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A Retrospective Assessment of a Failed Collaborative Process in Conservation

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Abstract
Collaboration provides one tool for managing the complicated and often the contentious natural resource issues. Successful collaborative arrangements involve a mix of actors bringing key attributes to the table: power, capacity, motivation, mandate, and synergy. These attributes, if missing or if one overshadows the rest, can derail the collaborative process and/or the conservation outcomes. We offer a case study of natural gas field development impacts on America's only endemic ungulate —pronghorn (*Antilocapra americana*)—winter range in the Upper Green River Basin (UGRB), Wyoming, USA. We illustrate how a collaborative process can go awry, given asymmetries between the relative strengths and the associated attributes of actors, and the subsequent extent to which this imbalance created an unfavorable situation for continued collaboration. The case study reveals disagreements on technical data and potential insight on agency capture operating at a local scale. Despite these process challenges, some conservation outcomes resulted from work generated by the collaboration. Our experience underscores the importance of defining a clear purpose for collaborative processes at the outset, articulating specific roles, ensuring transparency among actors, and flexibility for long-term management as possible ways, in which the groups involved in collaborations to manage natural resources can complement each other's strengths and strive for better conservation outcomes.

Keywords Collaboration · Energy extraction · Industry · Pronghorn · Agency capture

Introduction

Conservation of natural resources often depends on collaborative arrangements. Such arrangements may include a diversity of actors such as government agencies, not-for-profits organizations, citizens, and businesses. The collaborations themselves may take many forms (e.g., partnerships, consensus building, community-based natural resources management), but the shared characteristics are the pooling of appreciations and/or tangible resources (e.g., information, money, labor, etc.), by two or more stakeholders or actors in a multiparty participatory approach to address projects, programs, decision-making processes, or to solve a problem that none can achieve individually (Gray 1985; Conley and Moote 2003; Koontz et al. 2004).

A successful collaboration may be simply defined as mutual-gains outcome, where all parties to an agreement benefit (Weber et al. 2007), or as participants perceiving that an effort has been successful (Waddock and Bannister 1991; Wondolleck and Yaffee 2000). Success can also be defined as improved policy compliance, increased long-term problem-solving capacity among those actors engaged in the process, vibrant partnerships with trust, common purpose, and mutual dependency (Weber et al. 2007). Recent work advocates to evaluate the productivity success, or conservation outcomes, of a collaboration separately from the process (Emerson and Nabatchi 2015). Much of the literature influencing the thought on collaboration has been informed by studies of successful collaborations ranging from small rural communities in the Northeast organizing to maintain forested lands in timber production

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(Lauber et al. 2008) to engagement by the conservation groups to manage critical buffer zones (Poulsen 2009) to assessing the components of cooperation across public and private entities on fire management within a watershed (Bergmann and Bliss 2004). These studies document the circumstances leading to partnerships and the resources, and characteristics involved in making the collaborative effort succeed.

To a lesser extent, collaboration has benefitted from critical thinking about the collaborative processes from a theoretical standpoint (Kenney 2000); as well as identification of conditions that challenge the successful collaboration or other multiparty negotiations (Pritzker 1990; Wondolleck and Yaffee 2000). Wondolleck and Yaffee (2000) posit three overall barriers to successful collaboration: (i) institutional or structural barriers, (ii) barriers related to attitudes and perceptions, and (iii) barriers related to the process of collaboration. Lack of incentives to participate in a collaboration, conflicting goals and missions of the participating groups, inflexible policies or procedures within organizations, and lack of resources including time and personnel, represent some of the institutional or structural barriers (Wondolleck and Yaffee 2000; Dutterer and Margerum 2015). Barriers relating to attitudes and perceptions involve mistrust between participants, imbalances of power, group attitudes toward each other (e.g., timber companies vs. environmentalists), organizational norms and culture, and general lack of support for collaboration (Waddock and Bannister 1991; Wondolleck and Yaffee 2000; Bergmann and Bliss 2004; Ansell and Gash 2008; Dutterer and Margerum 2015). Last, the process of collaboration can create challenges if participants are unfamiliar with the effective procedures, lack proper management and interpersonal skills, or cannot manage the collaboration within the outside political or social context (Emerson et al. 2011; Innes and Booher 2016).

Despite these potential challenges, if shared interest or compatible goals exist, groups often can find ways to collaborate effectively. Even then, some collaborations may start but not succeed, and in few case, histories provide detailed accounts about how the collaborative arrangements fail. Reporting on collaborations to date, both successes and failures disproportionately focuses on the efforts initiated by government entities, rather than the private sector or not-for-profit organizations (Williams and Ellefson 1997; Wondolleck and Yaffee 2000; Schuett and Selin 2002; Koontz et al. 2004). Less common are the reports of collaborations that include engagement with industry (e.g., Chaieau et al. 2010; Dutterer and Margerum 2015), despite the fact that collaborations among conservation organizations and industry are increasing due to the rise of corporate social responsibility, the potential for industry activities to impact natural resources, and the growing need for innovative ways to fund conservation and management efforts (Robinson 2012; Rainey et al. 2015). Reporting of such omissions is of fundamental importance because much can be gained through examination of not only what has succeeded, but similarly what has not and, critically, why.

In this paper, we draw upon the frameworks for building a successful collaboration in this field, and we present a case study to demonstrate how the process can devolve when partners fail to articulate specific roles and maintain transparency. Additionally, we assess how a lack of certain attributes identified in the literature as key to successful interactions resulted in a compromised collaborative process. Further, it is our hope that by reporting what has not worked smoothly, practitioners in the natural resource management and conservation biology will benefit by additional a priori planning in the future multi-team operations.

Collaboration is an important conservation tool particularly in complex socio-ecological systems that serve diverse mandates and involve numerous actors bringing multiple resources, characteristics, and opinions to the table. One feature contributing to effective collaborations, in which the parties agree their goals and objectives have been partly met, involves having the right mix of actors at the table. Based on decades of collective field experiences with collaborative natural resource management, ensuring the proper mix of actors is context specific: it may depend on the conservation target, what threats exist, what the preferred management actions might be, and/or what attributes of each actor are involved in the collaboration possesses (Castillo et al. 2006). Weber et al. (2007) suggest that the capacity for collaboration depends on the ability of those involved in the collaboration to rely on one another; that reliance is supported through adequate trust and honesty among actors, and being able to rely on 'true' information sharing (rather than misleading information), as well as institutional commitments to pre-existing goals. Some attributes necessary for creating an appropriate mix of actors include: those who wield political, economic, and/or social support needed for a project (Power), those who have the knowledge, skills, and resources to accomplish the action (Capacity), those who are in a position to authorize or prevent action (Legitimacy or Mandate), those who care about a pressing issue or are motivated to conserve by cultural, ethical, or economic implications (Urgency or Motivation), and the ability to engage over the time by building enduring relationships on trust, honesty, and good faith bargaining (Synergy) (Mitchell et al. 1997; Bergmann and Bliss 2004; Castillo et al. 2006; Weber et al. 2007; Ansell and Gash 2008; Innes and Booher 2016; Fig. 1, Table 1).

