Governance Challenges in Joint Inter-Jurisdictional Management: The Grand Teton National Park, Wyoming, Elk Case

Susan G. Clark[1,2], Marian E. Vernon[1,a]

[1]Yale University, School of Forestry & Environmental Studies, 195 Prospect, New Haven, CT
[2]Yale University, Institution for Social and Policy Studies, 77 Prospect, New Haven, CT
[a]Corresponding author, mvernon19@gmail.com

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Abstract

The controversial elk reduction program (elk hunt) in Grand Teton National Park, WY, has been a source of conflict since it was legislated in 1950. The hunt is jointly managed by the National Park Service and the Wyoming Game and Fish Department. This forced organizational partnership and the conflicting mandates of these two agencies have led to persistent conflict that seems irresolvable under the current decision-making process. To better understand the decision-making process and participant perspectives, we reviewed management documents, technical literature, and newspaper articles, and interviewed 35 key participants in this case. We used these data to analyze and appraise the adequacy of the decision-making process for the park elk hunt and to ask whether it reflects the common interest. We found deficiencies in all functions of the decision-making process. Neither the decisions made nor the process itself include diverse perspectives, nor do they attend to valid and appropriate participant concerns. Agency officials focus their attention on technical rather than procedural concerns, which largely obfuscates the underlying tension in the joint inter-jurisdictional management arrangement and ultimately contributes to the hunt's annual implementation to the detriment of the common interest. We offer specific yet widely applicable recommendations to better approximate an inclusive and democratic decision-making process that serves the community's common interests.

Keywords governance, decision process, elk, national parks, institutions, hunting

Introduction

The elk hunt or "elk reduction program" in Grand Teton National Park (GTNP), Wyoming, has been controversial since it was legislated in 1950 (U.S. Congress 1950; Righter 1982). The hunt is jointly managed by the U.S. National Park Service (NPS) and the Wyoming Game and Fish Department (WGFD), agencies with conflicting mandates. The NPS mandate is to protect natural and cultural resources and provide for public enjoyment (U.S. Congress 1916). The WGFD mandate is to conserve wildlife and serve the public, although in practice it primarily manages game species for hunting (wgfd.wyo.gov). While both agencies' missions emphasize serving the public interest, the WGFD has been viewed as serving the special interests of hunters to gain revenue and preserve its states' rights authority over wildlife resources in Wyoming (see Brunner et al. 2005; Righter 2014; Vernon et al. in revision). These incompatible mandates, the forced organizational partnership, the joint decision-making arrangement, and the discordant use of hunting within a national park have led to long-term public opposition to the program. These factors have contributed to the persistence of this

case as a high-profile governance and policy problem that invariably maintains rather than resolves conflict (Vogel 2006; Keiter 2013; Vernon and Clark in revision).

The controversy peaks each year before and during the park elk hunt, evident in local newspaper articles and opinion pieces (e.g., Hatch 2010; Koshmrl 2012). Concerns expressed include park visitor safety, risk of conflict between and injury to hunters and threatened grizzly bears attracted to wounded elk, carcasses, and gut piles, and the appropriateness of hunting within a national park. The persistence of concerns expressed through public dialogue, with no resolution or reduction in conflict, suggests that the governance system is not serving the public interest. Individuals opposed to the hunt feel excluded from this process, although officials reject this claim (Vernon and Clark in revision). The established decision-making process seems to keep recycling the conflict at the expense of finding an enduring resolution acceptable to the public.

In this paper, we describe this case's history and analyze the structure and functioning of the current governance process, identifying underlying factors that structure and drive the current process and its seemingly predetermined outcomes. We argue that these factors need explicit, systematic management attention, and we offer suggestions to improve the process to reduce conflict and increase the likelihood of finding shared or common interest outcomes. The significance of our analysis and recommendations extends beyond this individual case and can help to understand and address other natural resource management issues characterized by persistent controversy and/or inter-jurisdictional management.

Methods

We analyzed the governance process for the park elk hunt using the meta-analytic framework of the policy sciences, which offers an empirical, problem-oriented, contextual, and multi-method approach (Brunner et al. 2002, 2005).

Conceptual foundation and theoretical frame

We conceptualized governance as "a social function centered on efforts to steer or guide the actions of human groups toward the achievement of desired ends and away from outcomes regarded as undesirable" (Young 2013, p. 3). We define "good" governance as a democratic process that works to create rules and outcomes that represent shared, rather than special, interests. Democratic process refers to meaningful citizen participation in community decisions to identify and realize common interests (Dahl 1998; Brunner et al. 2002, 2005). In their most basic conception, "interests are 'common' when they are shared; 'special' when they are incompatible with comprehensive goals" (Lasswell and McDougal 1992, p. 360). Common interests may be further defined as interests demanded by many and whose fulfillment will benefit the entire community, whereas special interests are demands made by the few and whose fulfillment benefits a small segment of the community with a corresponding deprivation to the rest (McDougal et al. 1980, p. 205). The common interest is not necessarily a single interest, but the integration or balance of multiple shared interests (Brunner et al. 2002). As such, a "good" governance process should meet the following principles, or standards: it must be *open* (available to all), *inclusive* (of all participants), *flexible* (in appraising and changing management policy), *fair* (in its inclusion and integration of multiple interests), *factual* (scientifically supported), and *comprehensive* (in its integration of all relevant perspectives and disciplines).

Data

Our data come from document analysis and interviews with key informants directly or indirectly involved in the decision-making process for this case. We reviewed scientific articles and management documents and management appraisals for the elk herd in order to understand the governance structure (e.g., U.S. Department

of the Interior (DOI) et al. 2007). We also reviewed 78 newspaper articles, letters, and editorials (*Jackson Hole News & Guide*, 2007 to 2013) to determine how information about the park elk hunt and elk management in general was being discussed. We documented direct quotes for our analysis.

Our document analysis, and, primarily, our review of newspaper articles, allowed us to identify "key informants" (Kumar et al. 1993) actively engaged in one or more decision-making process functions. These included government agency officials, environmental non-profit representatives with an official stance on the park hunt, and active citizens without a formal organizational affiliation ("unassociated citizens") who often wrote opinion pieces and tended to be regular park visitors and wildlife enthusiasts. We invited these individuals to participate in our semi-structured, confidential, and qualitative interviews. Many key informants referred us to other individuals for interviews. In total, we contacted fifty key informants by phone and/or email, of whom thirty-five (70%) consented to be interviewed. Three people declined to be interviewed because of scheduling constraints (6%), and twelve did not respond to our requests (24%). In total, we interviewed one journalist (2%), one representative from a local wildlife-related business (2%), two scientists (one affiliated with academia and a non-profit, the other not currently institutionally affiliated) (4%), three representatives from the state wildlife agency (8%), four individuals from the hunting/outfitting industry (8%), six unassociated citizens (12%), eight representatives from the involved federal agencies (16%), and ten representatives from seven environmental non-profits (22%). Most interviews were conducted in person, although three were on the phone. We took descriptive, typed notes using shorthand and documented direct quotes. Interviews ranged from 45–120 minutes. We sought insights into each individual's (and his or her employing organization's) views on decision making about the elk hunt. Interviewees often made statements that distinguished their personal and organizational perspectives about the hunt, and we asked clarifying questions as needed. Participant perspectives differed, with some opposed to the hunt and some in favor of it (Vernon and Clark, in revision).

