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FACTORS RELATED TO SUCCESS AND PARTICIPANTS' PSYCHOLOGICAL
OWNERSHIP IN COLLABORATIVE WILDLIFE MANAGEMENT:
A SURVEY OF SAGE-GROUSE LOCAL WORKING GROUPS

by

Lorien R. Belton

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Sociology

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2008

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ABSTRACT

Factors Related to Success and Participants' Psychological Ownership in Collaborative
Wildlife Management: A Survey of Sage-Grouse Local Working Groups

by

Lorien R. Belton, Master of Science

Utah State University, 2008

Major Professor: Dr. Douglas Jackson-Smith
Department: Sociology, Social Work & Anthropology

Declines of sage-grouse (*Centrocercus spp.*) across the western United States have prompted the formation of numerous collaborative stakeholder partnerships, known as local working groups. These voluntary groups create and implement local sage-grouse management plans and projects, often in the hopes that their efforts may help avert a federal Endangered Species designation for the bird. Using a mail survey of participants in 54 local working groups, I examined the importance of psychological ownership in working group dynamics. Psychological ownership is conceptualized as a latent, multidimensional variable consisting of responsibility, control, and caring elements. Multiple regression analysis showed early-stage group success, representative membership structures, older group age, and respondent identity and presence during group formation to be significantly related to feelings of ownership in group work. The results also showed that psychological ownership is a strong predictor of group success at the project implementation stage, when other variables were controlled. (160 pages)

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To my housemates, Lisa and Kirsten, who have tolerated my outrageously unpredictable sleep schedule with remarkable aplomb and astonishing forgiveness, I am eternally grateful. And to my brother, thank you for always being up to talk at 3:30 a.m.

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LIST OF ABBREVIATIONS

BLM	Bureau of Land Management
CRM	Coordinated Resource Management
ESA	Endangered Species Act
GIS	Geographic Information System
HCP	Habitat Conservation Plan(ning)
Locator	Sage-Grouse Local Working Group Locator website
NBII	National Biological Information Infrastructure
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
MOU	Memorandum of Understanding
USDA	United States Department of Agriculture
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAFWA	Western Association of Fish and Wildlife Agencies
WGA	Western Governors' Association

CHAPTER 1

INTRODUCTION

The philosophy of how natural resource management should be conducted has changed dramatically in the past several decades. From the more command-and-control, “technocratic” approach employed through the first two-thirds of the 20th century, natural resource management around the globe has been moving toward more inclusive efforts that better incorporate social, political, and economic values into management decisions. Planning processes are now more likely to incorporate the values, economies, and knowledge of local residents (Wilson 2001). In the United States, notable turning points such as passage of the National Environmental Policy Act (NEPA) in 1969, which legally mandated that planning processes include social concerns in natural resource management planning (Daniels and Cheng 2004; Wondolleck and Yaffee 2000).

However, such public comment periods have often been unable to satisfy many concerned stakeholders, and other more genuinely inclusive strategies have been developed. These partnership-based strategies allow representatives of diverse interest groups to participate in the earlier phases of natural resource management planning processes. In many cases, these stakeholder groups also participate in the implementation of management practices and/or the monitoring of outcomes. This trend can be seen in the proliferation of watershed groups and community forestry around the U.S. and elsewhere (Kenney 2000). Oregon, for example, has gone so far as to institutionalize these collaborative ventures as a primary method of watershed planning (Dakins, Long, and Hart 2005).

Collaborative planning has also gained ground in the wildlife management arena. Groups have formed to address management of game species, nuisance species, or threatened species. Habitat Conservation Planning (HCP) groups, for example, use collaborative process to involve private landowners in multi-species habitat planning (Alagona and Pincetl 2008; Peterson et al. 2004). Recently, the development of a system of partnerships to manage two species of sage-grouse (*Centrocercus spp.*, a sagebrush-obligate bird) across the western United States has transcended the scale of previous collaborative wildlife management efforts. Over 60 “local working groups” across an 11-state region have been convened to develop local sage-grouse management plans (WGA 2004).

Paralleling the increasing trend toward collaboration are attempts to evaluate how these collaborative efforts compare to more traditional management strategies. A few notable successes have been documented in the case study literature (Brick, Snow, and van de Wetering 2001; Wondolleck and Yaffee 2000). Theory and the conventional wisdom on collaborative natural resource management both suggest that collaboration is a good way to incorporate local knowledge and concerns, work across jurisdictions, reduce litigation, get local buy-in, and work past political impasse on issues (Selin 2004; Wondolleck and Yaffee 2000).

Participants from all quadrants, however, are calling for more systematic evaluations of collaborative processes. Politicians eager for proven and viable solutions to natural resource conflicts, agency and nonprofit sponsors, academics, and even critics are interested in knowing if these processes are effective. Because involving multiple stakeholders early on in a natural resource management process can take more time and

resources than other “expert-driven” planning techniques, public land management and wildlife agencies have a vested interest in understanding whether successful natural resource management can consistently be borne of these collaborative efforts.

Critics of the increasing trend toward collaboration, in contrast, issue an implicit call for evaluation with their criticisms of the collaborative ideal. Their concerns stem from several areas: that local interests may be unwilling or unable to manage for a common good beyond their own experience, that collaboration may be a sign of agencies abdicating responsibility (or giving local stakeholders undue influence in managing public resources), and that national interest groups have been or may be unable to effectively participate in these processes (Coggins 2001; McCloskey 1996).

Their fears may well be warranted; Leach (2006), for example, reported that national environmental interests *are* underrepresented in western watershed groups. Additionally, the legality of shared decision-making systems in the context of national policy making is a substantive concern (Coggins 1999; Moote and McClaran 1997). Such findings provide additional impetus to understand how effective collaboration can truly be, or in what circumstances it may not be an effective method for natural resource planning.

Evaluations of collaborative management in the published research literature reveal the task to be as complex as the processes themselves. This complexity grows from at least two sources: first, defining and measuring success, which may have multiple dimensions, is challenging; and second, a wide range of different factors are thought to influence success. In the first category, criteria for ‘success’ commonly fall into three areas: process outcomes, environmental outcomes and social outcomes (Conley and

Moote 2003). Alternatively, success may be measured at various stages of group development. In the second category, researchers have pointed at both internal factors (group leadership, participation, etc.) and external factors (resource investments, political history, setting, etc.) (c.f. Genskow 2001). The complex relationships between these factors, in addition to the sheer diversity and magnitude of potential influences and conditions, complicate evaluation (Koontz and Thomas 2006). As a result, evaluations vary based on the specific combinations of independent and dependent variables that are considered.

One emerging theme in the collaborative management literature reflects the potential importance of local participant ‘ownership’ over the collaborative process. While empirical studies on this issue have been scant, a number of authors have commented that collaborative processes in which participants take ‘ownership’ over the work of the group appear to be more effective than processes where such feelings do not develop (Bryan 2004; Lachapelle and McCool 2005). This assumption has been explored in more depth in the literature on organizational development (Mayhew et al. 2007; Pierce, Kostova, and Dirks 2003).

My research uses a large-scale collaborative wildlife management effort—sage-grouse local working groups—to identify factors related to success in collaborative wildlife management. The study combines results from a mail survey of over 700 participants (from 54 groups) with secondary group-level data obtained from a variety of planning documents and a publicly available website. The sage-grouse local working groups afford an unusual opportunity to overcome several frequent challenges in evaluations of collaborative ventures. First, because all of these groups have the same

basic goal (local sage-grouse conservation), comparisons between groups can be made more readily than comparisons of unrelated collaborative efforts. Secondly, the sheer scale of the effort—including multiple groups that *do* vary on other key characteristics across and within state lines—allows me to examine the effect of these characteristics on a key indicator of group success, specifically success at project implementation.

Variables derived from survey data include participant perceptions of success at several phases of group development, measures of the internal ‘membership diversity’ of each group, and reported levels of psychological ‘ownership’ in the group’s work. Other variables include indicators of external conditions (e.g., land ownership patterns) and internal group characteristics (e.g., membership structure, presence of a neutral facilitator, group age, etc.), most of which are derived from secondary data sources.

The purpose of this research is two-fold. First, I want to explore the character of psychological ‘ownership’ among participants in the local working groups. Second, I seek to examine the potential relationship between the emergence of psychological ownership among participants and the ability of individual groups to successfully implement their projects on the ground.

CHAPTER 2

LITERATURE REVIEW

Collaborative Natural Resource Management

The sage-grouse local working groups examined in this research represent just one example that reflects a global move toward devolution and decentralization in environmental planning (Weber 2008). Over the past several decades, this movement has shifted the focus of natural resource planning from the command-and-control model of management to a collaborative or community-based planning approach (Daniels and Cheng 2004; Knight and Meffe 1997; Weber 2000). Collaborative ventures around the world have involved local communities in managing local forests, wildlife, and watersheds, among other resources (Bouwen and Tailieu 2004; Dewulf, Craps, and Dercon 2004; Gray 2004; Margerum and Whittall 2004; Pagdee, Kim, and Daugherty 2006; Tippet et al. 2005; Weber 2000). While legitimate criticisms and concerns about this trend have been advanced (Coggins 1999, 2001; McCloskey 1996, Moote and McClaran 1997), collaborative ventures are clearly changing the face of environmental and natural resource management.

Ways of Collaborating

When synthesizing the vast literature on collaborative efforts, it is important to differentiate the collaborative approach from other efforts that involve multiple stakeholders in natural resource management. These efforts may take the form of advisory councils, public hearings, negotiated rulemaking, or stakeholder partnerships

(Leach, Pelkey, and Sabatier 2002). Excellent examples of this breadth can be found in the wildlife management literature, which applies the label of “collaboration” to a wide spectrum of efforts. These range from two-day workshops convened in Wyoming to solicit input on grizzly bear management (Burkardt and Ponds 2006) to citizen task forces for local deer harvest regulations (Raik, Decker, and Siemer 2006), multi-species HCP processes occurring at various scales across the U.S., and even “a multi-disciplinary, multinational... informal group of professionals that led the species’ recovery effort” for golden lion tamarins (*Leontopithecus spp.*) in Brazil (Kleiman and Mallinson 1998:30). In contrast, much of the literature on watershed groups seems to have coalesced around a particular type of collaborative effort (stakeholder partnerships; discussed further in the following paragraph) conducted at relatively similar geographic scales (i.e., watersheds). It is this type of effort that is examined in depth in this research.

Even among groups that fall into Leach et al.’s (2002) definition of a stakeholder partnership, further differentiation is useful. Several typologies have been proposed in the literature (Margerum 2002, 2008; Selin and Chavez 1995). Selin and Chavez (1995), for example, differentiated groups based upon differing motivations for involvement (shared vision versus conflict resolution) and expected outcomes (joint agreement versus information sharing). The authors labeled one of the resultant four types (the shared-vision/joint agreement type) as “partnership.” Many watershed groups, as well as the sage-grouse local working groups discussed in this research, fit this model.

Reasons to Collaborate

In the United States, collaborative groups have been formed in response to myriad natural resource management challenges, ranging from integrated watershed management to land-use planning and zoning. Agencies have convened collaborative efforts, hoping to avoid the litigation that so frequently follows federal and state resource management decisions, as have concerned citizens hoping to proactively avoid regulation they fear will reduce local authority (Bentrup 2001; Bidwell and Ryan 2006; Waage 2003; Wondolleck and Yaffee 2000). In theory – and often in practice—these groups provide opportunities for cross-jurisdictional communication and coordination, trust-building, buy-in for decisions, and involvement of private citizens and landowners in resource management decision-making (Lachapelle, McCool, and Patterson 2003; Wondolleck and Yaffee 2000).

Positive descriptions of collaborative efforts abound. For example, in the extensive work by Wondolleck and Yaffee (2000:19), which “seek[s] to provide images of success that others can emulate,” the authors describe the positive impacts of collaborative efforts in forest management, multiple species planning, and threatened ecosystems, and elsewhere. The Applegate Partnership, the Malpai Borderlands Group, and the Quincy Library Group are well known, oft-cited examples of success in forest management planning and ecosystem management (Cash 2001; Marston 2001; Moseley 2001). Even in literature noting significant concerns with some aspects of collaborative outcomes, such as lack of actual policy change, secondary (social) outcomes are highlighted as an important measure of success (Waage 2003).

Evaluating Collaborative Processes

Amidst the chorus of enthusiastic voices supporting collaborative work, there have been frequent calls for evaluation of these groups and their outcomes. Although critics of collaboration may seek evidence to support their concerns (Coggins 1999, 2001; McCloskey 1996), interest in evaluation comes also from within the community of believers, seeking ways to improve processes, laud successes, and garner additional momentum for the collaborative resource management movement (Conley and Moote 2003; Innes and Booher 1999). Generally speaking, evaluation research has focused on whether (and how) collaboration produces improved social and environmental outcomes.

Defining Success

Evaluation is often framed in terms of “success.” Knowing if collaborative processes “succeed” is of interest not only to the participants, but also to funders, supporting agencies, and outside interest groups. Many studies have focused on factors that influence success; fewer have taken pains to critically discuss how they define success (Kenney 2000). In some early studies, for example, oversimplified dichotomous measures of success were used with little discussion (Leach and Pelkey 2001; Williams and Ellefson 1997). Ideally, a careful discussion of how success is measured should be combined with an examination of the factors influencing it (e.g., Leach et al. 2002; Pagdee et al. 2006).

In a perfect world, changes in natural resource conditions could always be used as a key measure for evaluating success in collaborative management. However, the longer time scales and many confounding variables (beyond the influence of any collaborative

venture) that influence environmental conditions make understanding the connections between group activities and environmental change very difficult (Kenney 2000; Koontz and Thomas 2006; Perry and Ommer 2003).

In the absence of good indicators of environmental outcomes, researchers often focus on more easily measured variables. Early multi-group evaluations created very simplified measures (Leach and Pelkey 2001; Williams and Ellefson 1997). The latter authors, for example, defined a successful partnership as “a group able to attract and keep individuals and organizations engaged in partnership activities” (1997: 32). More recent work has focused more explicitly on how success is measured. Nonetheless, many still base formal evaluations on relatively limited criteria; for example, indicators of policy changes (Waage 2003) and participant impressions of group process or social outcomes (Dakins et al. 2005; Moore and Koontz 2003). In some cases, the process itself is critically evaluated for its adherence to ideal standards (e.g., elements of ideal democracy), on the assumption that meeting such standards increases the likelihood of a process leading to the desired outcomes (Leach 2006; Moote and McClaran 1997).

Typologies of Success

Several authors have proposed typologies for examining success. For example, evaluation criteria may relate to either processes or outcomes (Innes and Booher 1999), or be further broken down to reflect specific types of outcomes—socioeconomic or environmental, for example (Conley and Moote 2003). Koontz and Thomas (2006) emphasized that it is critical to differentiate between process *outputs*, such as documents or plans, and tangible *outcomes*, such as environmental results.

Another way to conceptualize success is to break it down into categories that correspond to stages of group development. Past theory and research on collaborative groups suggest that such efforts go through predictable stages (Bentrup 2001; Margerum 1999; Selin and Chavez 1995). Selin and Chavez's (1995) model of collaborative group work, for example, emphasized five stages: antecedent, problem setting, direction setting, structuring, and outcomes. Although primarily conceptualized as sequential, they were presented as adaptive, allowing for feedback between stages. Margerum (1999) reviewed several other stage models, noting that at least three phases commonly appear: planning/problem setting, planning/direction setting, and implementation. Although this conceptualization of success is decidedly oversimplified,¹ considering group work as taking place in stages allows one to examine success in a way that takes many aspects of group process, outputs, and outcomes into account. Past evaluations that measured success at keeping participants involved, achieving process goals, coming to agreement, implementing projects, creating environmental change, etc., also fit well within these models. The research in this thesis measures success in terms of a staged model, focusing primarily on success at the implementation phase. This is discussed in greater detail later in the document.

Measuring Success

Measurements of success are limited by the availability of information about any given group's activities, outputs, and accomplishments. A wide range of research

¹ One primary failing in this kind of model is that the overly linear sequential conceptualization does not account well for any kind of feedback or adaptive management. However, given the previously stated need for researchers to explicitly state how success will be defined, this simplified conceptualization is at least a useful beginning.

methods have been employed, including key informant interviews (Bidwell and Ryan 2006), document reviews (Waage 2003), survey data using participant impressions of group effectiveness (Selin, Schuett, and Carr 2000), and meta-analyses of studies of factors associated with group successes (Leach and Pelkey 2001; Pagdee et al. 2006).

Each technique has strengths and weaknesses. For example, key informants might provide very different information on participant satisfaction than would a random sample of participants. Analysis of official documents might provide clear measures of acreage treated but leave out information on qualitative aspects of the group experience. Meta-studies are faced with the challenge of finding comparable data between diverse cases and may be forced to rely on highly subjective assessments of outcome information available in published studies. Case studies, while perhaps the best source of lessons learned, are somewhat idiosyncratic and can have limited generalizability. Thus, studies that triangulate multiple methods (Waage 2003, for example) would seem to have an increased chance of capturing the complexity of defining success in the collaborative context. As Pagdee et al. (2006:34-5) noted, “success has been defined as multidimensional. A single indication, such as improvement in forest covers... may highlight the success of a certain aspect, but each indication alone cannot determine the sustainability and success of the [collaborative] project.”

Factors Related to Success

In part, the difficulty in understanding ‘success’ in collaborative natural resource management mirrors the complex array of possible variables that may affect the processes and outcomes. For example, in a meta-analysis of 37 case studies, Leach and

Pelkey (2001: 381) found “210 distinct conclusions about what makes watershed partnerships succeed and fail,” in areas such as funding, local leadership, and decision-making systems. Clearly, the complexity in just these few early watershed partnerships points to the challenge in conducting research that seeks to explain variation in group successes. An added measure of complexity is that some factors are pre-determined group attributes, while others may be emergent group qualities. For example, success at creating environmental outcomes may depend not only on whether a group has a facilitator, or adequate funding, but also on whether participants learn to trust one another during the process, or how much time individuals spend on group work.

