stated that the listing would have a neutral impact on GUSG numbers with equal percentages stating it could be positive or negative.

In qualitative responses, respondents discussed their reasoning. First, they thought the community had already done a lot to conserve the grouse, and they were skeptical that more could be done. Most of the ranchers (63%: 26) expressed that they had already made changes to benefit the grouse (see participant characteristic section earlier), partially to avoid a listing decision. They believed that local regulatory and

Table 2

Perceptions of how a listing decision will impact social and ecological attributes in the Gunnison Basin.

	Will be beneficial	Neutral	Will be detrimental
<i>Ecological Impacts</i>			
Public land habitat	24.4%	43.9%	21.7%
Private land habitat	12.2%	41.5%	46.3%
Total grouse numbers	17.1%	65.8%	17.1%
<i>Social Impacts</i>			
My ranch	4.8%	22.0%	73.2%
Ranching in general	0.0%	12.0%	88.0%
The Gunnison Basin economy	0.0%	19.5%	80.5%
Tourism	7.3%	63.4%	29.3%
Housing/Development	2.4%	7.3%	90.3%

conservation actions were more effective than top-down actions by the federal government. Second, they described how the listing would not address what some of them perceived to be the key threat to GUSG: predators (39%: 16). Participants were concerned that postlisting management would focus on grazing rather than ranchers' primary concern, which was controlling predation.

Impacts to Community

Ranchers were split on whether they understood how the listing would impact the wider Gunnison community, the ranching community, and their own ranch (Table 3). Interestingly, the three ranchers who were serving or had served on the Strategic Committee all strongly disagreed that they understood listing impacts, while those who were less engaged stated that they understood the impacts. The majority of participants agreed that the listing would have a negative impact on their ranch, ranching in general, the Gunnison Basin economy, and ability to develop new housing (see Table 2). There was less concern over the impacts to tourism, with the majority of respondents feeling that the listing would be neutral.

Management Impacts

We asked participants to tell us if they were concerned with 1) their ability to manage productively, defined as ranchers' ability to both make a living and maintain the productivity of the land, and 2) their ability to maintain grazing permit, or continue to lease both federal and private lands. For both types of land there was a statistically significant increase in the number of people who expressed concern both about managing productively and their ability to renew leases between unlisted and listed scenarios (Table 4). In qualitative answers, ranchers displayed a range of interpretations of the listing's impact from catastrophic to minimal. Despite this concern, the majority cautiously agreed that the agricultural community and their own ranch would survive the listing of the grouse.

Suggested Alternatives to a Listing

Most participants did not want to see GUSG listed as endangered under the ESA, but few described alternative solutions. Some (12%: 5) described how they would prefer to see a listing of the subpopulations excluding the Gunnison Basin population. They described how the threat of a listing had motivated local efforts, which had helped to increase grouse populations. By listing the satellite populations, the USFWS would direct attention to those populations in need of assistance while encouraging local efforts where they were successful.

Planned and Potential Responses

Conservation Practices

We asked participants if they planned to adopt or continue ongoing conservation practices if the GUSG was or was not listed. Common conservation practices include conservation easements, where land is

Table 3

Participant attitudes about their understanding of the impacts of a listing decision.

	Percentage of participants (n = 41)						
	Strongly disagree	Moderately disagree	Slightly disagree	Neutral	Slightly agree	Moderately agree	Strongly agree
I understand how the listing would impact my ranch.	19.5	14.6	12.2	2.4	14.6	19.5	17.1
I understand how the listing would impact the ranching community.	12.2	17.1	12.2	0	14.6	17.1	26.8
I understand how the listing would impact the Gunnison community.	12.2	19.5	17.1	0	14.6	22	14.6

protected from future development but often still used for agriculture; National Resources Conservation Service (NRCS) programs, which help to fund conservation actions on private lands such as cross-fencing for better herd management; and allowing monitoring of GUSG on private lands. There was a statistically significant decrease in their projected participation for each of the practices if the grouse were listed (see Table 4). Ranchers explained that they wouldn't adopt additional conservation easements because it would devalue land that they might need to sell if no longer able to ranch. The decrease in NRCS participation was due to concern about participating in federally funded programs that might increase monitoring by federal agents on private land. The lowered willingness to allow monitoring was likely due to fear of additional regulations based on a potential decrease in population numbers (Polasky and Doremus, 1998).