All procedures involving human participants were performed in accordance with the ethical standards of the Yale University ethics review board, which approved our interview methodology, and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Oral informed consent was obtained from all individual participants included in the study.

Analysis

We looked at decision making as a process of seven interpenetrating functions (Lasswell 1956, 1971): (1) information gathering, processing, and dissemination (*intelligence*), (2) discussing and debating policy options (*promotion*), (3) setting the rules (*prescription*), (4 and 5) implementation of rules (including *invocation* and *application*), (6) monitoring and evaluation (*appraisal*), and (7) ending or succession of a policy or program (*termination)*. We used recognized standards to evaluate whether each function is operating effectively in practice and whether the overall process reflects the good governance principles identified above (Lasswell 1971; Clark 2002). To appraise the adequacy of the decision-making process and determine if it reflects good governance principles, we used the three partial tests of the common interest (Brunner et al. 2002; Steelman and DuMond 2009; Clark and Rutherford 2014): (1) the *procedural test*, about inclusive and responsible participation, (2) the *substantive test*, about whether participant expectations and concerns are being met and addressed, and (3) the *pragmatic (or practical) test*, which asks if decision outcomes work in practice and meet participant expectations, given changing circumstances. These functions and associated standards, as well as the tests of the common interest, can be thought of as our guiding research questions.

We coded data (quotes) from our document and interview analysis similarly, according to the seven decision functions and the three partial tests of the common interest. We also coded data referring to problems associated with the park elk hunt, as well as policy alternatives. We then identified emerging themes within the general categories with which we initially coded our data, specifically regarding the adequacy of each function in meeting the standards recommended in the literature, as well as whether the decision-making process

contributes to policy outcomes in the common interest. This inductive approach reflects the principles of contextual text analysis (Titscher et al. 2000) as well as principles of grounded theory (Titscher et al. 2000; Hsieh and Shannon 2005; Starks and Trinidad 2007; see also Vernon et al. in revision). We do not provide citations for participant quotes drawn from our newspaper analysis to protect authors' identities and meet the requirements of our oral informed consent, as there is considerable overlap between participants quoted in newspaper articles/opinion pieces and participants that participated in our interviews.

Standpoint Clarification

Vernon is a recent arrival to the Greater Yellowstone Ecosystem (GYE) after living and working in an urban environment as a wildlife ecologist. From his/her standpoint, wildlife conservation should be prioritized over utilitarian management of natural resources on public lands whenever possible. Clark has 40 years of experience working in the GYE on this and similar issues. In order to conduct useful research and interact respectfully with participants, we strove to put our own values and biases aside. While the case presented in this paper may seem fairly unique, our combined experience leads us to maintain that this case is symptomatic and reflective of other contentious natural resource management issues in the GYE and beyond.

Results

To explicate the governance process for this case, we describe the history of GTNP's and Jackson Hole's elk management practices and governance arrangement over the past few decades, systematically describe the current decision-making process as employed by officials, and ask and offer answers as to whether the current process serves the common interest.

History of the park elk reduction program

The park's elk reduction program is part of the overall management structure for the Jackson Hole elk herd, with the official decision process for the hunt directed by the NPS and the WGFD (Clark and Rutherford 2014). The herd, at approximately 11,600 animals, is subdivided into three main segments found in GTNP, southern Yellowstone National Park, and Bridger-Teton National Forest, and on adjacent private lands. The majority of elk migrate each fall and early winter to the U.S. Fish and Wildlife Service's National Elk Refuge (USFWS, NER; Boyce 1989). The remainder winter on a mix of private, NPS, and U.S. Forest Service (USFS) lands, including additional Wyoming-run feed grounds (Smith 2012). Thus, four jurisdictions are involved—the NPS, the USFS, the USFWS, and the WGFD.

The USFWS administers the NER, which was established in 1912 (Wilbrecht and Robbins 1979). There, elk are provided with access to native landscapes as well as dry land, irrigated pastures and supplemental winter feed. Feeding, which began in the early 1900s, contributes to loss of historical migratory routes, concentrates artificially high numbers of elk on limited winter range, and establishes conditions for major disease problems (Smith 2012). The feed grounds are another source of long-term contention over elk management and policy practices and are often linked to the need for the reduction of elk within GTNP (Wilbrecht and Robbins 1979; Clark 2001; Smith 2012).

The park elk hunt is a product of the strong western "frontier" culture of utilitarian resource extraction that dominates Wyoming politics (Righter 1982, 2014). Wyoming has long asserted that wildlife is state property and that the state has sole jurisdiction and authority to manage wildlife through hunting on all lands in Wyoming, including federal lands (Righter 1982, 2014). Just before 1950, the federal government began negotiating the expansion of GTNP into the Jackson Hole valley, previously under private ownership. During this process, the state of Wyoming, and WGFD in particular, were concerned with asserting local and state

authority and control of hunting in the newly expanded park (Righter 1982, 2014). The present elk reduction program was one outcome of this process, allowing for joint elk management in the park between the NPS/GTNP and the WGFD (U.S. Congress 1950).

The dates of the hunt and hunt quotas are determined through a planning process in the spring of each year. The WGFD is charged with identifying qualified hunters who are licensed by the state. These hunters are then deputized as "federal rangers" by the Secretary of the Interior in order to circumvent the law prohibiting recreational hunting within national parks (U.S. Congress 1950). Other parks with elk reduction programs, such as Theodore Roosevelt National Park, are solely managed by the NPS and recruit supervised volunteers to participate in highly regulated ranger-led hunts (W. Whitworth, pers. comm). The GTNP hunters apply for licenses through the WGFD each year for the following fall hunt season (wgfd.wyo.gov). The WGFD's requirements for a GTNP hunting license are no different from the requirements for hunt areas in the rest of the state. The WGFD sells licenses for the park hunt that range in price from $25 to $57 for residents and $114 to $591 for non-residents, depending on animal age class (cow or calf) and hunter age. Youth and adult licenses are available (wgfd.wyo.gov).