To create a working typology of the many possible factors, I follow two basic categories developed by Genskow (2001). He explained that factors may be external to the group, such as setting, resource availability, history, and regulatory context; or internal, such as how groups are structured and led, who participates in them, how they function, and the nature of their focus. Here, I consider emergent characteristics, such as the development of commitment to the group’s work, to be a distinct type of internal factor. The majority of factors considered as independent variables in studies of collaborative groups fall into the second category (Clark, Burkardt, and King 2005; Hershendorfer, Fernandez-Gimenez, and Howery 2007; Lachapelle et al. 2003; Leach 2006; Leach et al. 2002). Fewer studies addressed external issues such as property rights structure or physical attributes of the landscape (Pagdee et al. 2006). Recent research has identified numerous factors that may be determinants of group success (see Table 2.1). Factors included in my research are in bold. Factors that seem relatively constant among sage-grouse local working groups, and are thus not included in models, are italicized.

Table 2.1 Factors and Group Characteristics Possibly Related to Success

Internal factors	External factors
<i>Who initiates partnership formation</i>	<i>Nature of the resource setting and related resource issues</i>
<i>Motivation for group formation (local motivation versus decree)</i>	- <i>physical features of the resource</i>
Composition/participation	- <i>threats to the resource</i>
- group size	Demographic and socio-economic setting
- who participates (participant diversity)	- land ownership
- participant level of commitment	- <i>property rights</i>
- participant knowledge of issues	- community features
- membership restrictions, if any	- community interest in collaboration
Trust	- community resources
- in others' motives and honesty	- technology and market influence
- faith in the partnership approach	<i>Situational History and issue salience</i>
Partnership Structure	- <i>low to medium levels of conflict</i>
- degree of formality	Regulatory and programmatic context
- distribution of partnership functions	- state where partnership is located
- organizational principles	Authority
- communication systems	- adequacy of group decision-making authority
Partnership operational process	- Perceived level of influence on resource decision making
- meeting frequency	- formal enforcement mechanisms
- decision-making structure	- appropriate lawfulness of group with respect to existing laws
- neutrality of facilitation	- amount of local decentralization
- fairness of process	
<i>Partnership direction-setting and focus</i>	
- <i>focus of goals/plan</i>	
- <i>statement of purpose</i>	
- <i>shared goals or fears</i>	
- <i>scope of issues addressed</i>	
- geographic scope of efforts	
Leadership	
- who runs meetings/manages details	
- use of volunteers for projects	
- extent to which leadership is local	
Governmental commitment and support	
- degree of interagency cooperation	
- agency staff support/participation	
Interaction with outside groups & public	
- maintaining political/public support	
Funding	
- financial/human resource support	
- budget size	
Use of a plan as a tool for group to create/follow	
Extent to which group does monitoring/evaluation	
Time/Duration (Age of group)	
<i>Possible outcomes (open or limited options)</i>	
Information availability	
- scientific and technical information	
- within-group information sharing	
- training in collaboration	

Sources: Genskow 2001; Lachapelle et al. 2003, Clark, et al. 2005; Leach 2006; Leach and Pelkey 2001; Hershdorfer et al. 2007; Pagdee et al. 2006; Leach et al. 2002; Kleiman and Mallinson 1998.

Table 2.1 lists several emergent group characteristics, such as trust and participant commitment. Emergent characteristics are those that arise through the structures and process of the group, resulting in something that would not have arisen in the absence of the group (Daniels and Walker 2001). I consider one of the key variables in this research, psychological ownership, to be such an emergent group characteristic. By measuring emergent characteristics, their relationship to ‘success’ can be highlighted alongside other more structural factors such as many of those listed in the table above. Simply put, when considering factors that may contribute to ‘success,’ it is important to allow for the possibility that not every one existed prior to the initiation of the group.

Either anecdotally or through more quantitative methods, each factor in Table 2.1 is listed because researchers have demonstrated, or in some cases only theorized, that it relates to group successes. A clear challenge in evaluating collaborative efforts is that all of the myriad factors listed above are unlikely to be addressed in a single project. Most research limits itself to a small subset of these options, often restricting analysis to those factors that lend themselves to straightforward measurement or simple description.

Because my research is part of a larger project assessing needs of the sage-grouse local working groups, the data collection instruments were designed to produce recommendations for state and federal agencies on how they can better support the working groups. Therefore, my analysis focuses largely on potential determinants of success that are: 1) potentially under the control or influence of agencies, at least at the outset during group formation; and 2) possible to measure given the time and budgetary constraints of the project.

Factors used in this study are listed in Table 2.2. Two external factors will be considered: local plan authority (relative to state plan) and land ownership patterns. Although only a few external factors are expressly mentioned here, the nature of the sage-grouse local working group context is such that several key external variables – nature of the resource issue, motivation for participation, and partnership direction setting – are relatively constant across all of the groups and thus do not need to be included in analysis. By contrast, the internal factors (e.g., facilitation, geographic scope, age of group, etc.) vary more widely between the groups. The final three internal factors listed in Table 2.2 reflect the ‘emergent’ qualities of the group’s experiences mentioned above: psychological ownership of the group’s work, levels of personal investments in group projects, and indicators of each groups’ successes at early stages of development.

Studies of how particular factors relate to success have produced inconsistent and at times contradictory results. For example, effective facilitation and other forms of leadership have been reported to have positive relationships with success in some studies (Leach and Pelkey 2001; Pagdee et al. 2006). Others, however, found no clear

Table 2.2 Factors and Group Characteristics Examined in this Research

Internal Factors	External Factors
Membership structure	Land ownership (percentage of private land)
Facilitation	Which plan (state or local) has more authority
Group duration	
Geographic scope	
Diversity of membership	
Psychological ownership in groups’ work	
Investment by working group participants	
Success at early stages of group work	

relationship between facilitation and success (Williams and Ellefson 1997). In Dakins et al.'s (2005) work, members of groups with restricted membership structures reported slightly lower levels of group effectiveness compared to open and representative membership types. Their study, however, did not report significant differences between open and representative membership types. Group duration (i.e., age) does not always show a clear relationship to success. Several studies excluded recently formed groups based on the assumption that at least some time is required before groups will be able to be effective (Bidwell and Ryan 2006; Dakins et al. 2005; Leach et al. 2002). After eliminating these youngest groups, however, Bidwell and Ryan (2006), at least, did not find any association with age and successful plan development within their sample. One possible association between the length of time a group has been in existence and success at group work is time commitment by individuals. The longer a group exists, the greater the total time required of participants becomes. Margerum (2007) notes that greater demands on participants' time, a type of transaction cost, are a challenge (i.e., negatively related) to group work.

Diversity of membership seems to enjoy a less ambiguous positive relationship with success (Bidwell and Ryan 2006; Williams and Ellefson 1997), although contradictory reports of the influence of inclusivity of membership are noted in at least one meta-study of watershed partnerships (Leach and Pelkey 2001). Moore and Koontz (2003) found that groups with varying memberships report different kinds of successes, but did not provide sufficient information to determine relative success at similar goals. Different approaches to measuring membership diversity may also explain the variation in research findings. A positive relationship between success and the matching of

appropriate group boundaries and the geographic scope of the resource problem has also been reported (Leach and Pelkey 2001; Pagdee et al. 2006), although the relationships appear to be complex.

“Early success,” such as successfully forming the group, developing constructive working relationships, and formulating a group vision and/or plan, has not, to my knowledge, been explicitly tested in the literature to determine its relationship to later types of successes, such as success at implementing projects or concrete impacts on environmental conditions. The assumption of a positive relationship between early and later group successes, however, is implicit in the literature on collaborative natural resource management. Even as the skeptical Kenney pointed out, ideas about collaborative group success are often “married to the speculative idea that organizational achievements will lead to on-the-ground success” (2000:12). He identified the need to address this assumption empirically as a key research question for collaborative groups.

Psychological Ownership in the Collaborative Context

One potentially important factor related to collaborative group successes is the emergence of feelings of ownership over the work of the group.² While a few observers have commented about the potentially important role for psychological ownership, empirical research on this subject has been extremely limited in the collaborative literature. My research addresses this gap in the literature by conceptualizing,

² Wondolleck and Yaffee (2000) are the only ones to explicitly include ‘ownership’ as a factor related to group success. Due to the more amorphous nature of their exposition on various factors relating to success, however, their categories are not included in Table 2.1 above.

operationalizing (measuring), and evaluating psychological ownership as a factor potentially related to success in collaborative natural resource management groups.

It is important to review the basic dimensionality of the term ‘ownership’ in order to limit the scope of this discussion. In common parlance, ownership typically refers to legal possession: owning a car, for example. This kind of ownership might be individual (“my car”) or group-level (“my company’s resources”). Similarly, a psychological meaning of the feelings of ownership can refer to individuals (“I feel ownership in my work”) or groups (“our group owns this project”). While the legal sense of ownership has received ample attention in the literature on property rights and institutional arrangements surrounding common pool resources (Burger et al. 2001), in the context of my research, and with respect to the collaborative management of common-pool resources in general, the psychological dimension of ownership is also quite important. In my research, unless specifically stated otherwise, ‘ownership’ refers to individual-level feelings of ownership, also referred to as ‘psychological ownership.’ An extended discussion of the history of the concept of ownership as a psychological state can be found in Pierce, Kostova, and Dirks (2003, 2001).

There appear to be several reasons for the lack of empirical attention paid to psychological ownership by collaborative natural resource management researchers. First, the conceptualization of the term is difficult given the multidimensional nature of its meaning and its inconsistent usage throughout the literature. Secondly, operationalizing and measuring the concept is somewhat more difficult than for many of the other factors discussed above. Third, psychological ownership is unlike many of the factors noted above in that it is not an antecedent factor. That is to say that, unlike

variables like membership structure or budget, which can be externally controlled prior to the group's formation, psychological ownership is more likely to be an emergent property of groups. For example, during group initiation, one cannot assign a certain level of psychological ownership to the group or individuals within it prior to the process beginning. Each of these reasons will be addressed further in the following sections.

Psychological Ownership: Important but Vague

'Ownership' is frequently used to denote a positive quality somehow associated with effective teamwork, but is nearly as frequently left undefined. In the context of collaborative natural resource management, the term generally refers to either 1) a state of being or emotion experienced by individuals in a group, or 2) a quality of a group. In both cases, there is an implicit indication that this ownership is not the legal possessive kind, but something else related to belonging: an increased sense of responsibility or interest in the work of the group, and something which, when it exists, is likely to influence success. However, the term has not been clearly operationalized, and recent debates have highlighted a need for research on the topic (Lachapelle and McCool 2005, 2007; Manning and Ginger 2007).

In the following sections, I explore how the term has been used in the collaborative natural resource management literature, compare this to research from organizational development and social psychology literature on the topic, and propose a conceptualization of the term which will be explored in this research.

Psychological Ownership: Multidimensional and Complex

Like other latent or multi-dimensional concepts, such as “well-being,” the connotation (an intuitive rather than explicit definition) of the word ‘ownership’ seems to suffice to convey meaning: having ‘ownership’ in your work is a good thing—and who can argue? As a result, however, the term is used in a variety of contexts, often without explicit definition. The variety of usage points to the multidimensional nature of the concept. At times, authors will refer to psychological ownership by referencing several related concepts. For example, Bryan (2004:882) explained that

[w]hat I mean by shared ownership in this context is the collective recognition that this natural heritage contains value, that a larger problem or crisis exists, and the acceptance of at least part of the responsibility not only for creating the problem but also for correcting it.

His definition points to the idea that responsibility is one element of psychological ownership, as is the recognition of value. A brief review of the usage of the term reveals that ‘ownership’ is used in the collaborative literature in three main ways: in terms of responsibility, control, and caring.

The Responsibility Element

Perhaps the most frequently mentioned term in relationship to psychological ownership is ‘responsibility.’ Lachapelle and McCool (2005:281), for example, explained psychological ownership as “a conceptual notion that the public has an interest in and a sense of responsibility for stewardship of public resources. Wondolleck and Yaffee (2000:146-147) noted that “people who ‘owned’ the resource... felt compelled to find ways to take care of it” and that “a sense of common ownership helped build a sense of

shared responsibility.” And as Bryan (2004) described, feeling at least partial responsibility for creating or fixing a problem is part of psychological ownership.

The Control Element

Somewhat oblique references to control as a dimension of psychological ownership can also be found in the collaborative literature. For Lachapelle and McCool (2005:283), ownership “implies a shift in power” which can “begin to imbue citizens with a sense of genuine input over process and outcome.” The expanded definition by these authors focused clearly on power and control as key features of ownership. Wondolleck and Yaffee (2000:148) believe that “providing people with the latitude to make creative decisions is critical to fostering ownership.” The term “latitude” here implies a lack of outside control over group decisions. The same authors also noted, however, that “building this sense of ownership is just as important for agency staff as for outside groups” indicating that simply already having *official* responsibility and control over something is not necessarily synonymous with ownership (Wondolleck and Yaffee 2000:184).

The Caring Element

‘Caring’ is a less concrete dimension of psychological ownership, one which takes varied forms. Bryan (2004) discussed the value that individuals recognize in natural resources. His use of the word “value” supports two interpretations: emotional value, (i.e., caring), as well as other kinds, such as potential economic or social values. Pride, a similarly emotional dimension, was referenced by Wondolleck and Yaffee. They noted that “activities built a sense of pride that reinforced [the group participant’s]

feelings of ownership” (Wondolleck and Yaffee 2000:147). Finally, Lachapelle and McCool’s (2005:279) evaluation of past uses of the term explained that ownership “has been defined as responsibility, obligation, and *caring* imbued by individuals in problem situations” (italics mine).

Responsibility, control, caring, value, pride: alone, none of these words define the term “ownership.” However, taken together, they reinforce the idea that psychological ownership is a complex concept whose various dimensions have not been adequately explored in the collaborative literature.

Psychological Ownership Outside Natural Resource Literature

More in-depth research on the concept of psychological ownership can be found far from natural resources, in the organizational development literature. Recent research has focused on conceptualizing psychological ownership and exploring related factors and results in business and management fields (Mayhew et al. 2007; Pierce, Kostova, and Dirks 2001, 2003; Pierce, O’Driscoll, and Coghlin 2004). Most of these studies sought to understand how psychological ownership in organizations relates to work behavior or employee attitudes, like organizational commitment (Pierce et al. 2004; Van Dyne and Pierce 2004; Wagner, Parker, and Christiansen 2003). Because collaborative natural resource management groups are essentially small, if somewhat informal, organizations, the natural resource literature has much to gain from these studies. This literature provides an opportunity to better understand the linkages between psychological ownership and the success of an organization or group.

Variables examined by authors in the organizational development literature closely parallel many dimensions of psychological ownership outlined more vaguely in the collaborative literature. This body of literature provides support for two assumptions of my research: first, that the elements I have explained as dimensions of psychological ownership are, in fact, related to the psychological ownership concept; and second, that psychological ownership is of interest as a potential factor related to group success. Table 2.3 provides a limited overview of this literature, broken down as relevant to those three dimensions.

In the organizational development literature, empirical research has been conducted on variables addressed only anecdotally in the collaborative literature. Control and influence, for example, have been shown to be positively related to psychological ownership (Pierce et al. 2004). Other research has examined aspects of investment and indicators of caring in comparison to psychological ownership.

There is some disagreement, however, about how exactly this suite of variables relates to the psychological ownership concept. Pierce et al. (2003:102), for example, feel that control is a variable *leading* to feelings of psychological ownership, while “the

Table 2.3: Dimensions of Psychological Ownership Explored Empirically, by Study

Ownership Dimension	Related Research
Responsibility	- Pierce, Kostova and Dirks 2003 (responsibility) - Van Dyne and Pierce 2004 (organizational commitment) - Mayhew et al. 2007 (organizational commitment)
Control	- Pierce, O’Driscoll and Coghlin 2004 (influence and control)
Caring	- Van Dyne and Pierce 2004 (organizational citizenship behavior) - O’Driscoll, Pierce, and Coghlin 2006 (“positive extra-role behaviors”) - Mayhew et al. 2007 (job satisfaction)

assumption of responsibility, caring... stewardship, and a willingness to make personal sacrifices and assume risk on behalf of the target” are among the *consequences* of psychological ownership. One author viewed responsibility as synonymous with ownership, but did not explore this assumption empirically (Parker, Wall, and Jackson 1997). Other studies variously examined control as a “mediating” variable between situational factors and ownership (Pierce et al. 2004), or psychological ownership as the mediating variable between work environment and other variables of interest (O’Driscoll et al. 2006). None of this research appears to have proved more than correlation, however, so assumptions of temporal order or causation remain theoretical. What is clear, however, is that while the organizational development literature does show evidence of relationships between psychological ownership and other variables, it has not converged on what exactly constitutes psychological ownership, nor on any models of how it comes to be or what the impacts of psychological ownership are.

In many of these studies, psychological ownership is represented by a summated scale variable. Although many studies explore the relationship between ownership and a wide variety of work-environment and attitudinal variables, none of them, to my knowledge, treats ownership explicitly as a multidimensional latent concept as I propose in this thesis. It has been theorized as a “dual creation—part an objective and part psychological state” (Pierce and Rodgers 2004:588), but that distinction does not include the many other possibly relevant concepts discussed here. In contrast, Mayhew et al. (2007:487) conducted a factor analysis of survey questions to ensure that the ownership and commitment “latent constructs were distinct.” They, like many others, treated ‘ownership’ itself as a distinct concept. Another close approximation is Pierce et al.