Land Sales

A third of the participants (14) explicitly stated that they were committed to staying in the Gunnison Basin and learning how to coexist with GUSG despite a listing decision. This group expressed connection to place and willingness to work hard in order to remain. However, a smaller proportion (17%: 7) of respondents stated that the listing, in combination with other challenges, might make them more willing to retire or move elsewhere. We asked participants to describe their actions: 1) under a scenario in which the bird is listed and 2) under a scenario in which it is not listed. There was a 133% relative increase in the percentage of participants who said they would plan to sell land in the next 10 years if GUSG was listed in comparison with nonlisting (see Table 4). This increase represented four additional properties and > 4000 acres. Potential buyer characteristics are unknown, but given current land sales patterns, it would likely be to nonlocal owners who are looking for smaller ranchettes or who want to subdivide and develop

Table 4

Number and percentage of participants who expressed the following concerns and planned actions under listed and unlisted scenarios.

	Not listed	Listed	Significance ¹
Concerns			
<i>Federal land (N = 25)²</i>			
Ability to manage productively ³	10/40%	20/80%	$P < 0.001$
Ability to maintain permit	11/44%	18/72%	$P < 0.001$
<i>Leased land (N = 22)²</i>			
Ability to manage productively	5/23%	12/54%	$P < 0.001$
Ability to maintain permit	7/32%	8/36%	$P < 0.001$
Planned actions			
<i>Conservation actions (N = 41)</i>			
Conservation easements	6/15%	3/7%	$P < 0.001$
Natural Resource Conservation Services programs	24/58%	22/54%	$P < 0.001$
Allow monitoring	25/61%	19/46%	$P < 0.001$
<i>Private resources (N = 41)</i>			
Sell land	3/7%	7/17%	$P < 0.001$
Buy land	25/61%	19/46%	$P < 0.001$
Sell water	0/0%	4/10%	$P < 0.001$

¹ χ^2 test.² This number differs from total participants as this is the number whose operation included this type of land.³ This is defined as the ranchers' ability to both make a living and maintain the productivity of the land.

the properties. There was also a 24% relative decrease in percentage of current rancher participants who said they would buy additional land.

Water Sales

Ranchers described that selling water rights was not a preferred action, and most said they would only consider it if they were unable to sell land and needed money. Many ranchers described how they thought it was bad to separate land and water rights as it reduces the productive capacity of the land. This aversion to water sales corresponds with the way agriculturalists place utilitarian value on natural resources (Ruiz and Domon, 2012). Almost all of the participants owned water rights (95%: 39). If listing occurs, there was an increase in respondents who would plan to sell or would consider selling water rights (see Table 4). However, only one of the participants had investigated and found a potential buyer.

Changes to Management Practices

Participants had contrasting opinions about how the listing would change their management. Some participants stated that loss or restrictions on public land leases might force them to run more cattle on private lands to compensate for the loss of public lands (12%: 5). Others described how they might lower their cattle numbers (12%: 5), think about diversifying with different species (goats and sheep) (5%: 2), and focus more energy on hay production (7%: 3).

Discussion

Current Status of Conservation Efforts

Since this study was conducted, the GUSG has been listed as "threatened" under the ESA. While partially responsive to local conservation efforts (USFWS, 2014), it led to lawsuits by both environmental groups, who wanted to see an endangered listing, and the State of Colorado, the Gunnison County Stockgrower's Association, and Gunnison County, who felt a threatened listing was not justified. The State of Utah and San Juan County, Utah have also moved to intervene in the lawsuits. These lawsuits and budgetary limitations have led Colorado Parks and Wildlife to limit resources for GUSG conservation until a decision is reached. A prohibiting rider to the Federal Omnibus Funding Bill in 2015 has blocked the development of special regulations that would help to tailor ESA protections to the Gunnison context (ESA 4(d) rules). These legal challenges have also inhibited the ability of the local community to access resources that could potentially be available when and if a listing decision is finalized.

Despite this, the Strategic Committee has continued to meet, local riparian restoration projects have continued, and there has been increased interest (despite results of this study) in conservation easements. It is too soon to evaluate land and water sales, but these decisions will likely play out over time.

Perceptions of Endangered Species Act

In the past, negative interpretations of the ESA have been explained as general beliefs about federal regulation (Conley et al., 2007). This study reveals other context-specific reasons that inform local interpretations of the ESA, including skepticism about the capacity of the federal

government to manage more effectively than the local community, the power of lawsuits to result in land-use restrictions, and the ability to address the underlying causes of GUSG declines. This study shows how these three factors feed into beliefs about the usefulness of federal regulation and probably reflect both ideology and experience.