The program is used conjointly with the 2007 Federal Bison and Elk Management Plan. This plan guides decisions for the Jackson Hole elk herd on GTNP and the NER in conjunction with WGFD (DOI et al. 2007). It was developed in conjunction with an Environmental Impact Statement and was prepared pursuant to the National Wildlife Refuge System Administration Act of 1966, the National Park Service Management Policies of 2006, and the National Environmental Policy Act (DOI et al. 2007). This plan has four primary goals: (1) to conserve habitat, (2) to maintain sustainable populations of elk and bison that can adapt to changing environmental conditions and that are at reduced risk from non-endemic diseases, (3) to meet and maintain WGFD's target numerical population size objectives to the extent compatible with Goals 1 and 2 and the legal directives for the NER and GTNP, and (4) to manage for disease. It also calls for USFWS to implement "adaptive management" actions to transition progressively from intensive supplemental winter feeding to an undefined greater reliance on natural forage, based on other considerations (e.g., desired herd size, public support, approval by the WGFD). Progress to date has been minimal (Koshmrl 2015).

The plan also lists numerical objectives for the herd—11,000 elk in the overall herd unit, 5,000 elk wintering on the NER, and 1,600 elk summering in the central valley of GTNP. The post-hunting season classification surveys conducted in February 2014 estimated the overall herd unit at 11,600 animals, with approximately 8,300 animals that wintered at the NER. The pre-hunting season classification surveys conducted July–August 2013 classified 923 animals in the GTNP central valley herd unit (WGFD 2013b). The plan states that, "when necessary, a herd reduction program in the Park will be used to assist the state in managing herd sizes, sex and age ratios, and summer distributions" (DOI et al. 2007, p. 5). Thus, the WGFD can draw on its informal goals, operations, and management history to justify annual GTNP elk reduction. These goals and approaches are established through a state process approximately every five years. It involves a cursory public input process, development of recommendations from local WGFD staff that are then given to the Wyoming Game and Fish Commission for final approval (L. Dorsey, pers. comm.). These goals, such as reducing the number of GTNP elk that winter on the NER and increasing the number of animals in the Teton Wilderness/Yellowstone segment, have proven difficult to achieve using the methods currently being employed by the USFWS and the WGFD (e.g., primary reliance on hunting pressure, management of apex predators, and difficulty of accounting for elk behavior in response to such methods).

Decision process mapping

Governance is a structured process that determines who participates in decision making, what is considered in the process, who is authorized to make decisions, and what outcomes will ensue. Below we examine each of the seven decision process functions and compare them with standards recommended by Clark (2002), drawn from

Lasswell (1971). We focus our analysis on events that occurred after the authorizing legislation was enacted (the *prescription)*. We therefore begin with an analysis of the *prescription* function and end with a discussion of the *intelligence* and *promotion* functions in relation to current debates over policy alternatives. Data guiding our appraisal are cited in the text below and in tables 1 and 2.

Prescription and program implementation

A *prescription* establishes the rules by which people live and should reflect the basic goals, norms, and values of the community. In order to be successful, a prescription must be clear about the goals or purpose to be achieved, specify the rules intended to meet the purpose, describe the circumstances under which the rules should apply, and represent the common interest (Clark 2002). The *invocation* and *application* functions are part of program implementation, during which participants determine the circumstances under which the prescription should be invoked, resolve disputing claims over how the prescription will be implemented and who decides, and determine if the prescription is consistent with established rules (Brunner and Clark 1996). Standards for these functions and all others can be found in table 1 and are evaluated after data are presented.

The 1950 prescription for the program describes the purpose to be achieved and details how the program should be implemented: "The Wyoming Game and Fish Commission and the National Park Service shall devise a program to insure the permanent conservation of elk within Grand Teton National Park [through the] controlled reduction of elk by hunters licensed by the state of Wyoming and deputized as rangers by the Secretary of the Interior when it is found necessary for the purpose of proper management and protection of the elk" (U.S. Congress 1950, Section 6(a)). However, the prescription lacks clear rules about how and when the program should be used to meet the stated purpose, the goals to be achieved, or circumstances under which the rules apply, leading one historian to write that it was a "cumbersome provision" (Righter 2014, p. 147).

These conditions have made program implementation a continuous source of debate. Disputing claims over how prescriptions will be implemented and who should make such decisions remain unresolved by officials. In the early years of the program, the NPS and the WGFD "differed sharply in their interpretations of the legislative provisions for public hunting of elk in the new park" (Barmore 1985, p. 96). The WGFD believed they applied to the management of elk migrating through the park as well as those that summered there, whereas the NPS believed hunting was to be permitted only to conserve or control elk that summered in the park (Barmore 1985). Today WGFD's interpretation appears to take precedence, although the NPS maintains that the program is primarily used to "keep the numbers at a manageable, sustainable level for the available range." Both agencies agree that the program is used to "bring elk numbers down to within the stated objective that both agencies are trying to achieve" as part of the Federal Bison and Elk Management Plan (DOI et al. 2007).

There also remains disagreement as to which agency (if any) has the ultimate authority to terminate or suspend the program. While one WGFD official said that "[the NPS] control[s] whether there is a hunt there or not," a journalist said that an NPS official had told him the opposite, saying, "the Grand Teton superintendent cannot . . . halt the big game hunt." Another official followed the latter statement, saying that "to change the way the [hunt] currently operates would require a legislative change made by Congress." Many opponents argue that, since the overall population and GTNP segment have been at, near, or below objective for the past several years, the program is no longer "necessary" and should be terminated or suspended. One opponent said that "the population . . . is currently around . . . the target" and later concluded that "[the agencies] are going against the original legislation" by continuing the program. Such disputes have not been adequately resolved and contribute to underlying tension in the agencies' joint management arrangement.

While consensus for a prescription may never be complete in complex natural resource management cases such as this, many participants have argued, both historically and presently, that the prescription serves the state of Wyoming and its constituencies at the expense, or exclusion, of other participants (see Righter 1982, 2014).

One said "[the agencies are] managing the herd for recreational uses," although "hunters aren't as big of a constituency anymore" and "non-consumptive use [wildlife viewing, photography] is growing." In defense, an NPS official said, "[we are] not trying to honor [Wyoming's] hunting heritage" by implementing the program. This perception is closely linked to the dissonance between the prescription and other established rules in the community regarding national parks and wildlife conservation. Several guiding principles for the national park system emphasize the importance of natural regulation, non-interference, protection of wildlife, and maintenance of ecological integrity within the parks (see U.S. Congress 1916; Leopold et al. 1963; Barmore 1985; Boyce 1989; NPS Advisory Board Science Committee 2012). As one historian said, "If Grand Teton National Park sought to become a reality in 1950, it had to accept the contradiction of being a national park dedicated to the welfare of wildlife while simultaneously agreeing to kill them" (Righter 2014, p. 147). Another participant said, "The hunt is contradictory to what their [the NPS's] stated goals are." This dichotomy is central to the conflict.