(2003), who presented ownership as a feeling that may arise through one of three paths: control, intimate knowing, and investment of self. They did not, however, break down the actual ownership concept into dimensions. The limited empirical work on the topic and lack of consensus in the literature supports my conclusion that psychological ownership as a latent, multidimensional concept merits further exploration.

The literature also provides evidence supporting further research on linkages between psychological ownership and outcomes. There is a belief by some in the natural resource management literature that ownership is linked to success of the collaborative model. As Bryan (2004:894) noted, “shared ownership, and the social contract that accompanies it, appears to provide an important key to averting the inevitable tragedies of the commons we all face.” The organizational development literature provides support for a parallel assumption: that levels of ownership relate positively to group outcomes. Druskat and Pescosolido (2002:287), for example, “assume that teams holding the core shared mental models [which includes ownership]... will engage in teamwork behavior and processes that lead to team effectiveness.” Others have hypothesized, although not always found, a relationship between psychological ownership and employee performance and behavioral outcomes (Mayhew et al. 2007; Van Dyne and Pierce 2004). Studies in other fields, such as education and criminology, support this assumption as well: that a sense of ownership improves chances for positive change (Elizondo-Montemayor et al. 2008; Fejes and Miller 2002). Put simply, although it has not been conclusively shown to be the case, the presence of psychological ownership is often seen as positively linked to the success of group efforts.

Operationalizing Psychological Ownership

The bulk of my discussion on operationalizing ownership (via its subcomponents) will take place in the methodology chapter. However, one key distinction with regard to measurement of the concept is addressed here: the level of measurement.

A recent series of articles in *Society and Natural Resources* highlighted this issue. As noted above, Lachapelle and McCool (2005:279), in an article specifically addressing the lack of clarity surrounding the ownership term, explained that it “has been defined as responsibility, obligation, and caring imbued by *individuals* in problem situations” (italics mine). In “expanding” this definition, however, they presented ownership as more of a group characteristic: “the interaction of interested citizens and agencies” (Lachapelle and McCool 2005:282). They made reference to the “ownership model” of natural resource decision making. They then contrasted such processes with more traditional “rational comprehensive planning” (Lachapelle and McCool 2007). As noted by Manning and Ginger (2007:188), in a response article, Lachapelle and McCool “conflate ownership with collaborative, transactive planning approaches,” leaving behind the assumption that ownership may represent an individual-level psychological state.

It appears that much of the confusion in these initial explorations is the conflict between whether ownership is manifest at the group level as Lachapelle and McCool (2005, 2007) imply, or if it is (either additionally or in contrast) more appropriately observed at the individual participant level. This tension is also addressed in the organizational development literature, where, for example, researchers have examined the relationship of job performance to ownership at both the individual and organizational

level (Druskat and Pescosolido 2002; Pierce and Rodgers 2004). Regardless, ownership felt by individual participants should be considered to be different than ownership as a defining quality of a process. For clarity, it is critical to explicitly address the level at which ownership is examined. The research examined above primarily addresses ownership as an individual characteristic. For the purposes of my research, I also use the term ‘ownership’ to denote an individual-level characteristic. When referred to at the group level, it represents mean participant scores for a given group, not a separate characteristic measured at the group level.

Ownership as Internal and Emergent

Ownership is included above as an internal factor influencing the success of collaborative groups. Unlike many of the other internal factors included in Table 2.1, however, ownership is not an antecedent factor. In the literature, it is implicitly presented as something which precedes success (implementation of projects, for example, or changes in the targeted natural resource of interest), but it does not necessarily precede the group’s existence. So long as it is conceptualized as an individual characteristic, it cannot be decided in advance by an agency convenor, unlike, for example, how members will be recruited. Instead, it emerges during the group’s work. The matter of how and why it does or does not emerge is a topic for additional research, but the relevant point here is that if it exists, it likely emerged once the collaborative process was under way. Therefore, I present ownership as an emergent internal factor. Even Lachapelle and McCool (2005:280) might well agree: they noted that “when both citizens and agencies

are intimately engaged in planning processes, a sense of ownership in the plan is created, leading to greater chances for political support and implementation.”

Ownership is not alone in being emergent and internal; many other variables in Table 2.1 are at least partially emergent as well: level of commitment, level of knowledge, and trust, for example. For each of these variables, its emergent nature indicates that it may change throughout the life of the group. This makes them difficult to measure without longitudinal studies. In part, therefore, the emergent nature of ownership helps explain additionally why it has received only minimal examination in the empirical literature on collaborative natural resource management planning groups.

Investment

The concept of investment also seems inextricably tied to psychological ownership. Investment is not one of the items discussed in the collaborative resource management literature on ownership. I argue that investment is a behavioral indicator of the presence of psychological ownership. Conceptually, it seems reasonable to assume that psychological ownership parallels legal ownership to some degree. Legal ownership frequently requires an investment, whether it be an upfront purchase or a later input of time and money for upkeep, as for a house. Such behaviors (spending time, paying money) may indicate that a person owns his or her home. In keeping with this parallel, investment is examined here using measurable behaviors that indicate the existence of psychological ownership. The frequent mention (in the general collaborative literature) of transaction costs involved with participation in collaborative processes (Imperial 1999;

Margerum 2007; Margerum and Whittall 2004) lends credence to the idea that level of investment by participants (in time, money, or energy) is likely to be relevant.

Organizational research literature also provides support for the idea that personal investment is integrally related to ownership. Pierce and Rodgers (2004:598), for example, made the same argument as I do above, noting that the similarity between legal ownership and psychological ownership suggests a parallel between levels of investment as well, through “tenure, hours worked, and performance.” In other works, some of the same authors discussed investment as an antecedent to ownership, one of three “routes” through which ownership may arise (O’Driscoll et al. 2006; Pierce et al. 2003). Wagner et al. (2003) tested the relationship of psychological ownership and monetary investment in employee 401(k) plans, and found a positive correlation. In this research, I assume that investment is an indicator of the presence of psychological ownership, and test whether investment behaviors are correlated with ownership. I also seek to extend these ideas using empirical data from a collaborative resource management effort.

Collaboration in Wildlife Management

Collaboration is an increasing trend in wildlife management, as in other natural resource management areas. Although it has not received the same level of attention in the sociological literature on collaborative groups, which tends to focus on watershed management or community forestry, there is nonetheless a growing base of literature on how collaboration efforts fit into wildlife management (Wilson 2001, Weber, Lovrich, and Gaffney 2005).

Some of the most salient research in collaborative wildlife management relates to Habitat Conservation Planning (HCP) processes in the United States. HCP groups are often multi-species, multi-stakeholder groups that work to reconcile habitat needs of endangered species with development or private property interests (Beatley 1995; Peterson et al. 2004; Wilson 2001). From a research perspective, however, collaborative wildlife management still appears to be at the descriptive case study phase (Alagona and Pincetl 2008; Mburu and Birner 2007; Peterson et al. 2004), rather than more detailed examination of factors and definitions of success that characterizes the watershed management literature (Clark et al. 2005; Dakins et al. 2005; Leach et al. 2002). Meta-analyses and multi-group studies appear to be in short supply.

Given the abundance of watershed and community forestry studies and the relative paucity of detailed examinations of collaborative wildlife management groups, it is helpful to address a few key elements of wildlife management before making direct comparisons between collaborative wildlife management and the larger literature on collaboration. Several aspects of wildlife management paint a distinctive, if not unique, picture. Property rights structures, levels of uncertainty, and motivations for participant involvement in collaborative processes, regardless of their level of similarity to watersheds or community forestry, are important considerations. Each could affect the choice or weighting of factors, or definitions of success to consider during evaluation.

Property Rights

Wildlife species present a complex situation with regard to the overlap between legal ownership and control. Wildlife species are a public resource, but the habitat they

require may or may not be publicly owned or managed. Management decisions rest with state or federal agencies, while control of habitat generally rests in the hands of a wide variety of public and private actors (Turner and Rylander 1998). The property rights structures of water and wildlife are quite similar; water is also common-pool resource whose management must cross jurisdictions in order to be effective (Wagner et al. 2007). This cross-boundary nature of most wildlife resources points to a need to consider the ability of participants to coordinate well across boundaries as a potential key factor in group success.

Uncertainty and the Nature of the Resource

A second element of collaborative wildlife management that may distinguish it from other types of resource-management collaborations is the nature of the resource itself. Watershed, forest, wildlife, weed, and land-use planning work all fall under the general category of “natural resource management,” but the nature of a resource clearly influences the challenges faced by groups convened to manage it. For example, a bounded viable and immobile resource like a forest will have different management needs (and present different challenges) than does a wildlife population. Forest management, however complex, involves working with a resource whose existence in space is clearly defined. A forest in Wisconsin will never walk away and spend the winter in Colorado. The same cannot be said of wildlife species. The mobility of many wildlife species (and sage-grouse in particular) adds a dimension of uncertainty that could complicate collaborative resource management efforts.

For example, an issue in many sage-grouse local working groups is the fact that local sage-grouse population sizes, densities, locations, and migratory patterns are likely to be only partially known, if at all. To make effective management decisions, group participants do not only have to learn about other stakeholder concerns, interests, and perceptions of threats to the bird, but also learn about (and agree upon) basic population details which in some collaborative settings would be unnecessary—likely a basic map of a forest or watershed already exists. This need for substantial additional learning suggests that the ability and willingness of group members to conduct monitoring or deal with this level of uncertainty can be an important internal, emergent factor which may impact group success. In addition, the time and effort required to gather needed data, which for sage-grouse would take several seasons and notable amounts of coordinated manpower, has the potential to extend the process beyond certain participants' interest or ability to participate. An additional possible source of uncertainty could stem from multiple groups attempting to manage the same population, unbeknownst to one another, which might compromise a given group's potential for success. All this is not to say that watershed or community forestry groups have no similar challenges, but that this challenge is highly likely to be of concern in the sage-grouse management context.

Motivations for Involvement

A third factor of particular significance in wildlife management is the motivations participants have for joining the effort. Clearly, this is a critical factor in any stakeholder situation, but the particular reasons related to wildlife management are important to consider. Motivations that have been shown to be significant factors in other natural

resource collaborations, such as the incentive of potential or continued economic benefit from a resource, or “security of tenure to a resource” do not necessarily apply to wildlife (Pagdee et al. 2006:41). Although some wildlife species (fish species and some profitable game species, for example) do provide significant economic benefit to some stakeholders (Bentrup 2001; Moller et al. 2004; Wagner et al. 2007), this is not always the case. In the case of *rare* species management, fear of negative impacts from potential Endangered Species Act (ESA) listings has motivated participants to join groups (Turner and Rylander 1998). In the sage-grouse context, there are no significant economic benefits to managing the grouse itself, only perceived potential economic losses to agriculturalists if local management control over sage-grouse habitat and livestock grazing range is lost.

Understanding the factors that motivate participants to participate may help define which group goals are appropriate to use as measures of success during evaluation. For example, many collaborative processes have policy change as a goal, so evaluations have focused on whether they have succeeded in that goal (Bentrup 2001). For sage-grouse local working groups, measures of success may be exactly the opposite: a lack of policy change is the desired outcome. Although obvious, it is important to be clear that this definition of success cannot be compared directly with group processes whose purpose is to create or change policy.

The points above are outlined to more fully illuminate some of the potential critical factors in wildlife management. Although this research cannot address many of them, the relevant point is that these issues may require special consideration as researchers undertake evaluation of wildlife management collaborative efforts.

**Multiple-Group Comparisons:
A Research Opportunity**

The past two decades have increased our understanding of the factors that may impact the success of collaborative groups, particularly watershed partnerships. Only in the last few years, however, have many multiple-group comparisons examining the relationship of factors to group success begun to appear in the literature (Bidwell and Ryan 2006; Clark et al. 2005; Dakins et al. 2005; Koontz 2005; Leach 2006; Leach et al. 2002; Pagdee et al. 2006; Williams and Ellefson 1997). Studies of multiple groups provide the important opportunity for comparisons between groups that can control for various confounding factors, such as the policy environment. However, even these studies encountered difficulty controlling for potentially important factors that may vary between groups (Bidwell and Ryan 2006).

An ideal evaluation of multiple collaborative processes might account fully for the wide array of possible influencing factors, carefully define all dimensions of success, track environmental and social variables prior to the groups' existence, provide comparable control situations, and possibly even compare all these results with the impact of other kinds of planning processes—collaborative versus more standard public involvement processes, for example. However, the near impossibility of setting up such an experiment is clearly beyond the scope of most, if not all, research efforts. Understandably, all extant research fails in some regard on at least one of these ideals. However, every study that controls for a few more factors brings the field closer to an understanding of what makes collaborative processes succeed or fail.

My research takes one step in this direction by examining a relatively large set of collaborative groups for which many factors do not differ, or differ much less than among other subsets of collaborative groups that have been conducted in the past (Leach 2006; Leach and Pelkey 2001; Margerum 1999; Pagdee et al. 2006). A unique opportunity has arisen to apply the work on collaboration to an unprecedented large-scale collaborative wildlife effort. Sage-grouse local working groups, described in the following section, afford an extraordinary opportunity to explore these concepts further. These groups are all focused on the same natural resource issue; have access, at least theoretically, to the same body of research and experts (Connelly et al. 2004); and are brought to the table by a remarkably standard shared vision (Stiver et al. 2006). Although some variation exists between groups, similar interest groups gather at each groups' table. All have been convened and managed at least in part by state wildlife agencies, and most came into being under the same general mandate and national policy environment (Stiver et al. 2006). Even the congruence of just these few factors has the potential to greatly improve the predictive power of a model exploring relationships of other factors and success.

The Sage-Grouse Context

Over the last several decades, biologists have grown increasingly concerned about declines in populations of two species of sage-grouse, a bird whose range covers a vast portion of eleven western U.S. states and two Canadian provinces (Stiver et al 2006). This chicken-sized bird inhabits sagebrush habitat on public and private land across its range (see Figure 2.1). The possible ramifications, both biological and social, of these declines has mobilized a conservation planning effort of unprecedented scale and scope.

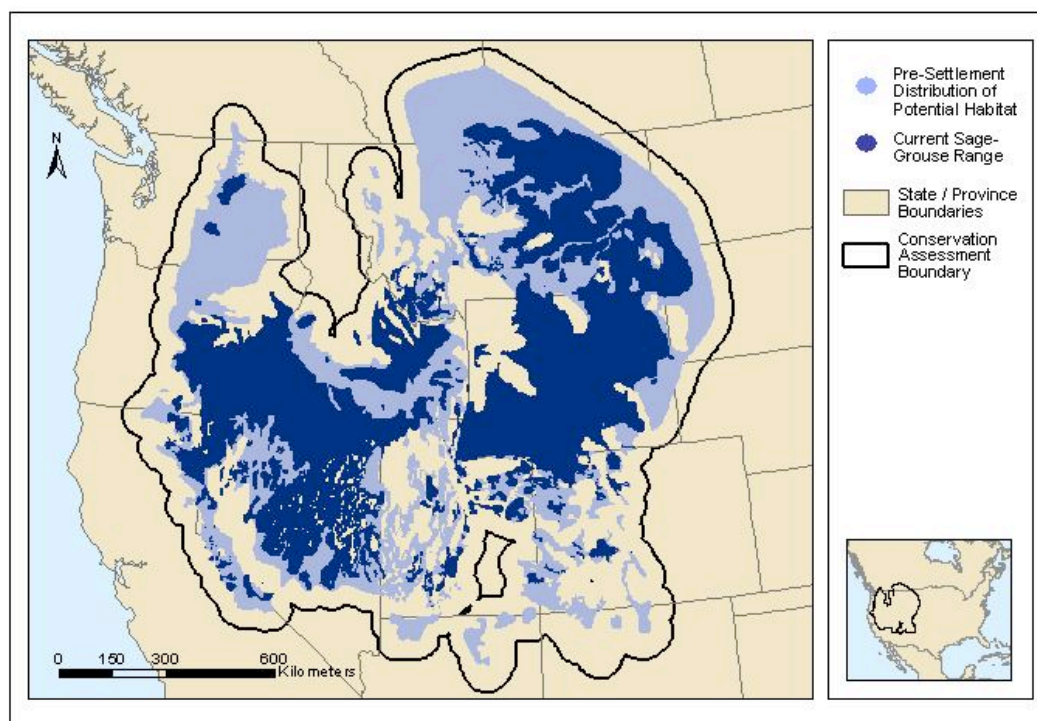


Figure 2.1 Current and Former Sage-Grouse Range (Stiver et al. 2006:I-9)

Background Information

Concern over sage-grouse declines comes from two main camps: those concerned for the species themselves, and those concerned with the social and economic implications of the decline of species in sagebrush habitats around the West. Although many individuals and agencies bridge this divide, it is a useful way to understand motivations for involvement in sage-grouse conservation efforts. Biologists and environmentalists see, in the birds' decline, signals of ecosystem degradation. Many others, including ranchers, industry representatives, and local government officials, see sage-grouse declines as an indirect threat to economic activities based in sagebrush habitat, such as grazing or energy development. Their concern is based on the fear that

sage-grouse declines could result in the birds being listed as threatened or endangered under the federal Endangered Species Act (ESA). Species listed under the ESA fall under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS). There is a common perception among landowners and the general public that this change in management would spell disaster (economic, social, or otherwise) for anyone interested in maintaining local control over land-use decisions (Turner and Rylander 1998). Regardless of the degree of truth in this assumption, the fear exists, and the possibility of listing is real: numerous petitions to list the bird have been put forth by environmental activist groups, and the potential land area that would be impacted is a remarkably large percentage of the western United States.