When actors in a conservation collaborative bring the right mix of attributes to the management process, and the

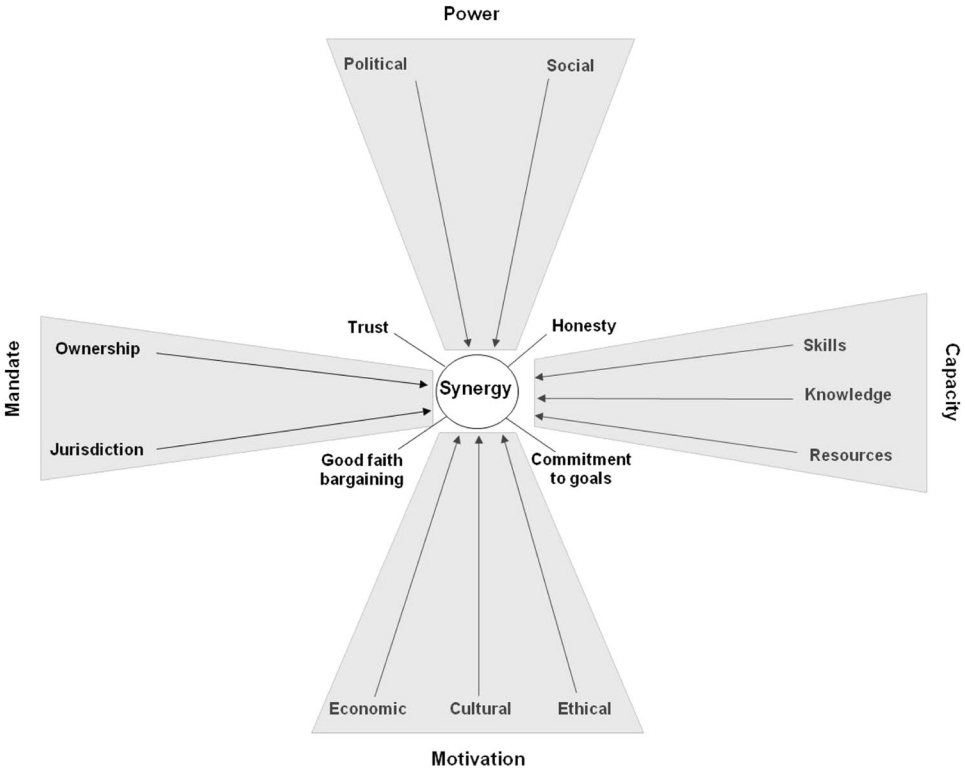

Fig. 1 Five key attributes encompassing multiple elements that are needed to effectively manage the natural resources. Conservation practitioners might consider how different actors fill these roles in order to complete a core management team. Synergy is the glue that holds a cast of actors together for long-term successful collaboration on a conservation issue (Modified from Castillo et al. 2006)

synergy or communication among the actors clearly and effectively occurs, the result often bodes well for the conservation practice. The key to selecting actors in appropriate roles for successful collaborations, are the linkages among the actors involved in the process (Lauber et al. 2008). Linkages refer to how communication occurs among the different actors or what type of relationships or social networks are present among a suite of stakeholders. Linkages may be formal such as a partnership, or an informal relationship (Waddock and Bannister 1991; Zanetell and Knuth 2002; Raik et al. 2005; Lauber et al. 2008; Innes and Booher 2016). These linkages form the basis of communication about an issue and can serve to move a collaborative process forward.

However, what are the conservation consequences when the attributes of players are asymmetrical? For example, what happens if one actor with more power dominates the direction of the collaboration, or only one actor brings a strong sense of urgency to the table? Can the collaboration succeed if the social linkages are strong among a subset of the key actors, but not all of the actors? How does transparent communication with accurate representation of organizational mission influence the collaborative dynamics? What steps can conservation organizations take when establishing collaborations among multiple partners to reduce the possibility of failure?

Here, we attempt to address these questions using a case study from the Upper Green River Basin (UGRB), Wyoming, USA, to provide insights about the complexities of managing public lands when a private industry has access to sub-surface petroleum resources. Our perspective is that as conservation biologists employed by the Wildlife Conservation Society, a global conservation organization with programs in over 60 countries. WCS works with Diversity Partners, including industry, and this has led to successful collaborations with tangible conservation benefits (e.g., Liebezeit et al. 2009; Robinson and Queiroz 2010). The views in this paper reflect the experience of the program team, but not necessarily the views of the organization per se.

Approach

We have worked in the UGRB since 2002, and we received support for our work from the industry extracting natural gas in the region, among other sources of funding. While we have not attempted a comprehensive evaluation of the collaborative effort (Conley and Moote 2003) with systematic interviews, we offer instead a deductive retrospective assessment. Two authors are biologists and the participant observers, who attended all the meetings were a part of all phone, mail, and email correspondence with other members of the collaboration, kept records of the events as they happened. The third author observed the process from the perspective of a social science colleague interested in

the conservation outcomes from a collaboration with diverse partners. Our assessment includes presenting a case study and comparing experiences in the UGRB with a modified framework for engaging a mix of actors with certain attributes to achieve conservation (Fig. 1; Castillo et al. 2006; Weber et al. 2007), and reflecting on this situation in light of other work and theoretical approaches to understand the complexity of establishing effective collaborations (Waddock and Bannister 1991; Wondolleck and Yaffee 2000; Schuett and Selin 2002; Ansell and Gash 2008; Emerson and Nabatchi 2015; Innes and Booher 2016), and the nuances of working with industry (Singleton 2000; Robinson 2010; Shapiro 2012; Carpenter and Moss 2014). Given the circumstances surrounding this collaboration, a complete evaluation where all parties provided input was not possible, also no formal records of the annual meetings were kept. However, we believe it is important to share our interpretations of the collaborative experience as an informative narrative for those engaged the in conservation practice with industry partners, as well as for those interested in how a small collaboration fits within some of the broader collaboration literature. This may enable others to approach the collaborative arrangements armed with strategies to improve the positive outcomes.

Case Study

Case Study on the UGRB

One of America's most vexing challenges is the management of public lands for multiple uses, such as natural resource extraction and wildlife. The intersection between energy development and biological conservation in our rapidly transforming world offers opportunities to gather knowledge and to implement the findings about how best to mitigate the impacts to wildlife. Natural resources management issues related to energy and conservation are prime candidates for collaborative processes, as there are often multiple actors, multiple mandates, and multiple nodes of power. Throughout the Rocky Mountain region of North America, open spaces provide necessary habitat for diverse wildlife. The UGRB of western Wyoming contains world-class wildlife, e.g., >100,000 over-wintering pronghorn (*Antilocapra americana*), elk (*Cervus elaphus*), mule deer (*Odocoileus hemionus*), and moose (*Alces alces*) (Berger 2004; Beckmann et al. 2011), and an estimated 30-50 trillion cubic feet of natural gas (Burke et al. 1989; Beckmann et al. 2011, 2012; BLM 2008), some of the richest concentrations in North America. This area is particularly significant, given that it is the wintering grounds for the pronghorn, using the Path of the Pronghorn, the first federally protected migration corridor in U.S. history (Berger and Cain 2014).