Standards—Our analysis suggests that the prescription and implementation functions do not meet recommended standards. First, the prescription lacks clear justification and rationale describing how and why the program is required, and it lacks guidance as to potential future conditions under which the program should be implemented or terminated. Thus, it is not *rational* (balanced) or *prospective* (future-directed). As well, the prescription is not *effective, inclusive,* or *non-provocative*, nor is implementation *uniform,* because the prescription and its implementation do not balance diverse participant expectations and perspectives about the role of parks in wildlife conservation and is perceived to serve special interests. Program implementation remains *timely* and *dependable*, as the program occurs annually. However, it is not *constructive* or *rational* because the agencies and other participants disagreed about several aspects of implementation (e.g., distribution of agency authority, conditions for program termination). Few constructive changes have occurred to address these underlying disputes.

Intelligence gathering, program appraisal, and termination

The quality of each decision-making function relies on information to inform management decisions and actions. In the *intelligence* function, participants gather, process, and disseminate information to inform policy options and appraisals for decision makers (Clark 2009). Intelligence is also an integral part of *appraisal*, during which participants assess the success of prescriptions in achieving their goals and evaluate the decision-making process as a whole. Finally, appraisals help inform decisions about whether to terminate programs or prescriptions. The *termination* function repeals, ends, or implements large-scale adjustments of a prescription, practice, or policy (Clark 2002).

Agency officials argued that appraisals occur each year as part of management planning efforts and that intelligence supports the program's annual continuation. One said, "The hunt is reevaluated each year." They argue that "decisions are made based on what the data tell us." At the same time, agency officials readily admitted that it is difficult, if not impossible, to evaluate whether objectives and goals have been reached. One agency official said, "The Grand Teton herd segment does not appear to be decreasing but there is no definite way of counting them." Another said, "It is tremendously difficult to harvest the right elk with the tools available." We also heard conflicting evidence from agency officials about whether program objectives and goals have been met. One said that "it looks like we've had little change [in the population]," whereas another said that "the herd is very close to objective." A recent management document estimated the GTNP's central valley summer population at 923 animals, below the formal objective of 1,600 (DOI et al. 2007; WGFD 2013a). This suggests that it may be appropriate to terminate or suspend the program, yet officials still argue that "all available data . . . support . . . the elk reduction program." As program goals and objectives cannot be adequately appraised with current methods of intelligence gathering, they may not be relevant measures for the purposes of appraisal and termination and may need to be reevaluated.

Table 1: Decision process functions, with direct quotes from interviews and document analysis. Quotes from newspaper articles are marked with an asterisk. Identities of quoted participants are in parentheses after each quote, and correspond to the following abbreviations: GTNP: Grand Teton National Park official; H: Hunter; UC: Unassociated citizen; ENP: Environmental non-profit representative; J: Journalist

Function	Data	Standards
Prescription		
Establish rules by which people live, clarify basic goals, norms, values of the community, articulate the common interest	"The hunt was legislated so that there would continue to be local control of wildlife and hunting" (GTNP) "Holding on to hunting was a way to make sure the local people still had some control over the newly acquired part of the valley" (H) "Both Grand Teton National Park and the Wyoming Game and Fish Commission have missions, but they are distinctive and sometimes antithetical" (Righter 2014, p. 147)	Effective Rational Inclusive Prospective
Invocation		
Determine if the prescription is consistent with established rules and the circumstances under which the prescription should be invoked	"Hunting elk in the Park generally is recognized as not in keeping with the purposes of national parks" (Barmore 1985, p. 33). "The hunt is contradictory to the values expressed in the chartering documents" (UC) "It's antithetical to what a park is" (UC) "NPS representatives found hunting antithetical to their concept of a national park" (Righter 2014, p. 17)	Timely Dependable Rational Nonprovocative Effective
Application		Rational Uniform
Resolve disputing claims over how prescriptions will be implemented and who decides	"There has been considerable controversy and misunderstanding about the intent of Congress in providing for elk hunting in the Park" (Barmore 1985, p. 94) "It was supposed to be for emergency reduction when the elk population was out of hand" (UC*) "It's not even close to what the original intent of the hunt was" (UC*) "I don't believe you [NPS] are adhering to the guidelines of the elk reduction program put forth by the park charter" (UC*).	Effective Constructive
Appraisal *Assess the decision process as a whole and the success of prescriptions in reaching their goals*	"This complicated elk hunting situation needs to be looked at, and, most likely, modified" (UC*) "According to your own park biologists, the numbers . . . are not great enough to warrant a reduction" (UC*) "Our viewpoint . . . is that things have changed since 2005, and we just want the park to look at it [the hunt] again" (ENP*) "Is it not time for policy makers to revisit the purpose, benefits, and downsides of carrying on a big game sport hunt in a national park—an archaic remnant grandfathered into being more than half a century ago?" (J*) "The Superintendent has determined that permitting the Elk Reduction Program, as reviewed and determined annually, is necessary to achieving long term management goals for the Grand Teton herd segment of the Jackson elk herd" (DOI 2013)	Dependable Continuing Independent Contextual
Intelligence		
Obtain and process information for decision makers to inform policy options	"The data collected by Wyoming Game and Fish are used to support their management paradigm" (ENP) "Science is being generated but also spun to support hunting licenses" (UC)	Dependable Comprehensive Selective Creative Available
Termination		
Repeal or make large-scale adjustments of a prescription	"If there was a reason biologically not to have a hunt, [the Park] could recommend not to" (WGFD) "It's the Park's decision about whether the hunt will be conducted based on the founding legislation" (WGFD)	Timely Comprehensive Dependable Ameliorative
Promotion		
Recommend and mobilize support for policy alternatives	"I would like to see the hunt ended altogether. For one, I don't think it's necessary, and I also think it's contradictory to . . . their stated goals" (UC*) "It's high time for the Fish and Wildlife Service to publicly commit to expeditiously phase out the winter feeding of elk . . . thus effectively relegating the Elk Reduction Program in Grand Teton Park to where it belongs: history books" (ENP*)	Rational Integrative Comprehensive Effective

Many participants questioned the adequacy of intelligence gathering used to inform management actions. The WGFD claimed the program cannot be terminated because "ending the hunt would seriously impact the state's ability to regulate the Jackson herd." Such claims prompt hunt opponents to argue that "the goals and objectives for the herd are politically determined and not based on science" and that "science is being generated but also spun to support hunting licenses." Another said, "I don't think [the agencies] have the data to appropriately manage the herd." Because appraisals and intelligence gathering are not open processes, data are not available to outside groups to evaluate the dependability of the intelligence independently. One participant said, "We need a study about the Teton segment of the herd's carrying capacity" to better inform management decisions. Calls for better intelligence and questions regarding the program's validity are not new. In a 1985 resource management plan for GTNP, the author wrote, "There is a need to determine whether or not elk hunting in the Park can be eliminated or reduced without adversely affecting the Park ecosystem or integrated management of the Jackson elk herd and its habitat" (Barmore 1985, p. 33). This plan essentially called for an appraisal of the program through experimental termination of the hunt to gather intelligence of outcomes, yet this recommendation has never been implemented.