Another fear, related to the ESA, may be a more unifying force. Most, if not all, parties seek to avoid the kind of divisive situations seen in the past surrounding ESA listings, such as in the case of the northern spotted owl (*Strix occidentalis*) in the Pacific Northwest (Yaffee 1994). The tensions between environmentalists and loggers in that conflict became national news, and a wide array of constituents in the Intermountain West and Great Basin areas where sage-grouse reside would prefer to avoid that kind of situation. The diversity of stakeholders motivated by this fear is reflected in the sources that mention the goal of keeping sage-grouse off the ESA list. While it should be obvious that private landowners who utilize sage-grouse habitat for ranching or other purposes will be concerned by a potential ESA listing, it is also clear that some national environmental organizations (Bleizeffer 2008) and state agency staff (Christiansen 2004:18) are equally keen to avoid such divisive conflict over a bird.

The unique position of state wildlife agencies helps explain their efforts to promote voluntary conservation of sage-grouse habitat. These agencies have a vested interest in maintaining local management authority over wildlife species within the sage-grouse range, in part because multi-species planning could be complicated by federal habitat requirements for sage-grouse. In addition, engaging landowners in species conservation efforts may increase in difficulty if individuals are afraid to allow wildlife inventories on their property or cooperate with agency employees out of fear that such actions would result in increased regulation or restrictions on their land management options (Brook, Zint, and De Young 2003).

The willingness of private actors to participate in sage-grouse conservation is particularly relevant because private landowner management decisions are a potentially crucial factor in sage-grouse survival. As Stiver et al. (2006:I-1) noted in the introduction to the Greater Sage-Grouse Conservation Strategy, although 72 percent of sage-grouse range is located on federal lands, “privately owned lands provide critical seasonal habitats... and their importance to conservation may greatly exceed the percentage of ownership” in a given grouse population’s range.” A critical goal for those responsible for managing sage-grouse conservation range-wide, therefore, is to engage private land managers in pro-active species conservation efforts.

In response to the birds’ population declines and the social concerns delineated above, the Western Association of Fish and Wildlife Agencies (WAFWA), an organization comprised of state wildlife agencies from the western United States and western Canada, took the lead in coordinating sage-grouse conservation efforts. In 1995 and 1999, Memoranda of Understanding (MOUs) were signed between WAFWA

member states to increase range-wide coordination on data collection and conservation planning for sage-grouse. Each MOU also mentioned the need to develop partnerships with other relevant entities. In 2000, a more detailed MOU was developed between WAFWA, the Bureau of Land Management (BLM), the U.S. Forest Service (USFS) and the USFWS. This agreement brought together the dominant land and wildlife management agencies with jurisdiction over sage-grouse. In addition to discussing range-wide conservation planning and coordination efforts, this third MOU more clearly delineated the path to achieve their goals:

The States will convene Working Groups to develop State or Local Conservation Plans. Working Groups will be comprised of representatives of local, state, federal and tribal governments, as appropriate. Participation will be open to all other interested parties. (Stiver et al. 2006:218)

Another objective points to the need “develop partnerships with agencies, organizations, tribes, communities, individuals and private landowners to cooperatively accomplish the preceding objectives” (Stiver et al. 2006:218).

Although some local collaborative groups had already been working together for several years, notably several Colorado groups focused on Gunnison sage-grouse (*Centrocercus minimus*), which were established in mid-1990’s, the MOU increased the focus of state wildlife agencies on sage-grouse planning. Some states chose to develop state-level plans first. Wyoming, for example, convened a statewide multi-stakeholder group whose completed plan recommended the formation of additional local groups whose role would be “to adapt the statewide plan to specific local areas and develop and implement strategies” (WGA 2004a:85). In contrast, the Nevada state plans is based substantially on the local working group plans that were developed first.

Although the MOUs encouraged each state or province to consider the local working group model as a potential management strategy, the idea was developed differently, or not at all, in each area. In some states, groups were mandated by gubernatorial decree, and implemented by state wildlife agencies. In other states, groups formed organically, some coming together exclusively for sage-grouse management, others growing out of other collaborative efforts, such as regional Coordinated Resource Management (CRM) or HCPs. In several instances (North and South Dakota), no local working groups were formed. To date, over 60 groups have formed across the sage-grouse range. Each group is an independent effort designed to develop locally relevant management plans for the bird. The scale of this effort is unprecedented in western wildlife management (see Figure 2.2).

Variation in Group Design

As noted previously, the extraordinary scale and coordination of the sage-grouse local working group effort, coupled with the variation among states and groups, provides fertile ground for examining how the many factors in collaborative natural resource management play out in large-scale wildlife management. The following section outlines some of the diversity among the local working groups, from factors that might influence success to goals and definitions of success.

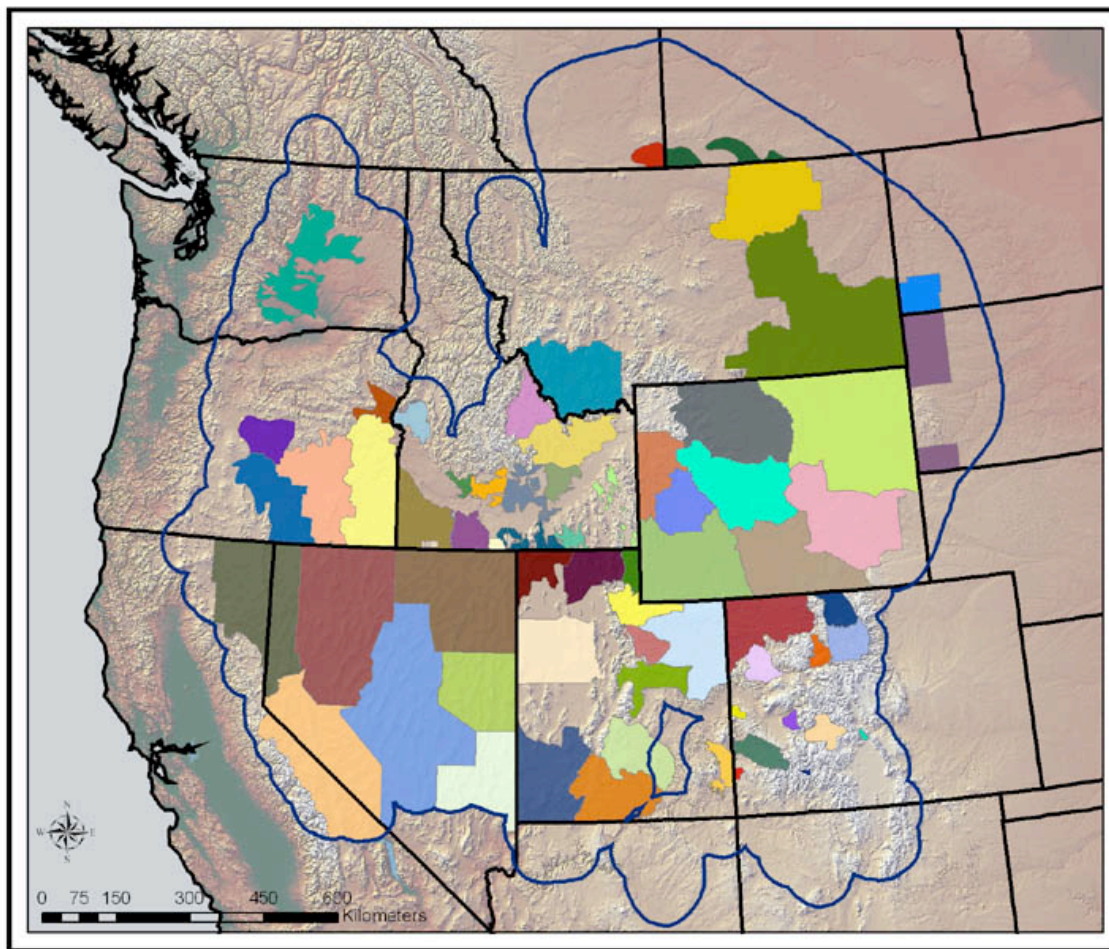


Figure 2.2 Geographic Boundaries of Sage-Grouse Local Working Groups (USGS 2008)

Membership Structure

Nine states chose to adopt the local collaborative model to address the sage-grouse issue.³ These states, however, approached participant selection and group definition in different ways. Some states opted to include primarily state and federal agency participants, at least initially, in their groups, while others endeavored to include a wide variety of interested parties in initial group formation. In Wyoming, for example,

³ Two states (North and South Dakota) and the two Canadian provinces did not develop local working groups. Reasons included small sage-grouse populations, an interest in waiting to see how other states' groups worked, and the different policy environment in Canada surrounding the grouse.

the groups have designated seats for particular interests, typically wildlife agencies, landowners, local government, federal agency, energy industry, and environmental representatives. Group members were individually identified and invited by the state wildlife agency to participate. Although their meetings are open to the public, official membership (and thus decision-making power) is limited to the invitees (approximately 13 per group). Oregon's approach was to begin with a small invited core group, then expand the group slowly as trust was built (C. Hagen, pers. comm.). In contrast, most other states have more inclusive procedures that allow virtually any interested agency staff, ranchers, landowners, interest group representatives, and the public to join local working groups. In all states, the groups' meetings are open to public attendance.

Participant Composition

Although the composition of each group is determined locally, several key types of individuals are usually involved. Participants in sage-grouse management efforts generally include state wildlife agency employees; local or state-level representatives of federal agencies such as the BLM, USFS, and the USDA/NRCS. In most (if not all) groups, there are efforts to involve local landowners and ranchers. In some cases, representatives of the energy industry, environmental groups, and recreation/hunting interests are active members of the working groups.

Group Processes

The local working groups vary considerably in how group processes are handled. Some have paid neutral facilitators, other have designated facilitator/coordinators with agency affiliations, and still others have a group chair but lack formal facilitation.

Similarly, decision-making procedures (consensus versus majority rule, for example) vary between the groups.

Goals and Measures of Success

The primary goal of all the sage-grouse conservation efforts, collaborative or not, is to “maintain and enhance sage-grouse populations” (Stiver 2006:i). In the local working group context, most groups are expected, as a step toward that overarching goal, to produce a local sage-grouse management plan. In many cases, implementation of the local plans is also an explicit goal. In Oregon, however, implementation of the statewide plan drives the local working groups’ agendas, and development of unique individual group plans was not the intent. In addition to addressing sage-grouse management, some groups have inherited (or developed interest in) the goal of collaborating on a wider range of local resource management issues.

Because of the diversity and complexity of local working group goals in each state, evaluation of the success of working groups is equally complicated. Indeed, participants from multiple working groups who attended a February 2005 conference listed ‘understanding how success was to be defined’ as an important need (WGA 2005). Clearly, even the groups themselves find success is challenging to define.

Despite this diversity, it is possible to identify several basic stages of success for sage-grouse working groups: forming a group that involves key actors, learning about local sage-grouse habitat and populations, creating a management plan, and implementing projects designed to help protect or “grow” grouse. The ultimate measure of success – maintaining or increasing sage-grouse population numbers – is more elusive,

in part because baseline data may not be available at the scale the group is working, and in part because it is difficult to confirm causal linkages between population changes and working group actions. In this research, I focus on groups' success at implementing projects, as it provides the best measurable approximation of a group's likely impact on grouse habitat and populations.

Other Differences

Other sources of group-level variation include the geographic scale of the area that the group is responsible for, the percentage of federal and private land included in the management area, the number of years the group has been in existence, and the extent to which local groups are responsible for implementing their own plans. Personal communication with state-level contacts indicated that current levels of effort also vary; some states have recently begun new groups (Idaho); efforts have waned in other states (Nevada) where at least some groups have ceased meeting, and still other states have long-term, ongoing efforts (Utah and Colorado).

The unique circumstance of so many groups with a very similar mandate working on the same resource issue provides an extraordinary opportunity to examine the impact of various key factors on group success. What makes sage-grouse local working group efforts truly unique is the sheer scale of the endeavor, including the huge potential for either success or failure. Additionally, because the sage-grouse local working groups are extremely visible as exemplars of non-regulatory, voluntary approaches to wildlife conservation in the American West, their experiences will be an important proving ground for collaborative management.

To date, only very limited research has been conducted on these local working groups. Information exists primarily in documents issued jointly by the Western Governors' Association (WGA) and the Natural Resources Conservation Service (NRCS). This information is largely descriptive in nature, and focused on the technical work being done by the groups (WGA and NRCS 2004a, b). Only one formal study has been conducted (Schultz et al. 2006). In 2004, these researchers surveyed participants in Nevada groups to gauge involvement levels, inquire about effectiveness of the group, and to assess the effectiveness of the facilitation efforts coordinated by the university cooperative extension service. Most evaluative questions focused on process and learning. In addition, their response rate of 36 percent and initial data on group composition provided a basis for gauging my expectations of research on local working groups. Further information about groups in many states was compiled in the reports from a range-wide local working group conference held in Reno, Nevada, in February of 2005 (WGA 2005). The needs and concerns recorded at that meeting also helped inform my research questions and design.

Research Hypotheses

The focus of this study is to examine the relationships between the factors outlined above and participant impressions of success at various group stages. In particular, special attention will be paid to the psychological ownership factor. The research questions fall into two categories: examination of the multidimensional psychological ownership concept; and comparisons of psychological ownership, investment, and stages of success.

The following hypotheses will be tested:

1A: Psychological ownership is a latent multidimensional concept (individual level)

Psychological ownership is a latent variable comprised of feelings of ownership in group work, personal responsibility for group work, pride in the group, and personal influence over group outputs. The concept is multidimensional in that distinct subcomponents emerge, including: (a) Pride/felt responsibility, and (b) Control/influence.

1B: Psychological ownership is related to internal and external group characteristics (at the individual level)

The relationships between ownership and group characteristics such as size, facilitation, diversity, and duration are difficult to predict. Initial suppositions include: (a) representative membership is expected to relate to higher ownership (since group participants may feel more responsibility), and (b) local plans with more authority are expected to relate to higher ownership (since participants may feel more control).

1C: Psychological ownership in the group's work will be positively related to levels of personal investment in activities related to group work (individual level)

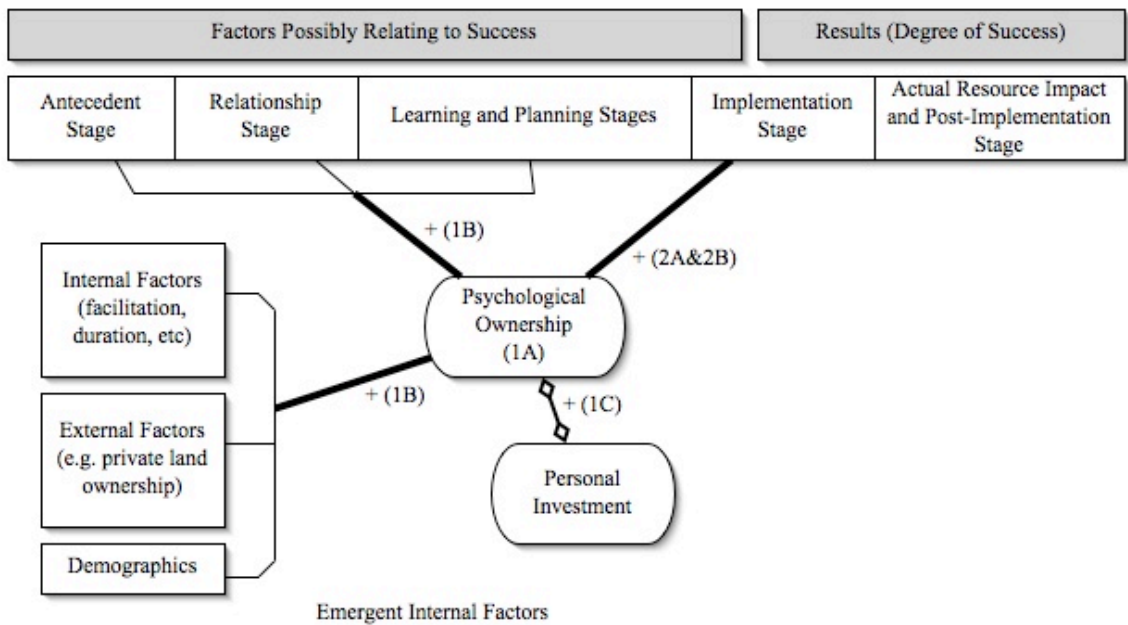
Investment by all participants (measured in hours spent and percentage of meetings attended) will be positively related to psychological ownership. Actual investment (specific to landowners with grouse on their land) will be higher among those who report higher ownership in the group.

2A and 2B: Feelings of psychological ownership will be positively related to group success when controlling for external and internal group characteristics and indicators of early group success (at both the group and individual level)

Individual-level and group-level ownership scores are predicted to be positively related to measures of group-level implementation success.

Figure 2.3 outlines the relationships between the categories of variables examined in this research. Although there may be many other relationships between these variables, only the relationships explored in this research are noted as linkages on this variable map. For example, group attributes might directly affect investment or implementation success, but that discussion is beyond the scope of this research. Possible directional relationships between control and dependent variables are not included in the diagram.

Hypothesis 1A involves only the psychological ownership box. Relationships to be tested in Hypothesis 1B are delineated with dark lines between ownership and factors, as well as ownership and early success stages. 1C will be tested at the individual level, and is represented by the double-headed line between ownership and investment. Hypotheses 2A and 2B examine the relationships between ownership and implementation success, taking into account control variables including investment and early-stage group success.



Line labels represent predicted relationship directions (and hypothesis reference numbers).