The ranching community has adopted tangible conservation strategies in the Gunnison Basin, and most ranchers are skeptical about what more a listing will accomplish. Populations of GUSG are stable in the Gunnison Basin, and local adoption of conservation easements has minimized both land and habitat fragmentation, which appears to have contributed to GUSG decline elsewhere. Local residents have gained local knowledge of GUSG habitats and behavior that have helped to inform local conservation efforts (Knapp et al., 2013). While the “threatened” status demonstrates a level of responsiveness to local efforts, the listing suggests a preference by USFWS for scientific over local knowledge, which may lead to local resentment, lack of support, or attempts to undermine expert solutions (Fischer, 2000). Since the listing, USFWS has had several staff changes and there currently is no individual specifically focused on this species in that agency (J. Cochran, personal communication, 2015). This lack of continuity and expertise is consistent with local concerns about the ability of the USFWS to manage effectively. As shown elsewhere, top-down imposition of expert advice in controversial situations can cause resistance by local residents (Wynne, 1992). The lawsuit filed by the State of Colorado contesting the listing of GUSG, as well as concerns by the State about what constitute beneficial GUSG conservation actions in the eyes of the USFWS, has led to contraction of the role of Colorado Parks and Wildlife in current management GUSG conservation efforts.

Ranchers described how they thought that the listing would fail to address the greatest threats to GUSG, because grazing is easier to regulate and grazing regulation is more bureaucratically acceptable than other causes of GUSG decline. Despite active enrollment in the Candidate Conservation Agreement with Assurances (CCAA) program (now at 54000 private acres enrolled), landowners are concerned that lawsuits by environmental groups may threaten their ability to graze, especially on public lands. The Gunnison Basin is more than 80% public land, and ranchers rely on public lands for spring and summer forage, when they need to move their cattle off private land in order to irrigate hay meadows. The ESA listing of GUSG, in addition to other stressors discussed earlier, increases concerns about ranching viability. The exact form of this impact and the point at which additional restrictions make use of public land untenable will differ among ranchers on the basis of their dependence on public lands, availability of private leases, and other factors. Despite assurances, there is concern that lawsuits and public pressure will restrict grazing on public lands.

The primary factor related to GUSG declines that concerns ranchers in this region is predation of birds and eggs (primarily by ravens, other aerial predators, coyotes, raccoons, ground squirrels, and foxes). This concern has been raised since the beginning of conservation efforts but has received little attention from land management and wildlife agencies. Predation issues are complicated, as they are usually interconnected with human activities. Changes in vegetation structure (Watters et al., 2002), fragmentation (Haegen et al., 2002), and increased human development (Bui et al., 2010) can all increase predation of grassland birds. The USFWS has argued that human activities such as roadkill and waste disposal subsidize predators, and management needs to address these subsidies before more direct predator control is attempted (Hogan, 2012). Ranchers, however, are concerned that human activities are diffuse and challenging to control, arguing for a more direct approach to suppress predators, such as shooting, trapping, or poisoning. Recent research in the field has suggested that predator control may be an effective way to increase grouse populations (Coates and Delehanty, 2010), but local agencies have expressed reservations (Gunnison Sage-grouse Strategic Committee, 2013). The inability to address underlying factors like predation increases concern about federal control.

It is likely that landowner concerns about the listing were magnified as a result of unavailable or unclear information about the potential impacts of the listing. Those most engaged in the process were the least sure about the impacts. This suggests that belief and rumor, rather than accurate information, may be influencing assessments. When potential impacts to livelihoods are perceived as high and information is scarce, people form opinions on the basis of whatever information they can access. These opinions may lead to decisionmaking about land and water sales that may hurt GUSG in the long run. At the level of individual decision making, ambiguity about listing repercussions is not beneficial for conservation outcomes. Future communication with the ranching community and others facing similar challenges should prioritize transparency so that landowners can make good decisions with the best possible information.

Potential for Unintended Consequences

The ESA is an important piece of legislation that has had far-reaching consequences (Czech and Krausman, 1999), but its on-the-ground effectiveness has been questioned (Norris, 2004). As a prescriptive law it primarily addresses threats to species and numbers of individuals of a species, limiting the consideration of feedbacks between social and ecological systems (Benson, 2012). Prior studies have shown that listing a species can lead to a decrease in beneficial management practices and in willingness to allow monitoring on private lands (Brook et al., 2003). Our study suggests that a listing decision will decrease participation in conservation practices and lead to increased sales of land and water (see Table 4). We demonstrate unexpected and contradictory outcomes to the intention of ESA. The exact impact of landowner decisions will depend on the characteristics of landowners and land, whether planned actions change after listing, or if the actions by a few individuals encourage others to act. It will take time to assess landowner responses to the recent listing decision.