Table 1 Definitions of key attributes of the conservation actors including the Synergy to Engage (Modified from Castillo et al. 2006)

Key attributes of the conservation actors
Mandate to manage
Mandate to manage is defined here as the recognition of legal or moral authority, or the ownership of land or resources. Ownership implies recognized or legal rights; authority assumes jurisdiction over a given area or natural resource (conferred through legal or social processes). This qualification can be related to issues of legitimacy and credibility, although the ownership and/or the authority do not always connote legitimacy
Capacity to act
The capacity to act is predicated on having relevant knowledge, skills, and resources. The latter can include both human and financial resources, while the skill sets might include a broad range of aptitudes in everything from conflict resolution, writing and communication to strategic planning and research. Knowledge refers to the information required for an effective decision-making and action.
Motivation to conserve
Motivation refers to an actor's interest in a conservation-related objective, activity, or role. Motivated actors tend to perceive a benefit from either conservation or subverting conservation, and are thus less passive than indifferent actors. Benefits may be material or economic in nature, or may be cultural, ethical, or spiritual.
Power to influence
Power refers to an actor's political, economic, and/or social influence. Without politically powerful allies, a conservation program's efforts remain vulnerable to negative influence. Power in itself does not define an actor's value to conservation, but rather it is how that power is applied, which could impact conservation positively or negatively. In this way, references to the actors' 'Motivation to Conserve' will indicate how these actors are likely to wield their power.
Synergy to engage
Synergy to engage refers to the presence of key social characteristics necessary for successful long-term engagement on complex issues that often involve multiple actors collaborating to reach a desired end point. These characteristics include a commitment to pre-existing goals, trustworthiness, honesty, and ability to engage in good faith bargaining, where actions match words, and the sharing of 'true' rather than misleading information among actors prevails.

The UGRB is a large and complex landscape with many uses and ownerships. The primary statutory authority for public land is the Bureau of Land Management (BLM), which oversees the land and minerals within the 198,000-acre region designated as Pinedale Anticline Project Area (PAPA), as well as the adjacent 30,000-acre Jonah Field to the south (Fig. 2). The Federal Land Policy and Management Act requires the BLM to serve multiple mandates including mineral extraction and wildlife conservation (43 U.S.C. §1702, 2008).

To protect the habitat, ecosystem functions, and wildlife while harvesting natural resources, careful planning must

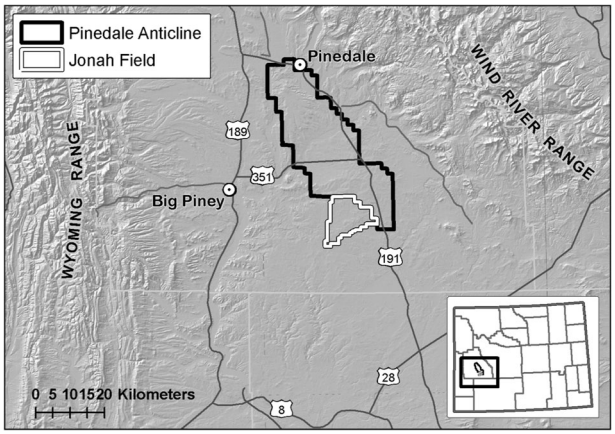

Fig. 2 Map of the Upper Green River Basin in Wyoming, USA showing the Pinedale Anticline Project Area and Jonah natural gas fields

occur. The U.S. Department of the Interior (DOI) directs all the bureaus, including the BLM, to incorporate adaptive management in their decision-making structure whenever appropriate conditions exist (U.S. Secretary of the Interior 2007a, b). "Adaptive management…promotes flexible decision making that can be adjusted in the face of uncertainties, as the outcomes from management actions and other events become better understood…" (Williams et al. 2009, p v). The DOI recommends an iterative six-step approach for adaptive management. To implement this approach, the appropriate stakeholders must be involved to decide upon clear and achievable objectives, and associated management actions to meet those objectives. Then the system must be monitored and the management actions must be assessed and updated periodically reflecting what has been learned about the impacts of different actions (Benson 2009).

At a time when the world's energy demands are growing, uncertainty remains regarding the effects of energy development on wildlife and strategies to minimize the consequent impacts. Understanding how the UGRB is affected by natural gas field infrastructure, associated human activities, and anthropogenic changes, is informed through collecting baseline data and by carefully monitoring wildlife population responses; the conditions where adaptive management could work well. In many areas, including the UGRB, where large-scale development is occurring, there is a paucity of baseline data on the wildlife movement patterns, habitat use, behavior, demography, and population trends (Beckmann et al. 2011, 2012), as well as the changing nature of human demography in and around such industrial-scale areas (Berger and Beckmann 2010, Beckmann et al. 2012). This absence of baseline data prevents wildlife managers and other decision makers from accurately assessing how species and society respond to an increasing human footprint. Further, the lack of long-term data in developing gas fields precludes the evaluation of critical wildlife responses including potential consequent changes in animal reproduction, survival, movements, habitat use, and behavior. In the absence of such insights, public remains with an incomplete picture of the possible impacts. Because effects, whether positive or detrimental, to wildlife populations often lag behind the initiation of habitat alteration, and long-term datasets are often required to detect these responses. Baseline data collection ideally occurs prior to natural resource extraction and informs decisions regarding how, when, where, and for what the duration disturbance will proceed. However, based on existing legal frameworks in the United States such as the National Environmental Policy Act, when and how an Environmental Impact Statement (EIS) or the integration of data should occur in the decision-making process for natural gas or oil extraction is unclear (Benson 2009). Although the collaborations between industry and other organizations (e.g., academic institutions, consultants, or NGOs) can increase the capacity for the co-production of relevant data to inform this process, few studies to date have examined how these collaborations to generate science have worked. Especially when the data generated has different future policy implications for the actors involved (Ascher et al. 2010; Dutterer and Margerum 2015).

Collaboration in the UGRB

Setting the stage

Under these conditions in 2005, the WCS program team (hereafter WCS) collaborated with an international petroleum company's risk assessment unit (hereafter the petroleum company) to initiate a 5-year study (4 years of data collection and 1 year to write a comprehensive report) of pronghorn in the UGRB (Berger and Cain 2014; Fig. 3). The mutually agreed upon goal was to understand the potential for winter-related effects of gas field development and infrastructure on different aspects of the pronghorn ecology and demography. This collaboration began through in-person discussions and mutual interest in the impacts on pronghorn and proceeded with a written request to WCS from the petroleum company in mid-2004 to draft a prospectus for a comprehensive study to examine how gas field development would impact pronghorn on their crucial winter range. The study plan was developed by WCS with input from the BLM and the Wyoming Game and Fish Department (WGFD). After several face-to-face meetings among the actors (representatives of WCS, the petroleum company, BLM, and WGFD; eight individuals at the in-person meetings, additional reviews of the proposal from other staff behind the scenes, and a subset of 3–4