When agency appraisals do occur, outside participant groups are not included, nor do they have access to the data used to make resulting decisions. One environmental non-profit representative said, "[We] asked the park to conduct a review and assessment of the park hunt and its potential impacts, but the park refused to do so." In response, an NPS official said, "It is kind of confusing that they're asking for an EA [environmental assessment]. These issues were already analyzed [by the agencies]." This back and forth contributes to a sentiment among hunt opponents that "there is no opportunity for public comment" to influence management directions as part of an ongoing appraisal process. This has left many participants and groups dissatisfied with the overall process.

Standards—Our analysis suggests that few standards pertaining to the intelligence, appraisal, and termination functions are being met. Several participants questioned the *dependability, selectivity*, *creativeness,* and *comprehensiveness* of the intelligence and intelligence-gathering methods used by the agencies to inform management decisions. This point was reflected by agency officials who described the difficulty of gathering intelligence to evaluate program goals and objectives. Some argued that the special interests of WGFD and its constituents, rather than ecological data, were driving implementation. Intelligence used to make management decisions was not readily *available* to outside participant groups, although in our experience the agencies are willing to share such information if requested. While appraisals are *continuous,* as the agencies claim to reevaluate the program annually, it is unclear if such appraisals are *dependable* or *contextual,* since participants within and outside the agencies questioned the reliability of the intelligence used. Furthermore, such appraisals are not *independent* (unbiased) because they do not include non-agency participants. As program termination has yet to occur, it is not *timely;* therefore, this function's other standards cannot be evaluated.

Promotion of policy alternatives

Many hunt opponents expressed dissatisfaction with how the elk reduction program was being implemented and offered solutions that reflected their perspectives and problem definitions. Such recommendations and mobilization of support for policy alternatives through open debate about policy goals and options takes place as part of the *promotion* function (Clark 2002).

Hunt opponents tended to promote solutions that addressed problems of human and grizzly safety, the appropriateness of the park for hunting, and the inflation of the elk population through supplemental winter feeding. One person said, "Tourists/hunters must have more warning about the elk hunting going on during specific dates in the park." Others addressed the issue of human-grizzly conflict, suggesting, "Since many [grizzlies] have tracking devices, they can obviously be captured and moved." Environmental non-profits tended to promote termination of both the hunt and the supplemental feeding program. One said, "We would

like the agencies to coordinate a plan that addresses these as intertwined issues," a sentiment also expressed by park officials and others (Righter 2014). Finally, some called for the termination of the program entirely.

Agency officials largely promoted the continuation of status quo management and expressed satisfaction with current management arrangements. One said, "There is good communication across jurisdictional boundaries" and the agencies do an "extremely good job of managing it [the hunt] as a team." As a result, any changes to program implementation are rare and serve to maintain the existing management structure.

Standards—Although alternatives exist and may seem *rational* in that they address concrete, technical problems, they are not *integrative* or *comprehensive* because they do not acknowledge underlying procedural problems. Since none of these solutions have been implemented, it is unclear if they could be *effective* in solving the problems defined by the groups that promote
them.

Three partial tests of the common interest

We now ask whether the governance process as described above reflects the common interest. Good governance should aid social and decision processes in finding common interest outcomes (Dahl 1998; McDougal et al. 1980). We use three partial tests of the common interest to examine the elk hunt case (see Brunner 2002; Steelman and DuMond 2009; Clark and Rutherford 2014). Answers cannot be "calculated" in a conventional sense, but can be arrived at based on empirical evidence, a clear goal, and good judgment. The guiding questions for each test and supporting data are in table 2.

The *procedural test* asks if inclusive and responsible participation is involved in decision making and who is responsible and held accountable. Many participants outside the government apparatus expressed feelings of exclusion from decision making and wanted to be part of a more inclusive dialogue. One non-profit representative said, "Wyoming Game and Fish falls short in incorporating recommendations, particularly from conservationists and environmental advocacy organizations." Another said, "[The agencies] have meetings that invite the public, but they are for show." Agency officials disputed such claims, arguing that the public is actively involved in decision making. One said, "We invite all folks to the table to provide input," and another said "the NPS is one of the most beloved federal agencies, and [at Grand Teton] we are very involved with the local community and stakeholders." The disconnect of perspectives makes it difficult to evaluate whether governance operates constructively toward common interest outcomes.

The *substantive test* asks whether participants' expectations about what will be accomplished are being met by reasonably attending to all valid and appropriate concerns. Participants outside the agencies expressed diverse expectations, ranging from the scientific reliability of management decisions to the safety of people and wildlife within park lands, and often felt that decisions did not reflect such considerations. One participant said the program seemed "pretty ineffective," since "they've been doing it for 50 years now and there's still too many elk." Others expressed concerns with the increased risk of human-grizzly conflict and safety of park visitors. One said, "It's an accident waiting to happen, in terms of a bear . . . or person being killed." Such concerns were brought to the forefront because of a controversial and highly publicized incident in 2012, during which GTNP hunters killed a grizzly bear – a threatened species listed under the Endangered Species Act (see Vernon et al. in revision). The park responded by temporarily closing one area of the park to hunting in order to prevent future conflicts. In response, one hunt opponent said, "Just close the park hunt and get it done with. It's still dangerous. You're putting a Band-Aid on the problem." Agency decisions in response to diverse participant expectations seemed to do little to placate valid concerns. Changes that do occur ultimately serve to maintain the overall program. In short, these expectations are not being met in a timely or rational matter as part of an inclusive democratic process.

Table 2: Three partial tests of the common interest and their guiding questions, with data from direct quotes from interviews and document analysis. Quotes from newspaper articles are marked with an asterisk. Identities of quoted participants are in parentheses after each quote, and correspond to the following abbreviations: GTNP: Grand Teton National Park official; H: Hunter; UC: Unassociated citizen; ENP: Environmental non-profit representative; J: Journalist