Figure 2.3: Predicted Relationships of Dependent and Independent Variables

CHAPTER 3

METHODOLOGY

Research on collaborative groups generally falls into one of three general categories: case studies (Bonnell and Koontz 2007; Genskow 2001; Wondolleck and Yaffee 2000; and a multitude of others), meta-analyses of these case studies (Leach and Pelkey 2001), and comparisons of various collaborative initiatives, especially using survey data from participants in multiple groups (Clark et al. 2005; Dakins et al. 2005; Leach 2006; Selin et al. 2000). This research employed a mixed-methods approach, designed to gather data from several sources. The resulting dataset combines the individual opinions of participants in local working groups with state- and group-level data collected via conversations with key informants in each state as well as a review of published and unpublished documents. Additional group-level data was available on the “Locator” website, discussed below (USGS 2008). The primary unit of analysis in this research is the local working group, although several steps of the analysis are conducted at the individual respondent level. I chose survey methods for three primary reasons: the large number of individuals involved in sage-grouse local working groups (over 2,500), our interest (as part of a larger project) in providing data on all groups, and the knowledge that data would be triangulated with key informant and other secondary data.

Case Selection: Local Working Groups

The project was designed to gather information from participants in all local sage-grouse working groups in the region. After discussion with state-level contacts in all

eleven U.S. states with sage grouse populations, it was determined that only nine states had groups that qualified as “local working groups.” It was also clear that there existed considerable variation in the composition and structure of those groups.

Although the original research proposal called for surveying *all* current local working groups, I determined that several groups were too newly formed (or still in formation) to be able to provide appropriate information. This decision was based primarily on two facts. First, facilitators of those groups indicated an inability to provide accurate or meaningful lists of participants since outreach and invitations were still under way. Secondly, there was some concern that surveying individuals in newly forming groups might interfere with the process of forming the group by asking for opinions on ideas not yet discussed or considered by the group. This decision is supported by other researchers, who have excluded recently formed partnerships from analysis due to the low likelihood of achieving results in under a year (Bidwell and Ryan 2006; Dakins et al. 2005; Leach et al. 2002). Therefore, I sought lists for the 55 groups listed on the United States Geological Survey’s “Local Working Group Locator” website (see Figure 2.2) in the spring of 2006, with the exception of several very recently-formed groups. The Locator site maintains a comprehensive list of sage-grouse local working groups across the range. One group list could not be obtained.

Unsurprisingly, given the variety of approaches to group design across the nine states, the definition of “local working group” lacks clarity. For this study, any defined sage-grouse group that could reasonably be considered to be localized and collaborative qualified for the research. State-level groups tasked only with producing the state plan were not included in this study. The only statewide group included in the survey was in

Washington State. It differs from the two more local groups in that state primarily in terms of implementation: the statewide group is more focused on information exchange and learning, while the local groups are geared toward on-the-ground work (M. Livingston, pers. comm.). However, the statewide group defines itself as a local working group. Similarly, another group, which shares territory in Nevada and California, appears to operate similarly, providing primarily large-scale coordination for smaller population management unit (PMU) plans and subgroups. It too is an official “local working group.” Both these groups remain in the sample for two reasons. First, not enough information was available on the exact structure and function of all the groups to justify excluding two based on limited information about them. Secondly, they remain in the study due to their long-term, inter-agency, sage-grouse-focused collaborative purpose. Both groups were included on the Great Basin Initiative’s “Locator” website, indicating their *self*-definition as a local working group. Although they clearly represent an instance of variation among the many groups, they remain in the sample.

Background Interviews

To familiarize myself with the relevant issues, I contacted state-level sage-grouse or upland game coordinators in each of the eleven states. Through informal and largely unstructured conversations with these individuals, I determined where to obtain lists in each state, and learned about key issues and foci for investigation and comparison which would need to be addressed in the study. These conversations were used to inform survey development and later independent variables, but no official data was collected during this phase, which took place in the fall of 2006.

Mail Survey

The mail survey was implemented over a seven-month period between May and November 2007. A total of 1,554 individuals were contacted in nine states. In order to qualify as a valid survey respondent, an individual needed to have attended at least one local working group meeting. In most cases, the lists I obtained did not indicate level of involvement by individual. Due to our inability to confidently remove from the sample individuals who had never attended a meeting (for example, those on the list for information dissemination purposes only), more individuals received surveys than were in fact valid respondents. All respondents who returned a survey and indicated having attended at least one meeting of a valid working group became part of our dataset. Individuals who appeared to have responded based on a different collaborative effort were removed from the sample. Individuals who responded yet claimed not to have attended any local working group meeting were disqualified for this project. Sampling issues are addressed below.

Survey Instrument

The survey instrument was designed to incorporate all major topics related to the larger project, in addition to specific questions relating to this thesis research. The 10-page survey covered involvement levels and motivations, information needs and formats, funding, impact of potential changes, demographic information, assessments of group challenges and successes, and meeting atmosphere, in addition to questions pertaining to individuals' influence on working group activities, investment levels, perceived responsibility and control in the working group situation, and ownership in the group's

work. Rather than provide a list of all working groups in the front of the survey, a separate survey version for each state listed only groups in that state, with the instruction to list groups in other states that the respondent might have attended (see Appendix A).

Development of Sampling Frame

Lists of current and former local working group participants were requested from state- and local-level key informants. In Wyoming, lists were available via the state wildlife website. In five states (Oregon, Nevada/California, Utah, and Montana), statewide lists were provided by current or former facilitators. Idaho lists were obtained from individual group facilitators, and Colorado lists by the integration of lists supplied by group-level contacts and a former statewide administrator. Nevada and California lists were provided by former university extension facilitation coordinators; this list did not indicate group affiliation in association with individual names. As a result, expected groups were assigned to individuals in these two states based on their zip code. This was a reasonable proxy measure because group boundaries almost exclusively follow county lines in Nevada. For the two groups overlapping with California, I used the approximate latitude of the dividing line between the two groups to assign the zip codes to a group.

Lists were cleaned and compared across all states to reduce the likelihood of duplicate surveys being sent to individuals. Some states, such as Utah, provided lists that contained names of both individuals affiliated local groups and those (such as press contacts) who were on the list for information purposes only. Only individuals with a group association were included in the final sample frame. Additional details of group lists are provided under the potential bias section below.

Sampling

Our original project proposal called for sending the survey instrument to all local working group participants. However, due to a much larger mailing list than expected (over 2400 potential valid respondents rather than the 1200 predicted), I followed the following basic sampling strategy: up to 30 individuals from each group were randomly sampled. If the group list contained fewer than 30 individuals, all participants received the survey. After resampling (explained below), 32 of the 54 groups were fully sampled. Various complexities arose during the sampling process. For example, some individuals were listed as participants in more than one group. Methods used to manage these complexities are in detail in Appendix B.

Several states presented special sampling problems. The Nevada/California lists, as noted previously, did not provide information on which group an individual had attended. After assigning groups based on geographic location via zip codes (which appears, in retrospect, to have resulted in lists at least as accurate as some other states), individuals were sampled as explained previously. However, based on my understanding that agency individuals based in large population centers were likely to attend multiple groups in an official capacity, I assigned individuals with zip codes in three metropolitan areas (Carson City, Reno, and Las Vegas) to a special “metropolitan” group, from which I sampled 30 individuals. This “group” is not included in any analysis because all respondents identified specific groups with which they spent the most time.

Three groups overlapped state boundaries. Two of these cases, both Nevada-California groups, were treated like all other Nevada-only groups. The third case, that of the San Juan/Dove Creek working group in southern Utah and Colorado, was handled

differently. The group is currently facilitated through Utah Extension. Lists for Utah groups were obtained and surveys mailed prior to the acquisition of the Colorado lists. When Colorado lists arrived, they unexpectedly contained individuals who had attended the San Juan group prior to its merger with Dove Creek. The Utah list had 100 names in comparison to 45 from Colorado. A comparison between the two lists indicated that 64 percent of the individuals on the Colorado list for this group were also on the Utah list. Due to the timing of the Utah mailing, the Colorado-sourced group list (which was at least three years out of date) was not used.

Replacing Disqualified Individuals

In addition to the complexities of the basic initial sampling strategy outlined above, individuals who returned surveys or contacted us indicating that they had never attended a group meeting, and people whose contact information was no longer valid, were disqualified from the study. (Further discussion about disqualification rates is provided in the section on response rates below.) Similarly, many surveys were returned as undeliverable due to bad addresses. Where the possibility existed to do so, replacement names were randomly selected from the same group to replace those who were disqualified or who had bad addresses. The system used to select replacement individuals is described in the Appendix B. This process was followed until a cut-off date of October 15, 2007, at which point a final set of surveys were sent to the last group of resampled individuals.

As noted previously, the sampling and replacement procedures resulted in 32 groups being completely saturated. Thirteen groups had a remaining unsampled

population of less than 50 percent of the original sample frame,. In nine of the groups, the unsampled populations comprised over 50 percent of the possible respondents. No more than two groups in any state fell into this final category. The widely varying quality and size of the lists clearly impacted resampling needs.

A Note on Weighting Responses

The final sample provides a random and unbiased set of responses for each local working group. However, since sampling densities and final response rates varied across the groups, I calculated weights that allow adjustments such that each individual survey response reflects its appropriate proportion of the estimated total population of all local working group participants in the nine states. Comparison of key demographic characteristics between the weighted and unweighted data revealed very few differences, and I determined that weighting data was unnecessary for the analyses presented here. Additional details on this exercise, and the explanation for why no weights are used in the final analyses, are provided in Appendix B.

Survey Implementation

Survey implementation followed a modified Dillman approach (Dillman 2000). An advance letter, initial survey, and reminder postcard were followed by the mailing of two additional copies of the survey to non-respondents. Advance letters, initial surveys, and postcards were separated by approximately ten days each. Follow-up surveys were sent between three and four weeks after the most recent mailing. In addition, to provide one last opportunity to increase response rates, those participants whose email addresses had been provided with their mailing addresses were sent a one-time email with a link to

an online version of the survey. The final email contact occurred at least one month after the final mail contact, although for several states (e.g., Montana) the delay was up to three months given the drawn-out nature of the staged survey mailings, explained below.

Due to the difficulty in obtaining some state lists, several “waves” of surveys were sent. Montana, Oregon, Wyoming, and Nevada/California mailings took place in May 2007; Colorado and Utah in June; Idaho in July, and Washington in September.

Online Survey

In Washington State, email addresses were provided for all possible respondents, but mailing addresses were not available. Permission was obtained from the individual who had provided the list to contact individuals electronically, and an online version of the survey was created using the SurveyMonkey.com web-based survey service. The survey contained the same questions and answer formatting (although several questions not relevant to this analysis were unintentionally omitted). Individuals were contacted first with an introductory email explaining the survey, then several days later with a follow-up email containing an individual link to the survey. Follow-up emails to non-respondents were sent after approximately one week had passed with no additional responses from the sampled individuals. This compressed timeframe was deemed reasonable based on my assumption of the shorter life of emails in in-boxes versus physical copies of the survey, the instant delivery of email messages, and the need to work around holiday schedules. Content of the emails paralleled the text of hard-copy letters and surveys; the only changes reflected logistical differences.

Response Tracking and Identity Protection

Each respondent was assigned a code number to protect their identity but allow for response tracking. These numbers were tracked in Microsoft Excel as surveys were received, both for hard-copy and online survey responses. Hard-copy surveys are stored separately from the compiled data files and any record of name-code number associations. For the online surveys, all data is managed through a password protected system. The password is known only to the two primary individuals managing the survey. Although names and emails of these individuals were necessarily connected with the survey data in the online system, names were disaggregated from the data when it was merged with data from the mailed-in surveys. All online data was permanently deleted once the information had been integrated into the full database.

Determining Primary Group Association

For analyses, individuals were considered to be a participant *only* of the group he or she chose as the one in which they had been most involved. In most circumstances, this was straightforward to determine. In several cases, however, individuals chose more than one group as primary. These individuals were removed from group-level analysis. A few others checked multiple groups but did not indicate a primary group. In this case, individuals were included for analysis in the group in which they had originally been sampled. In several cases in Nevada, respondents listed a sub-group (PMU, or Population Management Unit) as their primary group. They were included in analysis in the local working group containing that PMU.

Response Rates

Our overall response rate was 56.8 percent of eligible sampled participants (see Table 3.1). Response rates varied considerably by state and group. State responses ranged from 45.3 percent in Nevada, where several groups are no longer active, to 85.3 percent in Oregon, where small, active, highly coordinated groups were encouraged to fill out the survey by key personnel. Group response rates varied more widely, from 28.6 percent to 100 percent, with a median response rate of 57.6 percent. Disqualifications were particularly high in Utah (31.3 percent), which was unsurprising given the nature of the lists explained previously. Table 3.1 lists response rates and related information by state. Complexities associated with calculating response rates are discussed in Appendix B.

Potential Sources of Bias

In designing the survey, I attempted to avoid many sources of potential bias, although some bias was unavoidable or difficult to disaggregate from other factors. Of primary importance to the larger needs assessment project was the inclusion of participants who no longer attend working group meetings. Therefore, when participant lists were requested, I requested that all past participants in the groups be included, regardless of level of participation. In most cases it appeared that this was achieved: nearly half of survey respondents indicated that they no longer actively attend meetings. It is impossible to confirm, however, if all group lists included all past participants.

In addition, list quality and size varied considerably by state. In some cases it was impossible to disaggregate the effect of recordkeeping systems from actual group dynamics. For example, lists in Utah contained many individuals who had never

Table 3.1 Response Rates by State

	Wyoming	Oregon	Montana	Nevada/ California	Utah	Colorado	Idaho	Washington	Overall
Total sample frame	103	35	230	411	607	644	359	67	2456
Sample size	103	35	105	245	473	372	152	67	1552
Response rate	79.6%	85.3%	61.4%	45.3%	53.1%	50.3%	68.8%	51.8%	56.8%
Number of groups	8	5	3	7	11	11	6	3	54
Highest Group Resp. Rate	92.9%	100.0%	69.0%	90.0%	76.0%	83.3%	90.0%	58.3%	100.0%
Lowest Group Resp Rate	66.7%	60.0%	56.7%	28.6%	32.4%	32.6%	46.4%	45.5%	28.6%
Median Group Resp. Rate ^a	79.2%	91.7%	58.6%	52.4%	55.2%	48.4%	71.7%	50.0%	57.6%
Disqualification rate	0.0%	0.0%	15.2%	20.4%	31.3%	15.9%	7.9%	16.4%	19.1%

^aWyoming, Idaho, and Overall medians represent the mean of two center groups

attended meetings: the centrally-maintained list included individuals on the list for information only, or who had been added to the list in the hopes that they would attend in the future. As a result, Utah had a considerably higher disqualification rate than other states. Another factor which unavoidably biases the lists and, by extension, group response rates, is the variation in membership structure (primarily between states), which caused representative (appointed) groups' lists to not include casual "non-member" attendees who might in other states be considered a participant. These sources of variation between groups are important to be aware of as survey data are examined.

To avoid sampling bias, almost all local working groups were included in the study. The only groups not included were several newly started groups in Idaho that had only met once or twice and were less than a year old. One group, which was removed from the sample after data collection, turned out to be also less than a year old, and had also focused primarily on another species of grouse. Only one list (from a group that would otherwise have been included) was not obtained, due to external factors preventing the contact person from providing it. In total, 54 groups are examined in this study.

All surveys were hand coded by one individual to ensure consistency (reliability), and double-entry methods of data compilation were used to ensure accuracy.

Secondary Data Collection

Secondary data was gathered or triangulated via three sources: sage-grouse planning documents, a website focused on local working groups, and informal background interviews with key informants. Sage-grouse planning documents refer to a suite of government documents related to sage-grouse management. Examples include

formal state sage-grouse plans, synthesis documents on range-wide sage-grouse conservation strategy (Stiver et al. 2006), official memoranda of understanding (see Appendices in Stiver et al. 2006), local working group plans (available online on state wildlife department websites), and a 2004 local working group status report (WGA and NRCS 2004a).

The “Local Sage-Grouse Working Group Locator Site” (“Locator”) website was a significant source of data. This publicly available website is run by the U.S. Geological Survey (USGS) as part of the National Biological Information Infrastructure (NBII) Great Basin Information Project. It is administered partially through a contractor at Utah State University. The site contains specific local-working-group-level data, including links to local and state plans. It was first developed and posted with limited data in the summer of 2006. Several variables noted below, particularly landownership percentages, have been available since 2006. In early 2008, USGS began an effort to update and expand the data available on the site. Due to the clear overlap between their and my data collection interests and timing needs, and a strong interest in not duplicating efforts, I coordinated with the Locator site manager to use a small subset of the secondary data that would eventually be placed on the updated website pages as public data.

Key informant interviews were conducted as background research in the fall of 2006. State coordinators, facilitators, and group-level contacts were called on the phone to discuss the general status of working groups in their area. Data were not gathered via these interviews, as they were intended to familiarize researchers with current sage-grouse efforts in each state and introduce the project. However, information provided by these individuals assisted later in locating, triangulating, and clarifying secondary data.

Conceptualization and Operationalization of Variables

This section provides a detailed overview of the variables used in this research, including rationale, precedent, question design, and scaling (where relevant).

Internal and External Factor Variables

To compare survey data with group-level data, several relevant characteristics of each local working group are examined. I chose these variables using a combination of theory from the collaborative management literature and conversations with key informants (generally state-level wildlife coordinators). These group characteristics are used as both predictor and control variables in this research.

Key variables are membership structure, facilitation, duration (age) of group, diversity of membership, geographic scope, percentage of private land in the working group boundary, and relative authority of state and group plans. Measurement of these variables is explained in the following paragraphs.