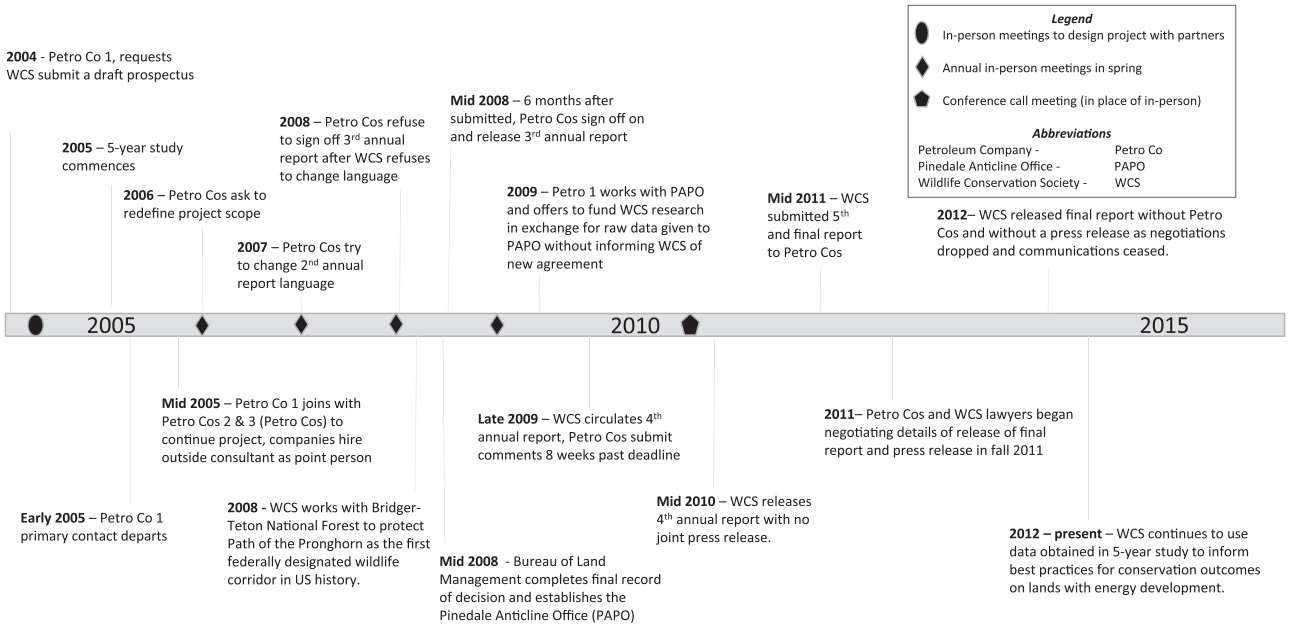

Fig. 3 Collaboration timeline and significant events

individuals in an informal dinner), the petroleum company stated their interest in developing leases in the most environmentally and wildlife friendly way, and to make adaptive management a part of the process. A final proposal with the clear goal and objectives along with a budget was agreed upon by all entities in January 2005.

Reframing the above in terms of a collaborative process, the petroleum company brought the power (in the form of economic support); BLM, WGFD, and the petroleum company had the mandate (jurisdiction over the lands, statutory authority for wildlife, and rights to the resources); WCS and WGFD brought the capacity (knowledge and skills necessary to complete the activities); all groups brought the motivation (specifically a stated conservation motivation explicit in the mutually agreed upon proposal); and at the outset, the synergy to work together, and transparency of the issue and perceived common objectives, enabled the collaboration to proceed. Of importance, the collaboration was a year-to-year agreement with no signed contract, only an accepted proposal submitted to the petroleum company by WCS. Notably, the petroleum company and WCS agreed that the support for the project would be provided via a tax-deductible donation to WCS rather than a pay for service contract, thus emphasizing a sharing of resources rather than a contractual relationship. From our perspective as participating members in this collaboration who hoped to achieve a mutual-gain outcome, the remainder of this case study assumes that success of the collaborative effort would mean that (1) research occurred and the participating actors integrated the science findings in management decisions (i.e., improved policy compliance) leading to conservation outcomes or successful productivity performance (Emerson and Nabatchi 2015); and that, (2) communication and decision-making regarding the partnership and management actions occurred in an open forum (i.e., a vibrant partnership with trust), with a successful and rational collaborative process (Innes and Booher 2016).

Building the collaboration

Soon after the project began in early 2005, the petroleum company employee who served as the main contact and helped initiate the study and funding left the project. In the first year, the petroleum company joined with two additional petroleum companies to jointly fund the research born out of this collaboration and a simultaneous project on mule deer (Sawyer et al. 2006) in the PAPA gas field. The three companies hired a consulting firm to represent them in the annual meetings, to which all parties (WCS, BLM, WGFD, and the companies' representatives) had agreed to in the proposal (Fig. 3). The meetings typically had 12–15 attendees including several WCS staff, local, regional, and state representatives for the BLM and WGFD, and at least one representative from each petroleum company, a biologist hired by the companies, and the hired consultant. In between the annual meetings, the members of the collaboration from different organizations communicated infrequently via email in the first 2 years. In years 3 and 4, once the results were being discussed, numerous email exchanges took place in between the annual meetings. By year 5, only one conference call occurred and then the communication ceased.

At the annual meetings, the collaborators discussed the results from the previous year. Within the first year, the actors at the table changed: the companies added five new people representing two new interests (two new companies and a consulting firm). While only one person left the group, he was a critical player from the petroleum company and through his early participation expressed a clear conservation motivation and mandate from his company to encourage the collaboration to occur. In terms of the collaboration, this transition meant a break in the continuity of recognizing and upholding the initial objectives and the desired outcomes of the partnership.

At the first meeting in 2006, with little data to discuss, the new consulting firm and petroleum companies wanted to "redefine" the project scope and focus research on a more restricted area that would not include a cumulative assessment of all wells and roads in the area. However, as the original 2004 research proposal included those elements, eventually all parties re-agreed to that approach. From our perspective, in subsequent annual meetings, the tone shifted from positive to negative. What had changed?

The actors were now different, and they brought different perspectives and motivations causing the good faith bargaining evident in the first year to waiver. Although the groups initially convened with a stated conservation motivation, the majority of the players had to balance multiple and often competing mandates such as economic, risk management, and conservation. During this transition period with new individuals at the table, conservation seemed to be only a secondary or possibly tertiary motivation driving the participation. This was however understandable, given the differing missions underlying the NGO and the for-profit corporations (Robinson 2012).

In the 2007 annual meeting, several participants attempted to alter the meaning of the data through changes in language and attempts to remove critical components of the report. For example, the 2007 draft report stated, "A few experimental animals exhibited patterns that suggest full or partial avoidance of the gas fields. Of these, two [pronghorn] demonstrated patterns that suggest complete avoidance of high intensity gas field development in the Jonah and PAPA." The petroleum company operators replied, "This section and the accompanying figures should be deleted" (Operators' comments on the Third Annual WCS Report, personnel communication via email, 2007). The changes would have benefited the extractive industry by lessening the stated degree of impacts the wells were having on the pronghorn, which at this time were minimally negative impacts (Berger et al. 2007). In the 2008 annual meeting, the data indicated several impacts inimical for the pronghorn including a decline in the use of crucial winter range inside the developing PAPA and Jonah gas fields. The draft report stated, "…the results of the model…indicate that pronghorn may be responding to increasing development by reducing their use of the habitat with the highest proportion of disturbance…this suggests that the development thresholds are being reached at which the behavioral responses to habitat loss are beginning to occur." The petroleum company operators responded "As the words 'maybe' and 'suggests' are speculative, this statement should be deleted." (Operators' comments on Fourth Annual WCS Report, personnel communication via email, 2008). Due to disagreements on these types of wording issues, the petroleum companies 'signed off' on the report 6 months after they mutually agreed upon the deadline, thus delaying the public release of the report itself and a joint press release.

Collaboration unraveled

During the delay over the third annual report in 2008, the BLM completed the Final Record of Decision (ROD) Supplemental EIS (SEIS). The ROD presents the basis for decisions and provides the adopted means to avoid, minimize, and compensate for environmental impacts. This ROD stated that a 15% decline in pronghorn numbers was needed to trigger the mitigation actions. It also established the Pinedale Anticline Project Office (PAPO) Board with representatives from BLM, WGFD, Wyoming Department of Environmental Quality, and the Wyoming Department of Agriculture. The ROD gave the PAPO Board the responsibility to: (1) oversee the disbursement of the mitigation funds (for each well a company drills in the PAPA, it must contribute $7500 to the mitigation funds for disbursement by the PAPO Board) to monitor wildlife, air, and water quality; and (2) direct future wildlife monitoring to determine whether the ROD mitigation triggers were met. Although the EIS did not establish the petroleum companies as members of the PAPO Board, it granted companies the ability to be involved in wildlife monitoring. The ROD for the PAPA created a Wildlife Monitoring and Review Team with BLM, WGFD, and the petroleum companies as members. This team was responsible for developing the wildlife monitoring plan for PAPA by 2009. All members could vote on who conducts the wildlife monitoring, determine appropriate research methods, and provide reviews and comments on the scientific results and reports. None of the research conducted by WCS was under the direction of the PAPO Board or the Wildlife Monitoring and Review Team, as the study commenced prior to the establishment of these entities.