Test	Data
Procedural test	
Is inclusive and responsible participation involved in decision-making?	"Small group of people with special interests have tremendous political power in the state and can convince their representatives to make changes in their favor" (ENP) "[The agencies allow] no meaningful input from the public" (UC) "We have all expressed our opinions about ending this hunt and watched them fall upon deaf administrative ears" (ENP*) "The agencies delegitimize public interests all the time, and discount non-profit people just because of their position" (ENP) "The attitude of park officials is to be left alone" (UC) "The NPS claimed that they did an assessment, but it was not an open process" (ENP)
Who is responsible and held accountable?	"Earlier this year, [we] urged the park to formally analyze the elk reduction program in light of changing conditions since the [agencies] developed the Bison and Elk Management Plan several years ago" (ENP*)
Substantive test	
Are participants' expectations about what will be accomplished being met?	"The Jackson Hole elk herd has a history of 75 years of consistent mismanagement" (Beetle 1979, p. 259). "The Park and the state of Wyoming have agreed on the necessity of the hunt for all but two seasons in nearly 65 years" (Righter 2014, p. 148).
Are valid and appropriate concerns being attended to?	"The shooting of a grizzly bear and poor hunting practices are unacceptable" (ENP*) "[They need to] prove that the elk herd really does need to be reduced" (UC*) "Politics trump the biology and legal aspects of the hunt" (ENP) "My submitted requests to protect the park, visitors, bears, and other wildlife by vacating the park elk hunt have been denied by you [GTNP Superintendent]" (UC*)
Pragmatic (practical) test	
Do decision outcomes work in practice?	"So many differing missions and authorities that it is not a simple thing to match it all up" (USFWS) "Each of these agencies are coming from a position where they have their own constituencies to serve and legal mandates to satisfy" (USFWS) "It is tremendously difficult to harvest the right elk with the tools available" (GTNP) "Both Grand Teton National Park and the Wyoming Game and Fish Commission have missions, but they are distinctive and sometimes antithetical" (Righter 2014, p. 147)
Do they address changing circumstances?	"Recreational visits over the last several decades have increased by more than 22% during the fall months, when the park hosts the . . . hunt" (UC*) "Non-consumptive use is growing" (LB) "Probably a greater growth potential for wildlife oriented tourism than other types of tourism" (J) "Now [the park is] full of photographers and wildlife viewers" (ENP) "We need a culture change, since hunters aren't as big of a constituency anymore" (UC)

Finally, the *pragmatic (or practical) test* asks if decision outcomes work in practice and if decisions are adapted to address changing circumstances over time. While the GTNP herd segment is below the target objective (WGFD 2013a) and the herd remains close to objective, the number of elk in the entire herd unit has risen significantly since the Bison and Elk Management Plan was prescribed in 2007, contrary to the plan's goals (DOI et al. 2007; Koshmrl 2015). In response to such trends, one non-profit representative said, "We need to reevaluate the need for the hunt." One NER official countered this, saying, "The herd is at objective, but we can't stop hunting because the hunting programs are what are keeping those numbers at objective." Many agency officials remarked that among the significant obstacles to meeting the desired outcomes were the difficulties of coordinating management activities among agencies with differing mandates as well as risk-averse agency culture. One said there are many "conflicting philosophies that make it difficult to reach our objective." Another said the "strong tendency for agencies not to take on a risk" precludes significant changes in decision making (e.g., experimental termination of hunting, feeding). At the same time, other participants noted that changing social and ecological conditions over the past few decades may necessitate thorough program appraisal. One said, "Recreational visits over the last several decades have increased by more than 22% during the fall months, when the park hosts the . . . hunt." Others pointed to an increase in the numbers and types of large predators on the landscape over the past decade, with one agency official saying, "Ecological conditions have changed due to [an] increase in predators contributing to natural regulation of the elk." Officials have made few, if any, changes to the program to address such changing circumstances, nor have they reevaluated their management approach.

Discussion

Our analysis revealed deficiencies in every decision function. Data also showed that neither the decisions that were made nor the process itself include diverse perspectives or attend to valid and appropriate participant concerns. The conflict and disagreement over goals, purposes, and program implementation identified here demonstrate that the common interest has not been clarified nor secured. Officials always decide to hunt each year, regardless of concerns and negative program outcomes (see Righter 2014). Below, we discuss underlying conditions in the operation of the joint management arrangement that lead to the hunt's annual occurrence and contribute to the trends observed in the decision-making process.

Whereas many concerns of hunt opponents pertained to the program's conformity with established goals for national parks (e.g., wildlife protection, resource preservation, public interest), agency officials focused their attention primarily on technical aspects of wildlife management (e.g., herd sizes, movements) that dictated the goals for the program and ultimately dominated public and professional discourses about the hunt. Although these matters are important, they are hard to address given the difficulty of securing adequate data with limited resources. The agencies' dominant focus on concrete, technical issues has significantly bounded the discussion of elk management policy and decision making. Functional and procedural matters, such as the adequacy of the decision process, are entirely overlooked. Agency officials consistently fell back on conventional assumptions grounded in the scientific management paradigm, the wildlife management institution, and the historic role of technical experts (see Brunner et al. 2002, 2005; Pielke 2007). This technical, narrow focus of the agency-dominated decision-making process is ultimately problematic and symptomatic of many other contentious natural resource management issues in the Greater Yellowstone Ecosystem. It blinds agencies to questions regarding the adequacy of the structure and the process by which decisions are carried out by officials. Another central conditioning factor underlying the conflict is the fundamental disagreement between the federal government and the state of Wyoming over who should have authority and control of elk and wildlife management on public lands (Righter 1982). The WGFD has long resisted the federal wildlife management structure, asserting that wildlife within the borders of Wyoming is the property of the state (Craighead 1952; Clark and Rutherford 2005; Righter 2014). This states' rights ideology has contributed to the ongoing conflict between the state and federal government over wildlife management (Clark 1997; Clark and Brewer 2000;

Halverson 2000; Clark and Rutherford 2005). The program's structure and joint management operation are a compromise in this continuing struggle (Righter 2014). Consequently, effective elk management that serves common interests is significantly precluded in part by the difficulty of coordinating these agencies with their differing jurisdictions, mandates, and constituencies as dictated by the joint management arrangement (see Boyce 1989). Furthermore, the decision-making process lacks effective, clear patterns of authority, control, and leadership for the involved agencies, thus foregoing the possibility of implementing meaningful changes to the program. The technical focus of the decision-making process and its emphasis on "scientific management" to meet program goals largely obfuscate this underlying struggle between the agencies for authority and control and contributes to status quo management.

It seems that all participants are trapped inside an institutional form of wildlife management that does not adequately serve good governance or common interests (see Clark and Rutherford 2005). We define "institutions" as stable patterns of practice, interaction, organization, and action characteristic of particular groups (Lasswell & Kaplan 1950; Ostrom 2005; Vernon et al., in revision). The wildlife management institution, as it operates in this case, persists in a "dynamically conservative" mode that preserves the status quo, regardless of problems (see Schön 1983). The institutional system does not serve the public, whose valid and appropriate concerns go unaddressed. The system does not serve agency officials well, either (e.g., Smith 2012). Officials in charge of the program seemed committed to history and standard operating procedures inside their home bureaucracies, rather than pragmatically addressing a host of actual biophysical, social, and decision problems. Finally, the institution and people maintaining it seem highly resistant to change. In the end, only the WGFD benefits from the current institutional arrangement by receiving profits through the sales of hunting licenses for the program and by retaining control of wildlife resources within the park, which was Wyoming's major goal during GTNP's expansion. Given these conditions, it is unlikely that WGFD will ever agree to terminate the hunt. This is despite the fact that WGFD income from licenses statewide is declining and has led to subsequent reductions in staff and other expenditures, while at the same time expenditures for elk feed grounds continue to increase (WGFD 2013c). In sum, the decision-making process for the hunt produces outcomes that can best be described as a "persistent policy problem" (Vogel 2006; Vernon and Clark, in revision).