This study highlights the importance of looking at processes that connect livelihoods and landscapes both spatially and temporally. For example, this study documents spatial tradeoffs between public and private landscapes. If ranchers lose public land grazing permits or are further restricted in their management, they may respond by increasing stocking rates on private lands, thus potentially degrading important GUSG habitat on private lands. The short-term impact of increased regulation may lead to long-term shifts in ownership patterns from local ranching families to nonlocal ownership. Proactive assessments of perceptions and planned actions can reveal the reasoning behind perceptions, highlight communication needs and possible research questions, and gauge the potential for unintended consequences.

Implementing the Endangered Species Act

As the USFWS currently functions, its primary role is to provide critique for local efforts and then make a determination as to whether those efforts have been sufficient to preclude the need to list a species. It would be beneficial if instead they were engaged as a partner early in the process to preclude the need to list and work with local stakeholders to develop a conservation plan before the listing. This would shift the relationship from a local/nonlocal dichotomy to a cohesive community working toward conservation. If the USFWS invested more time and effort in working toward precluding the need to list species, this might build trust with local stakeholders and lead toward better conservation outcomes and reduce the expenditure of taxpayer dollars on litigation. We believe that collaborative efforts that include the regulatory agency (USFWS) should be the priority in effective species conservation, realizing that the agency must, if collaborative conservation fails, become the regulator.

Before the listing decision, we felt that one solution would be to use the distinct population segment provision of the ESA to allow for the exclusion of subpopulations that are stable or improving. This action

would reward local efforts and motivate continued proactive activities. Currently, the distinct population segment clause is rarely used and primarily with the intention to list subpopulations facing local extinction (USFWS, 2013b). Future use of this approach may send the message that proactive conservation is valued and will be rewarded. The USFWS did, however, decide to list the grouse as threatened rather than endangered, at least partially in response to local conservation efforts (USFWS, 2014). Although this was done to allow for more flexibility in management, the result was dissatisfaction from both sides.

This study also identified the importance of clear and transparent communication about impacts in order to avoid reactive and misinformed decisionmaking. Engaging in early conservation efforts (as described earlier) could assist to prevent unintended consequences, as well as providing continuity in USFWS representation. Clear articulation of the listing process, potential confounding factors, and case studies of prior listing scenarios in order to clarify potential impacts could be useful. These efforts would help to build trust by demonstrating a commitment to transparency. Finally, the USFWS could use existing local bodies to share decision-making authority postlisting and provide funding to realize new conservation efforts. This would lower concerns over nonlocal processes and demonstrate a commitment to building off prior efforts.

Study Limitations

Our results offer a snapshot of landowner perceptions before listing but may have been different if the study were conducted immediately post listing or several months later. In our survey questions we asked generally about responses to a listing decision. Given limited public awareness about the process of listing, we assumed that the nuance between “threatened” and “endangered” would not result in different answers. Since the species has now been listed as threatened, this difference would have been interesting to explore. Finally, we chose to focus this study on local landowners as we felt they would be most impacted by a listing decision. This leaves out second-home owners, whose actions on private lands may also affect grouse habitat.

Implications

This study demonstrated how the threat of a listing motivated intentions for local action, while the listing itself might generate reactions that could result in negative outcomes for the species that the law was intended to protect. Greater transparency and small shifts in the application of this law might have helped to dissuade local fears and avoid reactive decisionmaking. Potential solutions to avert unintended consequences could include a transformation of USFWS role from regulator to partner, the use of the distinct population provision of the ESA, more clear and transparent communication, and commitment to building off existing efforts.

Agricultural landowners in the Upper Gunnison Basin own many of the productive river bottoms, as well as the majority of local water rights. This study describes how landowners perceive the listing and documents their planned responses if a listing occurs. Engaging local perspectives may help to avoid conflicts and unintended outcomes that can emerge with inadequate understanding of stakeholders' values and needs. We believe that proactive assessments such as this one provide critical information about the tradeoffs of listing decisions, allowing more effective communication and design of conservation strategies that are supported by local communities. The study also provides a valuable prelisting baseline of rancher intentions that can be compared, in future studies, with actual responses to listing.

Acknowledgments

We thank the ranchers who generously shared their time for this study; N. Sayre, N. Fresco, G. Kofinas, and C. Carothers for feedback on this manuscript; and P. Fix for feedback on survey design.

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