Membership Structure

Following Dakins et al. (2005), membership structure is either open (anyone can attend meetings and participate in decision-making) or representative (based on voluntary appointments defined in advance to assure representation of all key stakeholders). These researchers also included a third category of “restricted” groups that does not clearly apply to local working groups. For this research, groups’ membership structures fell into one of two categories, representative or open.

Facilitation

Leach (2006) suggests that impartiality of facilitation is a key element of a genuinely democratic process. He allows survey respondents to code the level of impartiality of the group facilitator on a Likert scale. Because facilitation measures in this study are gathered at the group level, a simple typology is employed: whether facilitation for the group is by a neutral (non-stakeholder affiliated) individual, or not. The latter circumstance might include cases where facilitation is done by a “non-neutral” agency individual or other stakeholder, or where no formal facilitator exists for the group, such as cases where a group chair runs meetings but does not officially facilitate.

Group Duration

Several studies argue that collaborative groups require sufficient time to be successful. For example, Bidwell and Ryan (2006:831), citing Huntington and Sommarstrom (2000), chose to exclude groups younger than 28 months old from their analysis, based on the concern that they “may have had insufficient time to develop plans projects, or other outputs.” My study includes all available local working groups with the exception of those still in formation (less than a year old) following Dakins et al. (2005). Group duration is measured as the number of years between the year of group formation (as reported by key informants) and 2007 (the year I conducted my survey).

Diversity of Membership

Many studies have found that participant composition of collaborative groups relates to group outcomes (Bidwell and Ryan 2006; Moore and Koontz 2003). These studies vary in their operationalization of the concept. Moore and Koontz measure

participant diversity as a categorical variable: agency, citizen, or mixed. Because almost all working groups would fall into the “mixed” category, this typology has limited applicability to this research. Direct counts of types of participants represented (Selin et al. 2000) and breakpoints using such counts to dichotomize groups (Bidwell and Ryan 2006) have also been used. In my research, data on participant diversity is calculated from the survey data itself, using counts by group of the number of different types of individuals represented.⁴ These numbers are then used to calculate the ratio of types of participants to total valid responses in the group. Although this remains open to bias based on respondent sampling and response, it is nonetheless the most accurate available source of information on participation in the local working groups, and parallels and extends other work done as noted above.

Geographic Scope

The total area of land under the management of a given working group is also included here. Calculations of area expressed in square kilometers are available from the Sage Grouse Local Working Group Locator site, and are based on the Geographic Information System (GIS) shape files provided by each state to the Locator site coordinator (USGS 2008).

⁴ All categories in the survey were used in the calculations. However, due to the strong overlap between rancher/farmers and landowners on one hand, and livestock association or soil conservation district (SCD) representatives on the other, individuals who chose both categories were not double counted. Only respondents who chose SCD or livestock association representative exclusively were counted as a separate type of individual. Similarly, overlap between “agency” and “biologist/ecologist” designations was not double counted, and only biologists/ecologists who chose nothing but that category were added as separate types for overall group counts.

Relative Authority of State and Group Plans

Also under consideration is a variable that indicates which (state or local) plan has actual (or greater, if unclear) authority for implementation. This is an indicator of the control relationships between local and state efforts. Based on anecdotal information from interviews with state coordinators, it also may have a strong effect on how much ownership group members have over the plan. This information was collected as part of the Locator (USGS 2008) update efforts, and represents the opinions of official state-level sage-grouse management contacts within the state wildlife agencies.

Land Ownership

Data on acreage of land ownership, by working group, is publicly available on the internet (USGS 2008). Private landowners are key stakeholders in almost every working group (WGA and NRCS 2004a). In addition, vast acreage within the working group boundaries are managed by the BLM. This information may serve, in part, as a proxy measure for authority to implement projects, and provides insight into possible implementation challenges a group may face. For example, BLM projects require public review and input processes not necessary for projects on private land, whereas private landowners have full authority to implement (or not implement) projects on their land. Therefore, the percent of acreage in each group managed by private landowners is included as an independent variable in the analysis. Percent of BLM land, while important, is not included in the models in order to not confound the analysis with overly correlated measures.

With the exception of membership diversity, many state- or group-level independent variables above were obtained through methods unrelated to the survey responses. Table 3.2 presents a breakdown of the data sources used for measuring each factor. The measurement of internal factors based on survey data is discussed in greater detail in the following sections.

Control Variables for Individual Models

In addition to the group characteristics noted above, several individual-level control variables are included in the models. These include basic demographics (respondent age, gender, etc), whether the respondent is an agency employee, whether they still attend meetings, if they were involved when the group was forming, and if they own or operate land with sage-grouse on it. In addition, investment variables, such as how frequently they attend meetings, will also be included in the model to determine their predictive power on psychological ownership and success.

Table 3.2 Factors and Group Characteristics Used in This Research

	Internal factors	External factors
Survey Data	Diversity of membership Ownership in the groups' work Investment Early stage success	
Secondary Data	Membership structure Facilitation Group duration (age) Geographic scope (acres managed by group efforts)	Land ownership Which plan (state or local) has more authority

Ownership-Related Variables

Ownership is examined here as a multidimensional concept, consisting of three elements: responsibility, control, and caring. In addition, one direct question about ownership was asked on the survey. Table 3.3 presents the survey questions used to represent each of the dimensions of ownership.

As noted previously, for the purposes of this research, ownership was considered to be a personal feeling of individual participants, not an independent group-level characteristic or group outcome. All data on ownership were gathered at the individual level, using the mail survey. When scores of ownership by group are presented, they represent an aggregate of individual impressions. For example, the wording of the statement “I feel personal ownership in the work of this group” indicates the individual nature of the concept and its measurement. In addition, because this study uses individual level data, questions on responsibility and control actually measure *perceived* control and *perceived* responsibility, not an objective measure of actual control or responsibility by

Table 3.3 Survey Statements/Questions Relating to Psychological Ownership

Category	Question or Statement
Personal Responsibility	- It is my responsibility to participate in this group
Personal Control (Influence)	How much influence have <u>you</u> personally had over the following working group activities? - Setting sage-grouse conservation goals - Writing the group’s sage-grouse management plan - Deciding how the group allocates its resources - Deciding what projects the group implements
Caring	- I am proud of the group’s accomplishments
Ownership	- I feel personal ownership in the work of this group

group. This is important to understand when looking at aggregated group-level measures. It is also critical to the analysis of ownership as an individual characteristic, because it allows us to examine how the various dimensions interrelate at the individual level.

The questions included here are not only *measured* at the individual level (using survey responses); they also address individual-level *concepts*. For example, although questions about both group responsibility for sage-grouse and individual responsibility for sage-grouse problems are included in the survey, this research focuses only on those questions which relate to personal control, caring, and responsibility.

Only one question was asked directly regarding ‘ownership’ itself. It provides an opportunity to better understand how individuals’ responses to this question relate to the dimensions of ownership conceptualized in this research. The wording of this item, which refers to ownership specifically in the work of the local working group, helps restrict the scope of the variable, following the discussion by Lachapelle and McCool (2005), who noted that ownership in process, outcomes, and distribution may be distinct. The use of a single item to measure ‘ownership’ as a direct concept is in contrast with research from the organizational development literature, which uses pre-tested, multi-item scales (Pierce et al. 2004). Given the funding priorities and broad scope of the survey project, however, limited space was available for ownership variables. The use of the single-item measure was deemed sufficient here given the broader conceptualization of the dimensions of ownership and the exploratory nature of the research.

Of these three elements (responsibility, control, and caring), two are examined in detail in this research. The third dimension, caring, is represented only by the ‘pride’ variable. A more robust exploration of the ‘caring’ dimension is not included here.

Although I considered using “concern about sage-grouse” as a measure of caring, the low correlations between that and all other variables in the ownership dimension set suggested that concern may be a separate topic that requires additional conceptualization and measurement before being considered for inclusion in the multi-dimensional ownership scale.

Seven variables representing individual impressions about the work of the group were included in an omnibus scale, and factor analyses were run to test the multi-dimensionality of the ownership concept. Table 3.4 shows the distributions of responses to each of the variables used in the success scaling exercise.

Table 3.4 Distribution* of Responses to Ownership Dimension Questions

Statement	Percentages			Scores on a 5-point scale Mean
	Disagree/ Strongly Disagree	Neutral	Agree/ Strongly Agree	
	No influence	Some influence	Lots of Influence	
	1 or 2	3	4 or 5	
Ownership (<i>direct measure</i>)	12.92	37.1	50.0	3.5
Proud of group's accomplishments	8.9	30.4	8.9	3.7
Responsibility to participate	9.3	24.7	66.0	3.8
Influence: setting goals	31.5	52.1	16.5	2.7
Influence: writing plan	37.7	45.9	16.4	2.6
Influence: allocating resources	44.2	43.9	11.8	2.4
Influence: choosing projects	36.6	48.8	14.6	2.6

* unweighted

The un-rotated factor analysis showed that all elements load strongly onto the first factor. The rotated factor analysis resulted in two factors: one containing all the influence (control) variables; the other including the direct ownership measure, the pride measure, and the measure of personal responsibility. Table 3.5 shows the factor loadings (all greater than 0.5) on these two component factors, which strongly supports the use of this 7-item multi-dimensional scale to measure the ownership construct.

Finally, reliability analyses for the omnibus scale and its two subscales are presented in Table 3.6. The Cronbach's alphas for each scale (0.865 for the omnibus scale, for example) are remarkably high given the relatively small number of questions included in each scale. These results are roughly consistent with other studies using ownership scales. One study examining psychological ownership and related factors reported coefficient alphas on 7-item scales, of 0.84 for job-based ownership and 0.95 for

Table 3.5 Results of Factor Analysis of Ownership Dimensions

Variables	Unrotated First Factor loadings	Rotated Factor Loadings (absolute value greater than 0.25)	
		Control (influence)	Pride and Felt Responsibility
Ownership (<i>direct measure</i>)	0.731	0.348	0.784
Proud of group's accomplishments	0.558		0.812
Responsibility to participate	0.569		0.666
Influence: setting goals	0.819	0.857	0.258
Influence: writing plan	0.804	0.822	
Influence: allocating resources	0.844	0.847	
Influence: choosing projects	0.826	0.810	
Initial (unrotated) Eigenvalues	3.881		
Initial variance explained (%)	55.4		
Rotated Eigenvalues		2.972	1.952
Rotated Variance Explained (%)		42.5	27.9

Extraction method" Principal Component Analysis; Rotation Method was Varimax with Kasier Normalization- rotation converged in 3 iterations

organization-based ownership within the workplace (Mayhew et al. 2007). Another reported alphas of 0.72 and 0.83 for 4-item scales on ownership beliefs and behaviors, respectively (Wagner et al. 2003). This congruence lends credibility to the reliability of my scale in relationship to previous research.

Overall, the factor and reliability analyses support the use of a single ownership scale. Analyses at the individual level will compare individual's scores on this ownership scale to measures of individual investment and individual-level perceptions of group implementation success, as discussed below. The omnibus scale will be used to create group means for each working group, which will be compared to group-level implementation success measures in the final analysis.

Table 3.6 Additive Scale Reliability Analysis for Psychological Ownership

Variables	Omnibus psychological ownership scale	Pride and Felt Responsibility	Control (influence)
Ownership (<i>direct measure</i>)	+	+	
Proud of group's accomplishments	+	+	
Responsibility to participate	+	+	
Influence: setting goals	+		+
Influence: writing plan	+		+
Influence: allocating resources	+		+
Influence: choosing projects	+		+
		<i>Reliability Statistics</i>	
alpha	0.865	0.698	0.894
std item alpha	0.861	0.698	0.894
mean item-total correlation	0.636	0.518	0.766
mean inter-item correlation	0.469	0.435	0.678
		<i>Descriptive Statistics</i>	
Number of items	7	3	4
Mean	21.27	10.94	10.18
Std. dev.	6.32	2.32	4.76
Minimum	7	4	3
Maximum	35	20	15
# Missing Cases (listwise deletion)	72 (10.0%)	62 (8.6%)	51 (7.1%)

Investment Measures

Investment was measured using three types of variables. First, two questions ranking frequency of meeting attendance (one for current, one for former attendees) were combined into one variable, then the four categories were reverse coded so that larger values represented greater commitment. The numbers of hours that respondents reported spending monthly on working group activities was also included. Last, a suite of four questions directly addressing kinds of personal investments made by those who own or manage land *with sage-grouse on it* was combined into a summated scale. A dummy variable represents whether someone does in fact own or work land with sage-grouse on it. The text of the questions is included in Table 3.7.

Success Variables

To explore the dimensionality of local working group success, I conducted a factor analysis using various questions from the mail survey. The survey included nine questions about success at specific group functions, such as how successful plan

Table 3.7 Personal Investment Survey Questions

Respondent Type	Question Text
All respondents	How consistently do you [did you] attend the meetings? How many hours per month do you [did you] spend on working-group related activities?
Respondents who own or manage land with sage-grouse on it	To what degree have you made new personal investments in response to sage-grouse concerns: -- New cash investments in fences, seed, machinery, etc. to improve sage-grouse habitat -- New time and labor investments to improve habitat -- Sacrificed income opportunities to maintain sage-grouse -- Time or travel to discuss sage-grouse issues with others (who are not part of the same working group)

development or project implementation had been, as well as several variables that examine other dimensions of success, such as respondents' predictions about their group's ability to "make a difference for sage grouse." I operationalized success by creating summated scale variables corresponding to several stages of group development.

As described previously, several authors present models of group stages. Selin and Chavez (1995), for example, delineated five stages: antecedent, problem setting, direction setting, structuring, and outcomes. Their descriptions of what occurs at each phase, however, are vague and at times overlapping. Therefore, I used a loose interpretation of their work to create more a clearly defined model to test using the data available in this research. To clarify the stages in my mind, stages were refined and renamed, as shown in Table 3.8.

My purpose in focusing on stages of success was to determine how to measure independently two key accomplishments: early-stage success and implementation stage success. Early-stage successes, as noted previously, are presumed to be important precursors to later stages of success, such as implementation. Because implementation success is the step most likely to produce tangible changes in sage-grouse habitat and populations, I use it as the dependent variable in two of the analyses presented below. The scaling exercise that follows was conducted in order to confirm that measurements of success based on the stages of group development from Table 3.8 were a reasonable representation of these two concepts, early-stage and implementation-stage success.

Scales were used for several reasons. Creating scales allowed me to reduce the somewhat large number of potential success variables into more manageable categories. In addition, scales provide measures of success with increased variability, which is

Table 3.8 Stages of Group Development

Selin & Chavez Stages	Stages Revised and Renamed: Sage-Grouse Local Working Groups
1. Antecedents	1. <i>Not addressed in the survey</i>
2. Problem setting	2. Relationships and Membership decisions: whose voices get heard
3. Direction setting	3. Learning
4. Structuring	4. Planning (of content, not process)
5. Outcomes	5A. Implementation (post-plan outputs, like projects) 5B. Actual Resource Impact (outcomes)
6. <i>Not addressed</i>	6. Post-implementation (adaptive management, etc.)

particularly helpful in seeing differences among the 54 groups under examination; variation which would be otherwise very difficult to assess given the three-category response categories used in the survey instrument.

Reliability and factor analyses were run on all success variables to determine whether they broke down according to the staged model above. Table 3.9 shows the distributions of responses to each of the variables used in the scaling exercise. In order to create scalable items, all variables were recoded. All variables in the specific “success” section of the survey were originally coded from 1 to 3, one being “very successful” and 3 being “not successful” variables.

The four remaining variables, including the measure of whether all key parties were represented and the three questions related to predictions of future impact, were originally coded on a five-point scale from 1=strongly agree to 5=strongly disagree. In order to create comparable scales, the three-point variables were extended to a five-point scale (i.e., they were recoded such that 1 stayed as 1, 2 became 3, and 3 became 5.) Responses that were placed between provided boxes (such as 1.5 for a check mark

between the first and second box), which existed for almost every success variable, were placed in the 2nd and 4th positions on the five-point scale, as appropriate. Incidentally, this points to a need for a greater possible point spread on future surveys about success. Second, all variables were reverse coded so that larger numbers represented more positive values. Summated scales were then created based on the groupings of variables determined according to the factor analysis described below. In addition to variables that address stages 2 through 5 of the model, I also included a group of variables focused on respondents' predictions of future success in sage-grouse conservation.

Table 3.9 Distribution* of Responses to Group Success Evaluation Questions

Statement	Percentages			Scores on a 5-point scale Mean
	Disagree/ Strongly Disagree	Neutral	Agree/ Strongly Agree	
	Not Successful 1 or 2	Somewhat Successful 3	Very successful 4 or 5	
Inclusiveness and Social Relationships				
All the important interests are represented (REPRESENTATION)	25.3	19.5	55.1	3.3
Getting all key parties at the table (KEY PARTIES)	16.1	60.4	23.5	3.2
Improving landowner/agency relationships (RELATIONSHIPS)	22.2	58.3	19.5	3.0
Learning				
Learning about sage-grouse needs (LEARNING)	4.8	56.4	38.8	3.7
Monitoring local sage-grouse populations (MONITORING)	15.1	58.6	26.3	3.2
Planning				
Developing a management plan (PLAN)	10.2	55.0	34.7	3.5
Implementing				
Implementing projects on the ground (IMPLEMENTING)	29.1	54.3	16.7	2.8
Accessing funding to support the group's work (FUNDING)	28.7	56.1	15.2	2.7
Impression of Potential Future Impact				
This group is likely to make a difference for sage-grouse (DIFFERENCE)	13.8	18.0	68.2	3.7
This group would adapt well to a new threat to sage-grouse (ADAPT)	16.2	25.7	58.1	3.5
Working groups can effectively manage sage-grouse (EFFECTIVENESS)	41.1	30.3	53.2	2.8

* unweighted

Initial factor analyses supported the staged model relatively well, but were complicated by the tendency of the “plan development” variable to load on many factors rather than on just one. Given the relatively high correlations between plan development and other success measures, this was not surprising. Because the plan development variable is the only measure of its corresponding stage (planning), and therefore theoretically belonged on a separate factor, it was removed from the factor analysis. The analysis with the remaining variables resulted in a very clean depiction of the stages, as predicted by the model. This factor analysis with four factors is shown in Table 3.10.