Recommendations

We offer three recommendations to upgrade current governance practices. The goal of our recommendations is to better approximate an inclusive and democratic decision process that serves the common interest. Our recommendations are broadly applicable to other environmental management issues.

First, we recommend improved participation (Taylor and Clark 2005; McLaughlin et al. 2014). One of the main deficiencies identified in our analysis was the lack of meaningful public inclusion in the decision-making process, despite expression of valid concerns. We recommend that the agencies employ opportunities for greater meaningful public involvement in genuine problem-oriented ways, reaching out not only to the participants identified here but also to park visitors who may not be aware of the hunt and subsequently may not be actively engaged in this issue. Lasswell (1971) and Brunner et al. (2002), among others, note that the best means to identify the common interest and secure it in practice is to give each citizen a knowledgeable and fair voice in decision making. Bridging local, public, and professional environmental knowledge and problem solving for mutual advantage can be attained by mapping and understanding the context in which decisions are made and rebuilding engagement in civil society through the design and implementation of participatory, hands-on projects (see Taylor and Clark 2005; Richie et al. 2012; Rutherford et al. 2009; Wilkinson et al. 2007; Oppenheimer et al. 2014). Agency leaders (and all participants) should focus efforts on understanding each other's perspectives and values, an effort that can contribute to more respectful and cooperative interactions. Such efforts can help participants move beyond conventional, self-interested, and problem-blind perspectives currently dominating the elk management decision process.

Second, we recommend improved appraisal, both within and from outside the agencies (Brunner et al. 2002, 2005). Targeted research on the adequacy of the present decision process and how it can be upgraded is essential. This can be accomplished through carefully designed efforts to address the standards for each function and by focusing on the three partial tests of the common interest. Importantly, the focus of elk management should be shifted away from technical, expert-driven, and conventional agency means of problem solving toward more integrative, inclusive problem-solving approaches. In so doing, participants can better address problems in the underlying procedural dynamics and conditions as identified in our discussion.

Finally, we recommend improved agency leadership from within the NPS that reflects and advocates resource preservation and ecological integrity in accordance with the NPS's mandate and resource management policies. Agency officials should strive to make changes to their management policies that reflect the guiding principles and directions for resource management within the park systems (e.g., Leopold et al. 1963; NPS Advisory Board Science Committee 2012). One such recent report emphasized the need for improved resource stewardship to preserve ecological integrity within the long-term public interest, and it recommended using interdisciplinary knowledge, the precautionary principle, and appraisal of current management practices to upgrade or improve their policies to reflect these underlying goals (NPS Advisory Board Science Committee 2012). If we take this report as a baseline for our assessment of the park elk hunt, our analysis suggests that the hunt program does not reflect long-term public interests, threatens ecological integrity by preventing natural self-regulation, and thus requires agency appraisal. The underlying tension between the NPS at GTNP and WGFD for authority over wildlife management as a result of the unique joint management arrangement in this case seems to preclude such efforts. As such, we recommend improved agency leadership from high-level NPS offices and officials (e.g., Intermountain Regional Director; Associate Director, Natural Resource Stewardship and Science; Associate Director, Visitor and Resource Protection) with a focus on adhering to and implementing appropriate conservation practices within their jurisdiction. This may also address the difficulty that individual park managers face in undertaking controversial changes to resource management practices, contributing to status quo management.

Conclusion

In the end, good governance, like good policy, management, and science, should serve the common interest, regardless of the type of governance arrangement. Although the NPS's and WGFD's mandates have important differences, they nevertheless emphasize each agency's duty to serve the public interest. Furthermore, governance, management, and policy should be empirically grounded and adaptive, based on actual experience and changing values and contexts. Many, if not all, participants interviewed for this study have been actively involved in elk management in Jackson Hole for years or even decades. The combined experience of the participants we cite and others provides a wealth of information to upgrade and improve the existing decision-making process, but this will be successful only if participants work to build needed skills that are problem-oriented, fully contextual, multi-method, and genuinely integrative. We maintain that understanding the human social and decision processes is key to defusing the persistent policy problem and conflict in this case. We hope that our analysis and recommendations about participation, appraisal, and leadership might help break this decades-old policy problem and prove broadly applicable to other resource governance issues.

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References

Barmore WJ (1985) Natural resources management plan and environmental assessment, Grand Teton National Park. Laramie: Rocky Mountain Region, National Park Service

Boyce MS (1989) The Jackson elk herd: intensive wildlife management in North America. Cambridge University Press, New York

Brunner RD, Clark SG (1996) Making partnerships work in endangered species conservation: An introduction to the decision process. In: Wallace RL, Clark TW, Reading RP (eds) Endangered Species Update - Special Issue: An interdisciplinary approach to endangered species recovery: Concepts, applications, cases. School of Natural Resources and Environment, the University of Michigan 19:74-80

Brunner RD, Coburn CH, Cromley CM, Klein RA, Olson EA (2002) Finding common ground: Governance and natural resources in the American West. Yale University Press, New Haven

Brunner RD, Steelman T, Coe-Juell L, Cromley CM, Edwards C, Tucker D (2005) Adaptive governance: Integrating science, policy, and decision-making. Columbia University, New York

Clark TW (1997) Participants and perspectives: Complexity of joint action. In: Clark TW (ed) Averting extinction: reconstructing endangered species recovery. Yale University Press, New Haven, pp 28-41

Clark TW, Brewer GD (2000) The National Elk Refuge and the Jackson Hole elk herd: Management appraisal and recommendations. In: Clark TW, Casey D, and Halverson A (eds) Developing sustainable management policy for the National Elk Refuge, Wyoming. Yale School of Forestry and Environmental Studies Bulletin 104:9-22

Clark SG (2001) Wildlife resources: The elk of Jackson Hole, Wyoming. In: Burger J, Ostrom E, Norgaard RB, Policansky D, Goldstein BD (eds) Protecting the Commons: A Framework for Resource Management in the Americas. Island Press, Washington, D.C., pp 91-108

Clark SG (2002) The policy process: A practical guide for natural resources professionals. Yale University Press, New Haven

Clark SG (2009) An informational approach to sustainability: "Intelligence" in conservation and natural resource management policy. J. Sustainable For. 28:636-362

Clark SG, Rutherford MB (2005) The institutional system of wildlife management: Making it more effective. In: Clark SG, Rutherford MB, Casey D (eds) Coexisting with large carnivores: Lessons from Greater Yellowstone. Island Press, Washington, D.C., pp. 211-253

Clark SG, Rutherford MB (2014). Large carnivore conservation: Integrating science and policy in the North American West. Chicago University Press, Chicago

Craighead JJ (1952) A biological and economic appraisal of the Jackson Hole elk herd. New York Zoological Society and the Conservation Foundation, New York

Dahl RA (1998) On democracy. Yale University Press, New Haven

Halverson A (2000) The National Elk Refuge and the Jackson Hole Elk Herd: Management appraisal and recommendations. In: Clark TW, Casey D, and Halverson A (eds) Developing sustainable management policy for the National Elk Refuge, Wyoming. Yale School of Forestry and Environmental Studies Bulletin 104:9-22

Hatch C 20 October 2010 Wapiti hunt draws flak. Report. Jackson Hole News & Guide

Hsieh HF, Shannon SE (2005) Three approaches to qualitative content analysis. Qual Health Res. 15:1277-1288

Keiter R (2013) To conserve unimpaired: The evolution of the national park idea. Island Press, Washington, D.C.