Although the ROD established the PAPO Board and charged that group with funding wildlife monitoring in late 2008, that group did not have the ability to disburse the funds immediately. Without WCS' knowledge, the original company that funded the pronghorn research went to the

PAPO Board in late 2008 and offered to completely fund the 2009 study, but only if they could be reimbursed by the PAPO Board once it had the ability to disburse funds. PAPO Board members agreed but asked the company to tell WCS that raw data from the 2009 collaring activities would be required by the PAPO Board for the petroleum company to be reimbursed. WCS learned of this new arrangement in 2010 by phone when the PAPO Board members requested for the raw data from WCS for the last year of the study. At that point, much confusion arose over what the petroleum company had agreed to fund, who would analyze the last year of data, and how these details should have been communicated to WCS. The lack of clarity on who should have communicated what, to whom, during what time period, strained the relationships on the collaboration.

While the PAPO Board was formed, communication among actors shifted dramatically. Prior to the PAPO Board, decisions about the data, payments, and reports were made collectively at the annual meeting at which all players were present. Subsequently, the communication on these topics became closed and the linkages among some players remained strong, yet communications with others, namely WCS, were almost completely severed. This essentially shifted WCS from a player and a part of the collaborative process bringing knowledge, skills, and capacity for researching/monitoring wildlife to the project to something more akin to a contractor, where the entity with the power (i.e., money) dictates how the project should happen. For a complex issue such as drilling in a natural area where multiple mandates exist, who should be at the table and who makes the decisions, and how the decisions are made are also complicated legal processes (Benson 2009).

In December 2009, WCS finished the 4th annual report and distributed it to the other partners. Within 2 weeks, WGFD responded that they were satisfied and offered no comments on the document. By contrast, the three petroleum companies responded more than 8 weeks after the mutually agreed upon deadline for submitting their comments. WCS eventually agreed to incorporate those comments that would improve the factual accuracy in the 4th report. On a conference call in May 2010, all parties agreed to release the 4th annual report. However, the joint press release on the 4th report stalled during 2010 due to wording issues and was never released.

In July 2011, WCS completed the fifth and final comprehensive report that included management recommendations. It was not made public, given the three petroleum companies' concerns regarding the language and WCS refusing to alter the report. By December 2011, this stalemate progressed to discussions among lawyers and slowed the use of science in decision-making around the UGRB gas fields. Despite the compromised collaborative process, WCS continued to actively publish science from this project in peer-reviewed journals (e.g., Beckmann et al. 2012; Seidler et al. 2015; Beckmann et al. 2016) and released the final report in 2012 on the WCS website, but without official sign-off or an accompanying joint press release from the three petroleum companies.

The iterative and collaborative process by which the scientific results from monitoring should inform management actions within an adaptive management framework failed. The operating procedures and trajectories for the number of wells, roads, and spatial array of infrastructure to be drilled had not changed, based on scientific findings in this region at the end of the collaboration. For example, the mule deer population inside the PAPA had declined by >40%, compared to the pre-drilling levels (Sawyer and Neilson 2010). The mitigation trigger of a >15% decline in population for the EIS had easily been reached (BLM 2008). Yet no demonstrable changes in best management practices designed to enhance or even slow the decline of mule deer numbers had been undertaken by the BLM or the petroleum companies in direct response to the data presented on mule deer (Sawyer and Nielson 2010). As a result, several environmental NGOs litigated against the BLM (WCS was not among them). Pronghorn had a five-fold loss in the amount of highest quality winter range in both the PAPA and Jonah Fields from 2005-2009, and abandonment of some areas of crucial winter range (Beckmann et al. 2012). Although the reduced usage (i.e., abandonment) of crucial winter range does not trigger or necessitate any specific mitigation under the EIS for pronghorn, abandonment of winter range may be a precursor to population declines (demographic response), as has been innumerably shown for shifted species distributions in regions with high levels of roads (e.g., Beier 1995; Hebblewhite et al. 2003)

If the adaptive management process is to be successful, the BLM and the petroleum companies should react to early "warning signals" identified prior to population declines of pronghorn rather than wait for mitigation triggers. Despite the fact that mitigation measures have not been met, as part of the adaptive management, all of the data in the theory should be considered and management actions should be altered in order for the BLM to effectively meet its multiple mandates (Williams et al. 2009). In essence, because the mitigation triggers rely solely on the population numbers, no changes in best management practice are required, even though the documented decline in winter habitat and increase in abandonment may signal a future population decline.

Interpretation of the Collaborative Process

The original intent of the collaboration between WCS and the petroleum companies was to initiate a scientific

monitoring process that would lead to actions that promote on-the-ground conservation in the UGRB. Collaborative efforts involving knowledge generation for natural resources management between two organizations with competing interests create challenges for achieving conservation outcomes (Robinson 2012; Dutterer and Margerum 2015). The collaborative process failed to maximize conservation outcomes and improve policy compliance by having a scientific basis to inform changes in management of natural resources extraction in UGRB. Despite a failure of the process with industry partners, WCS has continued to engage the BLM and other agencies to ensure data generated by the collaboration have resulted in conservation outcomes in similar systems. For example, by engaging with management agencies and decision-makers, WCS staff have used the data to justify increased directional drilling to reduce surface disturbance, to inform the permanent retirement of 5120 acres from energy development in the Nobel Basin natural gas field, to contribute to the EIS process for the Normally Pressured Lance field, and to advise on energy development in other locations such as the Powder River Basin and Bridger-Teton National Forest. Further, the analyses on migration movements by pronghorn collared during this study and the data on mule deer movements in the other project in the UGRB were instrumental in the decision by the Wyoming Department of Transportation to invest $9.7 million on six underpass and two overpass wildlife-crossing structures on Highway 191 in western Wyoming to protect migrating pronghorn along the Path of the Pronghorn and mule deer in the UGRB along a 13-mile stretch of the highway (see Seidler et al. 2015).

Based on the collaboration literature and a framework for engaging actors in conservation practice articulated in Fig. 1, we believe there are three primary reasons why the collaboration process in the UGRB failed. First, while clear goals and objectives were initially established, new partners wanted to modify the goals and objectives as the collaboration progressed. Second, the actors representing the different organizations (particularly the petroleum companies and the BLM) changed which resulted in different motivations and social relationships. Third, changing legal directives, for example the EIS being signed in the middle of the study, altered actors' overall roles. The combined effect of these three situations resulted in a break-down of the synergy and open communication among actors, and resulted in a process where concerns of all participants were not represented during key points of the collaboration, industry attempted to alter the meaning of scientific results that could compromise production, and elements of agency capture seemed to influence some public agency decisions.