Using the results of the factor analysis, the four component scales shown in Table 3.10 and one single variable (planning) were developed to represent success at five group stages: relationships/representation, learning, planning, implementing, and predictions of

Table 3.10 Results of Factor Analysis of Success Variables

Variables	Unrotated First Factor Loadings	Rotated Factor Loadings (absolute value greater than 0.25)			
		Inclusiveness and Social Relationships	Learning	Implementing	Impression of Potential Future Impact
REPRESENTATION	0.57	0.812			
KEY PARTIES	0.679	0.803			
RELATIONSHIPS	0.655	0.566			0.269
LEARNING	0.593	0.267	0.816		
MONITORING	0.553		0.682	0.303	
IMPLEMENTING	0.68			0.774	0.253
FUNDING	0.561			0.889	
DIFFERENCE	0.755				0.804
ADAPT	0.739	0.291			0.774
EFFECTIVENESS	0.604				0.753
Initial (unrotated) Eigenvalues	4.132				
Initial variance explained (%)	41.3				
Rotated Eigenvalues		1.897	1.419	1.599	2.091
Rotated Variance Explained (%)		18.969	14.187	15.992	20.908
Extraction method" Principal Component Analysis					
Rotation Method: Varimax with Kaiser Normalization- rotation converged in 5 iterations					

longer-term success. The text of questions included in each scale, and the resultant Cronbach's alphas, are presented in Table 3.11.

The data I collected on success relied on participant evaluations of group accomplishments at various categories and stages of group work. Selin et al. (2000) provides a precedent for this method of measurement. Although subjective assessments of success are potentially problematic for measuring outcomes, it is useful data in this study to understand how participation perceptions of success correspond to their perceptions of other items. Future studies could address the linkages between actual outcomes and participant impressions of effectiveness.

Table 3.11 Additive Scale Reliability Analysis for Success Variables

Variables	Omnibus success scale	Inclusiveness and Social Relationships	Learning	Implementing	Impression of Potential Future Impact
All the important interests are represented	+	+			
Getting all key parties at the table	+	+			
Improving landowner/agency relationships	+	+			
Learning about sage-grouse needs	+		+		
Monitoring local sage-grouse populations	+		+		
Developing a management plan	+				
Implementing projects on the ground	+			+	
Accessing funding to support the group's work	+			+	
This group is likely to make a difference for sage-grouse	+				+
This group would adapt well to a new threat to sage-grouse	+				+
Working groups can effectively manage sage-grouse	+				+
		<i>Reliability Statistics</i>			
alpha	0.848	0.708	0.535	0.737	0.767
std item alpha	0.851	0.711	0.537	0.737	0.774
mean item-total correlation	0.535	0.533	0.367	0.584	0.606
mean inter-item correlation	0.342	0.451	0.367	0.584	0.532
		<i>Descriptive Statistics</i>			
Number of items	11	3	2	2	3
Mean	35.73	9.49	6.91	5.53	9.96
Std. dev.	8.19	2.85	1.98	2.34	2.56
Minimum	12	3	2	2	3
Maximum	55	15	10	10	15
# Missing Cases (listwise deletion)	181 (25.2%)	104 (14.5%)	103 (14.4%)	128 (17.9%)	51 (7.1%)

Use of the Scaled Success Variables in Analysis

“Early stage success” was hypothesized to contribute to the emergence of psychological ownership, as well as to later-stage implementation success. As a result, it was necessary to differentiate between success at earlier and later stages for the regression analyses. The scaling exercise just described provided a relatively straightforward method for doing so. First, the three first stages identified in the scales above were combined to create a single summated variable which represents the three early stages of relationship building, learning/monitoring, and planning. Although no proof is offered for the sequential relationship which underlies the assumption that “early” stages exist prior to “later” stages, that assumption was required to move forward with analysis. The implementation component of the scales above (representing stage 5 in the stage typology above) was used separately as the dependent variable for group success in Hypotheses 2A and 2B.

The final category of success that emerged from the factor analysis—impressions of potential impact—was excluded from the analysis plans based on findings from previous studies which revealed notable differences between participants’ responses when they were asked about group success at specific tasks or accomplishments, and when they were asked about more general predictions of group effectiveness. The responses not linked to specific achievements were considerably more positive than participant evaluations of actual achievements, suggesting that predictions of future success might be unrealistically optimistic if compared to actually achieved goals (Selin et al. 2000). Because my goal was to use the available measure of success that most

closely approximated actual conservation effectiveness, only the implementation success scale variable seemed appropriate for use as a dependent variable in this research.

Analysis Plan by Hypothesis

1A: Psychological ownership is a latent multidimensional concept (individual level)

As noted above, the factor analysis of survey items confirms that psychological ownership can be measured as an additive scale combining several indicators of ownership. In the analyses that follow, I will use this scale as a central analytical variable in both individual-level and group-level models.

1B: Psychological ownership is related to internal and external group characteristics (individual level)

I will use a multivariate regression model to examine the ability of a suite of internal and external group characteristics to predict levels of psychological ownership among individual survey respondents. Variables representing key demographic characteristics of respondents also will be included as controls. This allows for an examination of whether group and individual characteristics influence individual feelings of ownership over the group's work. Because early group successes are also thought to contribute to psychological ownership, I include measures of these in the models. This approach tests the idea that individual feelings of ownership are emergent attributes of the group process.

1C: Psychological ownership in the group's work will be positively related to levels of personal investment in activities related to group work (individual level)

The relationship between individual scores on the ownership scale and measures of personal investment in the working group effort will be compared using bivariate correlations. For the subset of respondents who own or operate land with sage-grouse on it, an indicator of actual investments on sage grouse habitat is also included.

2: Feelings of psychological ownership will be positively related to group 'implementation' success (group and individual level)

This hypothesis contains two models that seek to explain variation in each group's ability to implement projects on the ground, measured at both the individual respondent and aggregated group-level. In the first set of models (2A), individual-level perceptions of group success at the implementation stage will be regressed on individual psychological ownership scores, controlling for group-level characteristics, early group success, demographic characteristics of respondents, and indicators of their levels of involvement in the group process. In the second set of models (2B), implementation success scores will be aggregated at the group level and regressed on group-level estimates of overall psychological ownership, controlling for other group characteristics.

CHAPTER 4

RESULTS

Respondent Profiles

In general, most respondents fell into one of two categories: rancher/landowners and agency representatives. Representatives of other groups, such as environmental groups, hunting interests, energy and power companies, and tribal interests, are present in the respondent pool, but in considerably lower proportions than agency and landowner categories. Table 4.1 presents a descriptive profile of survey respondents. The first two columns reflect, respectively, the percentage of respondents who had stopped attending working group meetings prior to the survey, and those who are still attending. The third column shows the combined total.

Men comprise a considerably larger portion of respondents than women, which was not unexpected given the sample frame, which was also substantially male-dominated. Several groups, in fact, had no female names on the list. Most group participants are between 45 and 64 years old and have a bachelors or graduate degree.

Approximately half the respondents no longer attend local working group meetings. Agency employees are to be more likely to be still attending meetings than rancher/landowners. Older and less well-educated individuals appear more likely to have stopped attending. Of the individuals still attending, 63 percent are paid to attend, most of whom are likely to be either agency personnel or paid facilitators. Respondent profiles, along several dimensions, are very similar to those noted in the local working

Table 4.1 Respondent Descriptive Statistics (N=687)

	No longer attending	Still Attending Percent	Full population
Identity			
Rancher-Landowner	39.2	29.5	33.9
Agency Individuals	42.2	51.9	47.5
Local Gov't or Soil Cons. Dist.	4.0	2.7	3.2
Environmental Interests	2.0	3.7	2.9
Other	12.6	12.2	12.4
	100.0	100.0	100.0
Gender			
Male	82.8	80.6	81.6
Female	17.2	19.4	18.4
	100.0	100.0	100.0
Age of Respondent			
< 35	9.5	11.0	10.3
35 to 45	13.9	20.1	17.4
45 to 54	27.4	33.4	30.7
55 to 64	32.1	24.3	27.7
64 and over	17.2	11.2	13.9
	100.1	100.0	100.0
Education			
High school or less	6.8	3.2	4.8
Some college, assoc., or tech degree	20.6	14.5	17.3
Bachelor's degree	41.9	47.3	44.9
Graduate degree	30.7	35.0	33.1
	100.0	100.0	100.0
Individual characteristics (%)			
Participation since group began	41.1	48.7	45.1
Still attends meetings ^a	na	na	54.8
Paid to attend ^b	na	63.3	na
Owns land with sage-grouse	28.3	27.5	27.8
Frequency of meeting attendance^c			
All or Almost all (90% +)	39.0	62.0	51.7
Most (50-89%)	17.4	27.0	22.7
Some (25-49%)	16.1	7.4	11.2
Few (<25%)	27.5	3.6	14.4
	100.0	100.0	100.0

^a When weighted, this percentage changes to 47.3

^b Only asked of current attendees

^c When weighted, more respondents fall into lower attendance categories.

group survey conducted in Nevada in 2004 (Schultz et al. 2006), giving me increased confidence that the survey reached a representative sample of working group participants.

As discussed previously, comparisons of the descriptive characteristics of respondents calculated using unweighted and weighted data suggest that the unweighted data are a reasonably representative sample of the total population of group participants.

Research Findings

This research focused on two key concepts: psychological ownership and success of sage-grouse local working groups. First, in Hypothesis 1A, I examined whether the concept of psychological ownership can be measured as a latent and multidimensional variable using my survey data. This hypothesis was tested in the methods section. In the analyses presented below, I explore whether group-level and individual-level characteristics prove to have positive relationships with this measure of psychological ownership and with indicators of working group success. Table 4.2 provides a descriptive overview of the variables used in the regression and correlation analyses represented by Hypotheses 1B, 1C, 2A, and 2B. The independent variables include measures of internal and external group-level characteristics, indicators of group success, and controls for demographic characteristics of respondents. For each hypothesis, I begin by explaining which variables are included in the model and why, and then present the results of the model. The two columns in Table 4.2 reflect the two levels at which data were included in models. Means of group level data differ slightly between group and individual level data based on the varying number of respondents in each group.

Table 4.2: Descriptive Statistics^a for all Model Variables

	Individual Level	Group Level	
	<i>Percent or Mean</i>		
Group level variables (N=54 for group-level only)			
<i>Internal Factors</i>			
Geographic scope (mean log of sq. km)	9.14	9.17	
Diversity (mean of calculated ratio)	0.65	0.69	
Group duration (mean age in years)	5.84	5.52	
Current presence of neutral facilitator ^b	46.00	41.00	
Membership type: open ^b	82.00	74.00	
<i>External Factors</i>			
Private landownership (mean %)	33.61	33.06	
Plan order: local plan first ^b	37.00	35.00	
Authority: local has more authority ^b	75.00	69.00	
Individual-level Variables (N=563)			
<i>Demographic Variables (N=647)</i>			
Identity (dummy for agency employees)	46.87	na	
Have land with sage-grouse on it (%)	28.00	na	
Gender of respondent (% female)	18.00	na	
Age of respondent	see Table 4.1	na	
<i>Individual levels of involvement (N=638)</i>			
There at the start of the group	45.14	na	
<i>Investment Variables (N=626)</i>			
Hours Spent (per month)	9.88	9.86	
Frequency of attendance ^c	3.11	3.21	
Aggregated scales^d			
	Description	Mean	Std Dev
Ownership omnibus scale	range: 7-35	21.31	6.33
Early Success Stages	range: 6-30	19.70	2.41
Success Implementation Scale	range: 2-10	5.57	2.34
Landowner Investments Scale ^e	range: 4-16	8.55	3.29

^a unweighted^b % of groups with this characteristic^c 1=few to 4=almost all^d individual-level scale means = group-level values^e 1=no investment to 4=major investment; individual level only

Psychological Ownership: Hypothesis 1A

The results of Hypothesis 1A, the psychological ownership scaling exercise, were presented in the methods section. The hypothesis is supported by the results of scaling and factor analysis. The omnibus scale Cronbach's alpha of 0.865 supports the presence of a single multidimensional latent variable. To simplify the presentation of results, none of the component parts are used separately in the models presented below; all references to psychological ownership refer to the full scale.

As shown in Table 4.2, the psychological ownership scale ranges from a potential minimum value of 7 to a maximum of 35. The individual-level mean of 21.31 rests just at the center point (median) of the scale. Group-level values represent the mean score for all individuals in a given group. These group-level means range from 16.1 to 29.7, in a normal distribution seated below the median of the scale. The majority of standard deviations for group means fall between 4 and 7. In two states, Wyoming and Oregon, all groups have higher-than-average ownership mean values. The remaining states (Colorado, Idaho, Montana, Nevada-California, Utah, and Washington) have groups with values both above and below the mean value. Values of specific groups are not reported to maintain confidentiality.

Predicting Psychological Ownership: Hypothesis 1B

As noted in the research analysis plan above, I examined the relationships between a variety of group characteristics and the emergence of higher levels of individual ownership in the working group's efforts. During the background interview phase of this research project, several factors were identified that may relate to increased

feelings of ownership. One of these factors relates theoretically to the ‘control’ subcomponent of the ownership scale: whether the local working group’s plan has more or less authority than the state-level plan. Similarly, groups with appointed memberships (rather than open membership) were hypothesized to give participants a greater sense of responsibility, which would theoretically relate to increased feelings of ownership as measured by the scale developed above.

The regression analysis for Hypothesis 1B includes internal and external group characteristics, individual socio-demographic control variables, a measure of individual involvement, and measures of early group success to determine which have significant relationships with psychological ownership.

As I began the analysis, it began apparent that a number of key indicator variables had relatively high bivariate correlations with one another. Table 4.3 shows several of these variables. To avoid the hazards of multicollinearity, I examined the collinearity diagnostics available in SPSS. None of the variables had VIF values greater than 2.7, indicating that all variables could remain in the model.

Table 4.3 Bivariate Correlation Coefficients Between Selected Model Variables (N=687)

	<i>Individual-level correlations</i>					
	1	2	3	4	5	6
(1) State and local plan order	1.000					
(2) Group age	0.654	1.000				
(3) Membership type	0.353	0.441	1.000			
(4) Diversity	-0.088	-0.245	-0.525	1.000		
(5) Current neutral facilitator	-0.200	-0.037	0.276	-0.165	1.000	
(6) Plan with authority	0.091	0.271	0.078	-0.026	0.534	1.000

Correlations in bold are significant at the .001 level (2-tailed).

Table 4.4 Regression of Psychological Ownership on Individual and Group Characteristics

	<i>Standardized Regression Coefficients</i>				
	Model A	Model B	Model C	Model D	
Internal and External Group level					
Membership type: open	-0.359 ***				
Neutral facilitator present	-0.107 *				
Group age (duration)	0.121 *				
Log (ln) of area covered	0.019				
Private Land ownership	-0.057				
Authority: local plan has more	0.096 ^a				
Diversity ratio	0.026				
Demographic Variables					
Identity (agency dummy)		0.099 *			
Age		-0.088 *			
Gender		0.068			
Owns sage-grouse land		0.049			
Levels of Involvement					
There at the start			0.214 ***		
Early Success Stages					
Combined early success scale				0.271 ***	
	Adjusted R ²	0.143	0.020	0.044	0.072
	F	15.74 ***	4.108 **	27.55 ***	48.51 ***
	df	617	602	575	617

^a p<0.1; *p < .05; **p < .01; ***p<.001

To explore the effects of each separate block of variables on levels of psychological ownership, I began by estimating a series of smaller regression models. Table 4.4 shows how each block of variables relates to variation in the psychological ownership scale.

The first block of variables reflects the associations between group characteristics and individual psychological ownership. In this block, membership type, facilitation, and group age were all significantly related to the psychological ownership scale, at least at the $p < .05$ level. Plan with authority is minimally significant at the $p < .1$ level. In general, individuals in groups with open membership and neutral facilitators reported

lower levels of psychological ownership, indicating that individuals in groups with other types of leadership, or with representative membership structures, might be more likely to exhibit higher psychological ownership. Individuals from the oldest groups, and from groups whose local plans had purportedly greater authority than the state plan, were likely to feel more ownership over the group's work. Of these four variables, membership type was the strongest predictor (the standardized regression coefficient is more than three times that of the next largest coefficient in this block), with the highest significance ($p < .001$). Overall, group characteristics were the strongest predictors of any of the four tested blocks of independent variables (with an adjusted R^2 of 0.143).

The second block measured socio-demographic characteristics of respondents. The results suggest that agency representatives tended to report higher levels of ownership, while older respondents were slightly less likely to feel ownership. There was no systematic impact of gender or owning sage-grouse-inhabited land.

One key individual-level characteristic that proved to be strongly related to ownership was if the individual was involved with the group from the beginning. Participants who reported taking part in group formation, or being involved from the start, demonstrated higher felt ownership than participants who joined the group later.

The final block shows psychological ownership regressed on a scaled measure of early group success. The high standardized regression coefficient (0.271) associated with the early success scale, which measures group-level success at relationships, learning/monitoring, and plan development, suggests that success during early phases of group development is positively related to the emergence of feelings of psychological ownership.