Koshmrl M 24 December 2012 Other parks' elk hunts suggest options for Grand Teton. Report. Jackson Hole News & Guide

Koshmrl M 11 February 2015 Refuge plan a partial success. Report. Jackson Hole News & Guide

Kumar NL, Stern LW, Anderson JC (1993). Conducting interorganizational research using key informants. Acad Manage J 36:1633-1651
Lasswell HD (1956) The decision process: Seven categories of functional analysis. Bureau of Government Research, College Park
Lasswell HD (1971) A Pre-view of Policy Sciences. American Elsevier, New York
Lasswell HD, Kaplan A (1950) *Power and society: A framework for political inquiry*. Yale University Press, New Haven
Lasswell HD, McDougal MS (1992) *Jurisprudence for a free society*. New Haven Press, New Haven
Leopold AS, Cain SA, Cottam CM, Gabrielson IN, Kimball TL (1963) Wildlife management in the national parks. U.S. Government Printing Office, Washington, D.C.
McDougal MS, Lasswell HD, Chen LC (1980) Human rights and world public order: The basic policies of an international law of dignity. Yale University Press, New Haven
McLaughlin GP, Primm S, MB Rutherford (2014) Participatory projects for coexistence: Rebuilding civil society. In: Clark SG, Rutherford MB, Casey D (eds) Coexisting with large carnivores: Lessons from Greater Yellowstone. Island Press, Washington, D.C., pp. 177-210
National Park Service Advisory Board Science Committee (2012) Revisiting Leopold: Resource stewardship in the national parks. Washington, D.C.
National Park Service (NPS), U.S. Department of the Interior (2014) Superintendent's compendium 2014, Grand Teton National Park and John D. Rockefeller, Jr. Memorial Parkway. Moose
Ostrom E (2005) *Understanding institutional diversity*. Princeton University, Princeton
Oppenheimer DJ, Richie L, Clark SG (2014) Collaborative grizzly bear management in Banff National Park: Learning from a prototype. In Clark SG, Rutherford MB (eds) Large carnivore conservation: Integrating science and policy in the North American West. University of Chicago Press, Chicago, pp. 215-250
Pielke RA (2007). The honest broker: Making sense of science in policy and politics. Cambridge University Press, New York
Richie L, Oppenheimer DJ, Clark SG (2012) Social process in grizzly bear management: Lessons for collaborative governance in natural resource policy. Policy Sci 45:265-291
Righter RW (1982) Crucible for conservation: The struggle for Grand Teton National Park. Grand Teton Natural History Association, Jackson
Righter RW (2014) Peaks, politics, & passion: Grand Teton National Park comes of age. Grand Teton Natural History Association, Moose
Rutherford MB, Gibeau ML, Clark SG, Chamberlain EC (2009) Interdisciplinary problem solving workshops for grizzly bear conservation in Banff National Park, Canada. Policy Sci 42:163–187
Schön, DA (1983) The reflective practitioner: How professionals think in action. BasicBooks, New York
Smith BL (2012) Where elk roam: Conservation and biopolitics of our national elk herd. Lyons Press, Guilford
Starks H, Trinidad SB (2007) Choose your method: A comparison of phenomenology, discourse analysis, and grounded theory. Qual Health Res. 17:1372-1380
Steelman TA, DuMond ME (2009) Serving the common interest in U.S. forest policy: A case study of the healthy Forests Restoration Act. Environ Manage 43:396–410
Taylor D, Clark SG (2005) Management context: People, animals, and institutions. In Clark SG, Rutherford MB, Casey DE (eds) Coexisting with Large Carnivores: Lessons from Greater Yellowstone. Island Press, Washington, D.C., pp 28-69
Titscher S, Meyer M, Wodak R, Vetter E (2000) Methods of text and discourse analysis. Sage Publications, Thousand Oaks
U.S. Congress (1916) The National Park Service Organic Act, 39 STAT 535. Washington, D.C.
U.S. Congress (1950) Act of September 14, 1950, Public Law 81-787, Section 6(a), 64 STAT 840-849, which established the Grand Teton National Park in Wyoming. Washington, D.C.
U.S. Department of the Interior (DOI), U.S. Fish and Wildlife Service, the National Park Service (2007) Record of Decision, National Elk Refuge and Grand Teton National Park Final Bison and Elk Management Plan and Environmental Impact Statement. Washington, D.C.

Vernon ME, Clark SG. In revision. Addressing a persistent policy problem: The elk hunt in Grand Teton National Park, Wyoming. Soc Nat Resour
Vernon ME, Bischoff-Mattson Z, Clark SG. In revision. Discourses of elk hunting and grizzly bear incidents in Grand Teton National Park, Wyoming. Hum Dimens Wildl
Vogel JM (2006) Persistent policy problems. Dissertation, University of Colorado
Wilbrecht J, Robbins R (1979) History of the National Elk Refuge. In: Boyce MS, Hayden-Wing LD (eds) North American elk: Ecology, behavior, and management. University of Wyoming, Laramie, pp 248-254
Wilkinson K, Clark SG, Burch W (2007) Other voices, other ways, better practice: Bridging local and professional knowledge. Yale School of Forestry & Environmental Studies, Report No. 14:1-57
Wyoming Game and Fish Department (2013a) Harvest Report: Elk. http://wgfd.wyo.gov/web2011/Departments/Hunting/pdfs/HR2013_ELK0005991.pdf. Accessed 29 August 2014
Wyoming Game and Fish Department (2013b) Job Completion Report: Elk. https://wgfd.wyo.gov/web2011/Departments/Wildlife/pdfs/JCR_BGJACKSON_ELK_20130006053.pdf. Accessed 28 January 2015
Wyoming Game and Fish Department (2013c) Annual Report. http://wgfd.wyo.gov/web2011/Departments/WGFD/pdfs/WGFDANNUALREPORT_20130005237.pdf. Accessed 29 August 2014
Young OR (2013) On environmental governance: Sustainability, efficiency, and equity. Paradigm Press, Boulder