Lack of clear consistent goals and objectives

As noted, the BLM serves multiple mandates, including natural resources extraction and wildlife conservation (Williams et al. 2009). Due to the potentially conflicting nature of these mandates, broad participation was necessary from the beginning from all relevant actors to articulate and subsequently adhere to clear goals and objectives. A variety of legal stumbling blocks made adequate involvement difficult. For example, the Federal Advisory Committee Act restricted public involvement because the designated advisory group, the Pinedale Anticline Working Group, was legally required to have a charter (Benson 2009). During the 2-year period in which the charter was being created and approved, natural gas development continued (Benson 2009). Consequently, the collaboration proceeded without a specific legal directive and thus once scientific data became available, the companies were under no obligation to use the data or to alter existing operations. Similar to other places where complex systems and finite resources lead to disagreements and arguments on technical science (Dutterer and Margerum 2015), as data from the UGRB demonstrated serious risks to wildlife, industry used tactics to alter the meaning of reports and delay release of the information to the public. The collaboration also suffered from the lack of a clear purpose for monitoring and what changes could be made to management actions in light of new scientific information on the effects of the impact wells, associated infrastructure (e.g., roads and pipelines), and human activities (e.g., drilling, traffic volumes) on wildlife.

Changing actors leads to different relationships and motivations to participate

Social networking, or the formal or informal linkages among players at the table over a specific issue, has been lauded as a means for creating a successful collaborative environment. How social networking operates under situations of conflicting mandates and motivations may be quite different (Lauber et al. 2008). In this case study, the groups and individuals involved at the beginning appeared to be motivated by the desire to conserve wildlife in the UGRB. Behind those apparent motivations are broader institutional motivations. From our perspective, the driving motivations arguably changed as individual participants changed. For those representing petroleum companies, risk management or economic motivations appeared to supersede conservation motivations. That is, as data demonstrated partial abandonment of winter ground by pronghorn (a negative impact for conservation), the players with an economic motivation or motivation to manage risk of appearing to have practices that harm the environment worked to underplay the wording of this issue in the annual reports (a

positive impact for economic gain and strategy to reduce risk). How social networks were arranged may have contributed to the ultimate failure of the collaboration. For example, staff representing a public agency later left that agency to become a consultant for one of the petroleum companies. This could suggest strong relationships outside the collaboration between a subset of the collaborators, a practice noted in other collaborations, e.g., Cook 2015. It could also suggest positions of this individual were voiced to be viewed favorably by a potential future employer. Instances of self-motivation rather than working on behalf of public interest can lead to weak agency capture (Shapiro 2012, Carpenter and Moss 2014).

Agency capture occurs when, "either an agency or a subset of agents identifies its interest so tightly bound up with those they are charged with regulating that they no longer have the inclination to defend the broader public's interest or their agency's independence," (Singleton 2000, p7). Clear capture examples involve a public interest, a policy shift away from public interest and toward a special interest, and actions by that special interest showing intent to shift policy (Carpenter and Moss 2014). In the literature, examples of capture include clear regulatory implications often operating at larger geographic and economic scales (e.g. Deepwater Horizon explosion and oil spill, global financial crisis 2007-2009; Carpenter and Moss 2014). Our experience represents a potential example of nuanced influence from private industry operating at a relatively small geographic scale resulting in a shift away from serving the public interest. Weak agency capture occurs with the social benefits of the regulatory environment have been compromised but the public is still benefitting (Carpenter and Moss 2014). In this case, the public agencies are still regulating the oil and gas industry to minimize negative impacts in UGRB (a public benefit), however the scientific evidence that should have informed changes in management was delayed and excluded from the decision-making processes (a shift away from public interest) due to the actions of a few compromised individuals.

Collaborations involving multiple organizations often have more than one person representing an organization creating the "two-table problem" wherein individuals representing one entity have differing opinions; this challenge may be augmented when individual agents have been "captured". Overcoming the "two-table problem" or the possible influence of capture at this relatively small scale requires strong dialog within an organization prior to interacting with the group to reach consensus (Margerum 2008) or ensuring state or local offices of public agencies have adequate oversight options or policies to prevent capture. At the highest levels of the federal government preventing capture may occur through judiciary action, increased executive review or empowering consumers or supporters of special interest groups to demand behavior changes of those interest groups, industry or otherwise (Carpenter and Moss 2014). Little empirical data documents the challenges of agency capture and the solutions at this localize scale and is an area of conservation practice in need of further investigation. The lack of consensus and possible evidence of capture of some individuals involved in the process coupled with changing priorities and breakdown in communication disrupted any remaining synergy among the UGRB actors, undermined what Weber et al. (2007) refer to as the glue, or key elements of trust, honesty, and good-faith bargaining, of the entire collaborative process.

Changing legal frameworks

Mismatches in the timing of legal frameworks for collaboration and pre-existing partnerships or other arrangements create challenges for the successful management of natural resources. The relationship between WCS and the petroleum company began in 2004 with data collection commencing in 2005 prior to the final SEIS being completed and signed in 2008 and 2009. As a result, the collaborative framework specifically for monitoring impacts was developed outside of the legal framework for drilling wells on BLM lands. Without the legal framework and given that the collaborative effort was a partnership in good faith based on a handshake versus explicitly spelling out clearly how the parties would respond to the data from the monitoring, none of the parties were technically obligated to use the data generated by WCS to alter management actions. Then, signing the SEIS in the middle of the 5-year study created an additional challenge of changing power and legal directives among the actors in the collaboration.

A different yet fundamental challenge inherent within the legal system is that the petroleum companies started to drill wells in 1999, prior to any EIS. From a conservation standpoint, the monitoring should have started prior to 1999. In reality, because the extraction industry segments the process for oil and gas development into five stages (leasing, exploration, drilling, production, and reclamation), no EIS was required prior to the drilling (Benson 2009). Consequently, no wildlife data had been collected until after hundreds of gas wells already existed.

A further complication was not that the SEIS enabled new monitoring protocols but that the new protocols were established with the petroleum companies formally assisting in the design of research and evaluation. Again, from a conservation perspective, those with the capacity, i.e., the knowledge and skills, should also be offered a seat at the table to design monitoring protocols. Otherwise, in terms of collaborative processes, the petroleum companies retained substantial power by holding the purse and by being seated

on the Wildlife Monitoring and Review Team under the PAPO Board. Such power imbalances can make collaborative processes prone to manipulation (Ansell and Gash 2008). The resulting new monitoring program diverged from the science-based methods under which data had been collected since 2005 making comparison with data collected under the new methods unfeasible.

Conclusions

In this paper, we present a case study of lessons learned from a failed collaborative process. Our intent is to enable other conservation practitioners to avoid potential pitfalls of engagement in collaborative processes by following at least some of the steps for successful collaborations as identified in the professional literature (Mitchell et al. 1997; Conley and Moote 2003; Castillo et al. 2006; Weber et al. 2007; Lauber et al. 2011). The case study has limitations as we provide details from the perspective of the conservation organization involved in the collaboration and receiving funds to conduct the scientific study. More could be learned about the nuances of engaging in such a collaboration with interviews of all participants and review of formal records. However, based on our experiences in the UGRB, we expect that challenges in collaborative arrangements may arise when:

1. Power is asymmetrical and other players have been unable to shift into a power position to improve the collaborative process (Gray 1985; Mitchell et al. 1997). In this circumstance, the players with power may be in a position to influence many steps in the process from setting the stage for how actors with other important attributes can or cannot participate to agency capture
2. Social networking within controversial situations can negatively influence synergy (Fig. 1). This can lead to poor communication among actors, where some actors communicate and others do not, decisions may be made in the absence of full consensus among all parties, and agency capture may happen particularly if self-motivated individuals in public service see long-term benefits from cooperation with private interest (Shapiro 2012).
3. Divergent motivations (economic gain versus risk management versus conservation) exist and clear goals and objectives for the collaboration do not explicitly address how to manage these potentially conflicting motivations as new information is generated (Dutterer and Margerum 2015).
4. Legal frameworks change during the collaborative process. If the process begins under one set of directives and new circumstances arise, the changes may result in unfavorable conditions for continued collaboration.

Despite these potential challenges, most conservation groups are in a position where resources are limited for monitoring wildlife and other natural resources. Industry, along with many other groups, continues to be an important partner funding conservation science (Robinson 2012). This will likely continue given the increase of corporate signatories to the United Nations Global Compact, over 9500 currently (2017). Many of these corporations have defined goals for no net loss and net positive impact on biodiversity and will likely need to implement activities to achieve these goals as governments incorporate environmental externalities as real costs to corporations through fines, lawsuits, and/or project delays (Rainey et al. 2015). Conservation entails addressing some challenging ethical debates and requires an appreciation of trade-offs that may be necessary to consider multiple values of a particular resource (Robinson 2010). Given that relationships across a variety of actors, especially industry, are important for supporting conservation outcomes, we recommend that conservation organizations keep the following opportunities in mind as possible but not definitive ways to improve engagements in collaborative processes:

(1) *Establish clear guidelines for the provision and use of knowledge generated in a collaborative process*: We suggest that a collaborative group, at the outset of the collaboration, explore options or forecast a variety of potential future scenarios that could take place depending on what type of new information is collected (Selin and Chavez 1995). Then develop an explicit agreement with the other actors on what will happen under different possible scenarios. In this way, even if the data may not bode well for one of the group's specific motivations (e.g., economic gain), it is clear how the management actions should change based on a finding unfavorable to some of the members of the collaboration (Peterson et al. 2003).

(2) *Separate individuals from organizations*: Understand the role of each individual at the table versus the role which the organization he or she represents. Humans are complex, and each individual brings their own interests and personalities to the table as well as that of their organization. In a collaborative process, it is important to recognize the role each person has within the group, how they interact with others within the group and those outside of the group, what each person brings to the table, and importantly what would change should that person no longer represent their organization (Cross et al. 2001).

(3) *Recognize and reduce the potential for agency capture*: Special interests including private industry can have a strong role in shifting policy or decisions to benefit a limited few. Part of addressing this issue may involve working with local, regional or national public agencies to improve capacity, executive oversight, or other strategies to minimize the potential for agency capture (Carpenter and Moss 2014).

(4) *Develop clear and common objectives*: Developing clear and common objectives is a central tenet of adaptive management and a critical step in a collaborative process. Generally, the more divergent interests each party brings to the table, the more time required at the start of the collaboration to identify common ground including clearly stated goals and objectives (Lauber et al. 2011). Although, the original, agreed upon proposal by WCS, developed with input from BLM, WGFD, and the petroleum companies had clearly stated, hypothesis-driven, scientific objectives that were all successfully addressed by the research (e.g., see Beckmann et al. 2011, 2012; Seidler et al. 2015; Beckmann et al. 2016); in hindsight, a memorandum of understanding or other agreement would have helped to ensure all parties had the same expectations as to how the parties would respond to the data through best management practices. Such a document would have been particularly useful given the number of actors that changed during the process.

(5) *Stand by the science*: We encourage organizations to stand by their science. We had to be vigilant when participants in the collaboration suggested alternative wording that would have changed the meaning of statements in the scientific year-end reports. Given the types of power imbalances that can arise in contentious situations, other actors may apply pressure to alter the meaning of science. As good science is the currency for conservation, we recommend ensuring data are collected and analyzed with the proper methods and are accurately represented for the other actors and the public.

(6) *Situate collaboration within an existing legal framework*: Determine whether a collaborative effort has legal standing within a particular context. This may include understanding legal language of state or national governments for natural resource management or it may involve reviewing the policies and practices of organizations engaged in a collaborative arrangement. In particular, private sector companies may have language within corporate social responsibility policies to encourage multiparty engagement, but clarify from the start of a collaboration whether such encouragement requires eventual modifications in practice dependent upon the outcome of the multiparty engagement.

(7) *Document all collaborative processes*: We found our reflection of this process particularly useful for considering how we might approach similar situations in the future. We urge conservation practitioners to document collaborative processes and resulting conservation outcomes. As part of this, consider the elements that contribute both to successful collaborations, but more importantly to the unsuccessful ones. We further urge the academic community to engage in comprehensive reviews of collaborations wherein all participating members are interviewed and the process can be understood within a broader theoretical framework thus allowing comparisons across multiple examples. As we build our collective knowledge about the possible pitfalls of collaborations, we will inevitably improve our conservation practice.

Collaboration can be an effective means to address complex natural resources management challenges. However, collaborations are fragile. They must be entered into cautiously with attention paid to understanding who contributes what attributes to the process, how the actors involved relate to each other, how information generated in the collaboration will be portrayed and used, and what legal frameworks allow or prohibit the inclusion of collaborative outcomes in the decision-making process. Deviations from these approaches can undermine the collaboration and enable one group to dominate or derail the process. Managing a collaboration may be onerous—particularly at the outset—yet that is the critical time for setting the stage for success. Actors must clearly articulate goals and objectives and recognize that whatever agreement is made should be able to withstand changes in personnel participating in actual meetings and decision-making. Conservation requires support from diverse constituents to be effective, and without collaboration the ability to achieve conservation would be greatly diminished. Much can be learned from understanding successful and unsuccessful collaborations. We encourage others to share their experiences such that conservation goals can be more effectively attained.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

43 USC §1702 (2008). https://www.law.cornell.edu/uscode/text/43/1702. Accessed 4 Apr 2018

Ansell C, Gash A (2008) Collaborative governance in theory and practice. J Publ Adm Res Theor 18:543–557

Ascher W, Steelman T, Healy R (2010) Knowledge and environmental policy re-imagining the boundaries of science and politics.. MIT Press, London

Beckmann JP, Seidler RS, Berger J (2011) Wildlife and energy development: pronghorn of the Upper Green River Basin—Final Report. Wildlife Conservation Society, Bronx

Beckmann JP, Murray K, Seidler RG, Berger J (2012) Human-mediated shifts in animal habitat use: sequential changes in pronghorn use of a natural gas field in Greater Yellowstone. Biol Conserv 147:222–233

Beckmann JP, Olsen SH, Seidler RG, Berger J (2016) Sub-lethal effects of energy development on a migratory mammal - the enigma of North American pronghorn. Glob Ecol Conserv 6:36–47

Beier P (1995) Dispersal of juvenile cougars in fragmented habitat. J Wildl Manag 59:228–237

Benson MH (2009) Integrating adaptive management and oil and gas development: existing obstacles and opportunities for reform. Environ Law Rep 39:10962–10978

Berger J (2004) The longest mile: How to sustain long distance migration in mammals. Conserv Biol 18:320–332

Berger J, Beckmann J (2010) Sexual predators, energy development, and conservation in the Greater Yellowstone Ecosystem. Conserv Biol 24:891–896

Berger KM, Beckmann JP, Berger J (2007) Wildlife and energy development: pronghorn of the Upper Green River Basin—year 2 summary. Wildlife Conservation Society, Bronx

Berger J, Cain SL (2014) Moving beyond science to protect a mammalian migration corridor. Conserv Biol 28(5):1142–1150

Bergmann SA, Bliss JC (2004) Foundations of cross-boundary cooperation: Resource management at the public-private interface. Soc Natur Resour 17:377–393

Bureau of Land Management (2006) Record of decision for Jonah Infill Drilling Project, Sublette County, Wyoming. Wyoming State Office, Cheyenne

Bureau of Land Management (2008) Record of decision final supplemental environmental impact statement for the Pinedale Anticline oil and gas exploration and development project. Pinedale Field Office, Pinedale

Bureau of Land Management (2010) What are best management practices (BMPs)? http://wwwblmgov/wo/st/en/prog/energy/oil_and_gas/best_management_practiceshtml 2010 Accessed 14 April 2014

Burke IC, Reiners WA, Olson RK (1989) Topographic control of vegetation in a mountain big sagebrush steppe. Vegetatio 84 (2):77–86

Castillo O, Clark C, Coppolillo P, Kretser H, McNab R, Noss A, Quieroz H et al. (2006) Casting for conservation actors: people, partnerships and wildlife. Wildlife Conservation Society, Bronx, WCS Working Paper No 28

Chaieau CH, Mine J, Suripno (2010) The integration of biodiversity conservation with oil and gas exploration in sensitive tropical environments Biodivers Conserv 19:587–600

Carpenter D, Moss DA (eds) (2014) Preventing Regulatory Capture: Special Interest Influence and How to Limit It. Cambridge University Press, New York

Conley A, Moote MA (2003) Evaluating collaborative natural resource management. Soc Natur Resour 16(5):371–386

Cook JJ (2015) Who's pulling the fracking strings? Power, collaboration and Colorado fracking policyEnviron Policy Gov 25:373–385

Cross R, Parker A, Prusack L, Borgatti SP (2001) Knowing what we know: supporting knowledge creation and sharing in social networks. Organ Dyn 30(2):100–120

Dutterer AD, Margerum RD (2015) The limitations of policy-level collaboration: A meta-analysis of CALFED. Soc Natur Resour 28 (1):21–37

Emerson K, Nabatchi T (2015) Evaluating the productivity of collaborative governance regimes: A performance matrix. Perform Manag Rev 38:717–747

Emerson K, Nabatchi T, Balogh S (2011) An integrative framework for collaborative governance. J Pub Adm Res Theor 22:1–29

Gray B (1985) Conditions facilitating interorganizational collaboration. Hum Relat 38:911–936

Hebblewhite M, Percy M, Serrouya R (2003) Black bear (Ursus americanus) survival and demography in the Bow Valley of Banff National Park, Alberta. Biol Conserv 112:415–425

Innes JE, Booher DE (2016) Collaborative rationality as a strategy for working with wicked problems. Landsc Urban Plan 154:8–10

Kenney DS (2000) Arguing about consensus: examining the case against western watershed initiatives and other collaborative groups active in natural resources management. Natural Resources Law Center, University of Colorado, Boulder

Koontz TM, Steelman TA, Carmin J, Korfmacher KS, Moseley C, Thomas CW (2004) Collaborative environmental management: what roles for government? Resources for the Future Press, London

Lauber TB, Decker DJ, Knuth BA (2008) Social networks and community-based natural resources management. Environ Manag 42:677–687

Lauber TB, Stedman RC, Decker DJ, Knuth BA, Simon CN (2011) Social network dynamics in collaborative conservation. Hum Dim Wildl 16(4):259–272

Liebezeit JR, Kendall SJ, Brown S, Johnson CB, Martin P, McDonald TL, Payer DC et al. (2009) Influence of human development and predators on nest survival of tundra birds, Arctic Coastal Plain, Alaska. Ecol Appl 19(6):1628–1644

Margerum RD (2008) A typology of collaboration efforts in environmental management. Environ Manag 41:487–500

Mitchell RK, Agle BR, Wood DJ (1997) Toward a theory of stakeholder identification and salience: defining the principle of who and what really counts. Acad Manag Rev 22(4):853–886

Peterson GD, Cumming GS, Carpenter SR (2003) Scenario planning: a tool for conservation in an uncertain world. Conserv Biol 17 (2):358–366

Poulsen JR (2009) Building private-sector partnerships for conservation: Lessons learned from the collaboration between WCS, CIB, and the Republic of Congo in forestry concessions. Wildlife Conservation Society, Bronx

Pritzker DM (1990) Working together for better regulations. Natur Resour Env 5(2):51–53

Raik DB, Lauber TB, Decker DJ, Brown TL (2005) Managing community controversy in suburban wildlife management: adopting practices that address value differences. Human Dim Wildl 10:109–122

Rainey HJ, Pollard EHB, Dutson G, Ekstrom JMM, Livingstone SR, Temple HJ, Pilgrim JD (2015) A review of corporate goals of no new loos and net positive impact on biodiversity. Oryx 49 (2):232–238

Robinson JG (2012) Common and conflicting interests in the engagements between conservation organizations and corporations. Conserv Biol 26(6):967–977

Robinson JG (2010) Ethical pluralism, pragmatism, and sustainability in conservation practice. Biol Conserv 144:958–965

Robinson JG, Queiroz H (2010) Márcio Ayres: new approaches to the conservation and management of protected areas in Amazônia. In: Pinedo-Vasquez M, Ruffino ML, Sears RR, Brondizio ES,

Padoch C (eds) The Amazonian Várzea: The decade past and the decade ahead. Springer Verlag and New York Botanical Garden Press, New York, p 311–316

Sawyer H, Nielson RM (2010) Mule deer monitoring in the Pinedale Anticline Project Area: 2010 annual report. Western Ecosystems Technology (WEST), Inc, Laramie

Sawyer H, Nielson RM, Lindzey F, McDonald LL (2006) Winter habitat selection of mule deer before and during development of a natural gas field. J Wildl Manag 70:396–403

Schuett MA, Selin S (2002) Profiling collaborative natural resource initiatives and active participants. JAppl For 19(4):155–160

Seidler RG, Long RA, Berger J, Bergen S, Beckmann JP (2015) Identifying impediments to long-distance mammal migration. Conserv Biol 29(1):99–109

Selin S, Chavez D (1995) Developing a collaborative model of environmental planning and management. Environ Manag 19 (2):189–195

Shapiro SA (2012) The complexity of regulatory capture: diagnosis, causality and remediation. Roger Williams Univ Law Rev 17 (1):221–257

Singleton S (2000) Co-operation or capture? The paradox of co-management and community participation in natural resource management and environmental policy making. Environ Polit 9 (2):1–21

(2017) United Nations Global Compact. https://www.unglobalcompact.org/. Accessed 3 Aug 2017

US Secretary of the Interior (2007a) Secretariat order 3270. http://elipsdoigov/app_so/act_getfilescfm?order_number=3270. Accessed 1 Dec 2010

US Secretary of the Interior (2007b) Order 3270. elipsdoigov/ELIPS/0?doc/415/Page1aspx. Accessed 5 Feb 2014

Waddock SA, Bannister D (1991) Correlates of effectiveness and partner satisfactions in social partnerships. J Organ Change Manag 4(2):64–79

Weber EP, Lovrich NP, Gaffney MJ (2007) Assessing collaborative capacity in a multidimensional world. Admin Soc 39(2):194–220

Williams EM, Ellefson PV (1997) Going into partnership to manage a landscape. J For 95(5):29–33

Williams BK, Szaro RC, Shapiro CD (2009) Adaptive Management: The US Department of the Interior Technical Guide Adaptive Management Working Group. US Department of the Interior, Washington, DC

Wondolleck SL, Yaffee SL (2000) Making collaboration work: lessons from innovation in natural resource management.. Island Press, Washington, DC

Zanetell BA, Knuth BA (2002) Knowledge partnerships: rapid rural appraisal's role in catalyzing community-based management in Venezuela. Soc Natur Resour 15:805–825