These blocks of independent variables were then combined in three successive regression models (see Table 4.5) to observe the net effects of simultaneously including sets of key and control variables. The first model (Model 1) reproduces Model A above, including only indicators for internal and group characteristics. Model 1 explains roughly 16 percent of variance in reported ownership scale scores. It should be noted that the number of cases in Models 1-3 are slightly smaller than those reported in Table 4.4, due to the requirement for listwise deletion of cases for missing any of the full model's variables. This is likely the reason for the slight differences in the overall explained significance and individual parameter coefficients between Model A and the models in Table 4.5 despite the inclusion of the identical suite of independent variables. When individual demographic variables are added to the model (Model 2 below), all of the group characteristic effects remain, but there is additional significance from including participant age and the dummy variable for agency employee. This model also includes indicators for the presence of the respondent at the start of their working group's work. The model explains slightly (4 percent) more of the overall variance in ownership scale scores. The full model (Model 3) includes a combined group-level indicator for early group success. This new variable is significant in Model 3, and the explained variance increases to just over 21 percent.

Overall, group membership type appears to be one of the strongest predictors of psychological ownership in the model. Participants in groups with representative membership (coded 0) are significantly more likely to feel ownership in the group's work than respondents from open membership groups (coded 1). This supports the hypothesis that membership type may be a key factor in predicting psychological ownership.

Table 4.5 Regression of Psychological Ownership on Individual and Group Characteristics: Hierarchical Combined Model

	<i>Standardized (and Unstandardized) Regression Coefficients</i>		
	Model 1	Model 2	Model 3
Internal and External Group level			
Membership type: open	-0.377 (-6.13) ***	-0.335 (-5.45) ***	-0.264 (-4.28) ***
Neutral facilitator present	-0.095 (-1.22) ^a	-0.079 (-1.01)	-0.078 (-0.99)
Group age (duration)	0.136 (0.25) *	0.147 (0.27) **	0.111 (0.20) *
Log (ln) of area covered	0.055 (0.28)	0.065 (0.27)	0.064 (0.33)
Private Land ownership	-0.068 (-2.35)	-0.044 (-1.51)	-0.033 (-1.54)
Authority: local plan has more	0.134 (2.12) **	0.128 (2.02) **	0.084 (1.32) ^a
Diversity ratio	0.009 (0.37)	0.025 (1.00)	0.046 (1.82)
Demographic Variables			
Identity (agency dummy)		0.101 (1.29) *	0.099 (1.26) *
Age		-0.086 (-0.47) *	-0.080 (-0.43) ^a
Gender		0.050 (0.84)	0.039 (0.66)
Owns sage-grouse land		0.055 (0.80)	0.046 (0.67)
Levels of Involvement			
There at the start		0.176 (-2.26) ***	0.182 (2.34) ***
Early Success Stages			
Combined early success scale			0.142 (0.38) **
Adjusted R ²	0.155	0.197	0.211
F	15.65 ***	12.42 ***	12.46 ***
df	558	558	558

^a p<0.1; *p < .05; **p < .01; ***p<.001

Participants who were involved at the beginning of the working group's formation also report more positive levels of psychological ownership. Although our initial hypothesis did not anticipate this, it is reasonable that individuals involved in the formation of the group early on would feel more personal caring and responsibility, or feel like they have had more influence over the group's work. Group-level success in the early stages of group formation is positively related to increased psychological ownership by individuals in those groups, supporting the assumptions in the literature.

Participants from groups that have been in existence longer are more likely to express feeling of ownership toward their group's work. In contrast, older *individual*

respondents appear to have slightly less psychological ownership in the groups. Finally, agency individuals continue to report more ownership in the group's work, net of the effects of the other variables in the model. Although the reason for this observed phenomenon is not obvious, higher levels of official control/influence by agency individuals over sage-grouse management may be part of the explanation. Similarly, greater early involvement by agency individuals (since state wildlife officials were in many cases responsible for setting up local working groups) may play a part in this result.

The variables for presence of neutral facilitators and local plan authority, which were significant at the block level, lost considerable statistical significance in the last combined model, though the sign and size of the estimated coefficients are relatively unchanged. One item of note is that the sign on facilitation is negative, indicating that neutral facilitation may be associated with decreased psychological ownership by group participants (when the impacts of other variables are controlled).

Investment and Psychological Ownership: Hypothesis 1C

Because of the close theoretical links between psychological ownership and behaviors that demonstrate ownership (like making personal investments of time and money), I examined the bivariate correlations between the psychological ownership scale and various measures of personal investment among the survey respondents. The results show positive and statistically significant relationships. Table 4.6 lists these correlations. The strongest association, with frequency of meeting attendance, is notable at 0.558. Other correlations, while statistically significant, show somewhat weaker associations, though they are all positive and in the expected direction. The omnibus scale of

Table 4.6 Bivariate Correlation Coefficients Between Investment Variables and Psychological Ownership

	Psychological Ownership Scale
All respondents (N=615)	
Frequency of meeting attendance	0.558**
Hours Spent	0.196**
Respondents who own or manage land with sage-grouse on it (N=155)	
Omnibus investment scale (components below)	0.301**
New cash investments	0.219**
New time and labor investments	0.214**
Sacrificed income opportunities	0.161*
Time or travel to discuss sage-grouse	0.257**

* $p < .05$, ** $p < .01$

investments made by landowners with sage-grouse on it (a summated version of the four dimensions of investment also noted in Table 4.6) has a slightly stronger association with ownership than the individual components. This points to the idea that landowners who invest in multiple ways may have greater feelings of ownership than those who do not.

These measures of personal investment were not included in the preceding regression analysis predicting ownership, in part because the positive relationship between investment and psychological ownership seems likely to be bi-directional. Theoretically, investment could be either a result or a cause of increased psychological ownership, which suggests that more complex statistical analytical procedures may be required to examine this relationship. In this research, investment is conceptualized as a behavioral indicator of psychological ownership without assumptions of causal order.

Investment measures, however, remain a theoretically relevant potential predictor of group implementation success. According to the staged success models discussed in previous sections, implementation success (which is the dependent variable in the following two regression analyses: Hypotheses 2A and 2B) is assumed to occur following

the other stages, and, by extension, after the emergence of both psychological ownership and increased levels of personal investment have occurred. Although the models presented in this research are not sufficient to demonstrate causality, this line of reasoning supports the inclusion of investment variables as predictors of implementation success.

Success: Descriptive Findings

The focus of the remaining analyses is to explain variation in local working group success at implementing projects. The survey instrument gathered information about how respondents felt their group had done at each of the various stages of group development, including relationship-building, learning, monitoring, planning, and implementing projects. Because the survey did not include any direct measures of biological outcome indicators (like changes in sage-grouse habitat or populations), the best approximation of the tangible impact the group has had is their reported success at implementing projects to benefit sage-grouse. The two component indicators of implementation success used here are implementing projects and finding funding to implement those projects.

In the following pages, I explore predictors of group success at two levels. First, individual-level scores on the implementation success scale are used as the dependent variable in a regression equation with a variety of independent variables. Then, a similar analysis is conducted at the group level, using group means on the implementation success scale as the dependent variable values.

Predicting Implementation Success at the Individual Level: Hypothesis 2A

I used regression analysis to examine the relationships between individual scores on the implementation success scale (the dependent variable) and a number of theoretically relevant individual and group characteristics (the independent variables). In addition to the inclusion of all the same group characteristics and sociodemographic control variables used in the ownership regression models above, this model included indicators for individual-level investments in working group activities and the measures of psychological ownership described above. My analytical strategy followed the same pattern, with initial runs of block-level models, followed by successive hierarchical regression models to analyze the combined impacts of the independent variables explaining variation in implementation success.

To begin the analysis, I examined how each of six separate blocks of independent variables relate to individual reports of group implementation success. Table 4.7 shows the results of these separate block regressions. Initially, the model including working group characteristics explained 13 percent of variation in perceived group implementation success. Four variables -- representative group membership structure, presence of a neutral facilitator, longer group duration (age), and local plan authority -- are all positively related to increased levels of implementation success. Geographic area and percentage of private land in the working groups' area do not appear to have significant relationships with implementation success. Surprisingly, diversity of group membership also appears to have no significant relationship.

Table 4.7 Regression of Individual-Level Implementation Success on Individual and Group Characteristics

	<i>Standardized Regression Coefficients</i>					
	Model A	Model B	Model C	Model D	Model E	Model F
Internal and External Group level						
Membership type: open	-0.347 ***					
Neutral facilitator present	0.141 **					
Group age (duration)	0.198 ***					
Log (ln) of area covered	0.072					
Private Land ownership	0.001					
Authority: local plan has more	0.177 **					
Diversity ratio	-0.048					
Demographic Variables						
Identity (agency dummy)		-0.015				
Age		-0.003				
Gender		0.060				
Owns sage-grouse land		0.025				
There at the start		-0.024				
Investment Variables						
Hours Spent (per month)			0.070			
Frequency of attendance			0.092 *			
Landowner Investments Scale				0.088		
Early Success Stages						
Combined early success scale					0.381 ***	
Ownership omnibus scale						0.373 ***
Adjusted R ²	0.132	-0.005	0.011	0.000	0.143	0.137
F	13.21 ***	0.52	4.04 *	1.049	94.13 ***	87.19 ***
df	560	511	528	135	557	542

^a p<0.1; *p < .05; **p < .01; ***p<.001

None of the sociodemographic control variables appear to have any relationship with success. They remain in the final model as controls, since the individual-level data used in this analysis makes them theoretically relevant. It should be noted that “there at the start,” the dummy variable indicating whether a participant was involved during or very close to working group formation, is included in this block.

The next two blocks of independent variables measure individual behaviors that demonstrate personal investment in the working group efforts. Estimates of hours spent

on working group tasks and frequency of meeting attendance are available for the majority of respondents. Frequency of attendance appears to have a moderately significant positive relationship with perceptions of the group's success at implementing projects. The possibility that more frequent attendees are more familiar with, or less disillusioned with, the group could be equally valid explanations for this observed positive relationship.

The second investment block examines the relationship between respondents who own or manage (private) land with sage-grouse on it, and reports by those individuals of group success on the implementation scale. This variable is only available on the subset of respondents who report owning or managing land with sage-grouse habitat on it. Interestingly, there is no significant relationship between investments of time or money on private lands and perceptions of group implementation success.

Based on these results, two of the three investment variables were dropped from the full models to be discussed next. This decision is based on the insignificant (zero-value) model fit for the landowner investment block, the insignificant results at the block level for both this variable and the "hours spent" variable, and the notable reduction in useable cases caused by inclusion of either variable. Only frequency of attendance is retained in the final model set.

Early group success (measured as group means of the individual scale scores that combine the first three stages: relationships, learning/monitoring, and planning) is a significant predictor of implementation success, absent any additional control variables. This supports the assumption, on which this analysis is partially based, that success at early and later stages of group work are positively related.

Psychological ownership at the individual level relates positively and strongly (at a $p < .001$ significance level) to individual reports of group implementation success. This is a first indicator that higher ownership may be a strong predictor, as suggested in the literature, of increased group success.

The final model is presented in three stages, shown on Table 4.8. Model 1 shows that the combination of the first two blocks produces strongly significant and expected results. Membership type (representative), is the strongest predictor. The inclusion of socio-demographic control variables has no impact on variation in perceived group success. Neutral facilitation, group age, and having a local plan with authority are also all significant predictors of success, each with relative similar predictive power (their standardized regression coefficients all fall in the range between 0.18 to 0.22). The coefficient for group age suggests that older, more established groups are more likely to generate implementation successes. Net of these other effects, groups with slightly larger management areas appear to report more implementation success, although this is somewhat counterintuitive. Frequency of attendance, the only remaining investment variable, is included in the block of individual control variables, and shows no effect.

Model 2 adds the individual-level scores on the “early success” scale to the model, which prove to be highly significant. Inclusion of this variable improves the model fit from 14.5 percent to 18.9 percent. (as shown by the adjusted R-squared for each model), while only minimally affecting significance levels for other key variables.

In the full model (Model 3), psychological ownership is added as a final independent variable. This new variable is highly significant and exerts stronger influence on variation in perceived group success than the other variables in the model.

Table 4.8 Regression of Individual-Level Implementation Success on Individual and Group Characteristics: Hierarchical Combined Model

	<i>Standardized (and Unstandardized) Regression Coefficients</i>					
	Model 1		Model 2		Model 3	
Internal and External Group level						
Membership type: open	-0.415	(-2.39) ***	-0.292	(-1.70) ***	-0.226	(-1.29) **
Neutral facilitator present	0.205	(0.96) **	0.205	(0.96) ***	0.208	(0.97) ***
Group age (duration)	0.222	(0.15) ***	0.153	(0.10) *	0.117	(0.08) *
Log (ln) of area covered	0.115	(0.21) *	0.104	(0.19) ^a	0.068	(0.13)
Private Land ownership	0.008	(0.11)	0.022	(0.27)	0.031	(0.39)
Authority: local plan has more	0.188	(1.10) **	0.109	(0.64) *	0.084	(0.49)
Diversity ratio	-0.078	(-1.34)	-0.041	(-0.59)	-0.043	(-0.63)
Demographic Variables						
Identity (agency dummy)	0.000	(-0.00)	-0.003	(-0.01)	-0.011	(-0.05)
Age	-0.022	(-0.04)	-0.010	(-0.02)	0.011	(0.02)
Gender	0.019	(0.12)	0.001	(0.01)	0.002	(0.01)
Owns sage-grouse land	0.049	(0.26)	0.028	(0.15)	0.023	(0.12)
There at the start	-0.066	(-0.31)	-0.050	(-0.23)	-0.072	(-0.34) ^a
Frequency of attendance	0.055	(0.13)	0.043	(0.10)	-0.111	(-0.26) *
Early Success Stages						
Combined early success scale			0.247	(0.24) ***	0.208	(0.20) ***
Ownership omnibus scale						
					0.355	(0.13) ***
	Adjusted R ²	0.145		0.189		0.270
	F	7.39 ***		9.15 ***		13.1 ***
	df	491		491		491

^a p<0.1; *p < .05; **p < .01; ***p<.001

Its inclusion also increases the predictive power of the model from 18 percent to 27 percent of variance explained, without dramatically impacting the explanatory power of the key significant variables already mentioned: membership type, facilitation, group age, and early success stages. As the unstandardized regression coefficient shows, a score increase of one point on the ownership scale (which has a 28-point range) relates to an increase of 0.35 in the score a individual might have on the group-implementation success scale (which has an 8-point range). This suggests that the psychological ownership construct, as developed and measured in this research, adds considerable additional explanatory power.

A second minor effect of adding a measure of psychological ownership to the final regression model is that the coefficients of several less-powerful predictor variables change levels of significance or direction. The coefficient for frequency of attendance, for example, becomes significant but also unexpectedly *negatively* related to individual reports of group implementation success, in contrast to its earlier positive value in the block-level regressions. This indicates that, net the effects of other variables in the model, more meeting attendance actually has a negative relationship with perceptions about the group's success in implementing projects. One possible explanation may be that, once ownership is controlled for, frequent meeting attendees have greater familiarity with the groups' work and thus be more aware of group failures and possible barriers to group implementation success. Having been involved with the working group from the start seems to show a similar, though less powerful ($p < 0.1$), negative result. With the inclusion of psychological ownership, area covered and the plan authority variable lose significance. The magnitude of the effects of membership type and group age also diminish, although they remain significant. The overall analysis strongly supports hypothesis 2A, which states that psychological ownership and group implementation success will be positively related, controlling for other theoretically relevant group and individual characteristics.

Predicting Implementation Success at the Group Level: Hypothesis 2B

The final hypothesis to be tested in this research is essentially the same as Hypothesis 2A, only using group level data. Individual responses from each group were aggregated to obtain an estimate of how well each of the groups achieved implementation

success. As shown in Table 4.2, the range of possible values on the group-level implementation scale is 2 to 10. The highest group mean was 8.0, and the lowest was 3.2. Given this substantial range of variation between groups, I now present an analysis of the factors that help explain this variation in group implementation success.

As I shifted to analyzing group-level patterns, a key difference from the previous models was that all of the independent variables had to be measured at the group-level. Group characteristics such as membership type, facilitation, etc, were measured in the same way, whereas all previously individual characteristics—such as hours spent by group participants on working group activities—are aggregated from the individual-level data and presented as group means. I conducted the group-level analysis using a separate data set with an N of 54. The theory, however, did not change. Group means on the psychological ownership scale were expected to relate positively to group means on the implementation success scale, after accounting for the effects of any control variables. To test the hypothesis, group-level implementation success means were regressed on a suite of independent group-level variables.

The block-by-block analysis for this regression (see Table 4.9) begins with the final variable list from the individual-level analysis, excluding the demographic control variables, which are no longer meaningful at the group level. One variable, membership type, was excluded due to multicollinearity concerns, as its variable inflation factor (VIF) value was greater than 4, suggesting that removal of that variable from the analysis would improve the reliability of the coefficients of the other variables. This variable presented a problem in the group-level regression (2B), but not the individual level regression (2A), due to the increased difficulty of managing collinear variables when the sample size is

small, as it is (N=54) at the group level. Removal of the membership type variable appears to remove the significant effects of all but one of the other group-level variables that were previously observed in the individual-level regression model. Only the plan authority variable remains significant: local (versus state) plan authority appears to be linked to increased perception of implementation success by group members.

The remaining three component blocks show nearly identical results to the individual level block-level results, although the relative explanatory power of each block appears to be considerably greater. This is likely related to the removal of individual level components of unexplained error and the smaller number of cases (N) used in this analyses, since N is used in the denominator of the calculation for the adjusted R-squared. In these three blocks, greater mean frequency of meeting attendance, higher group mean scores on the early success stages scale, and higher mean group values on the psychological ownership scale are all associated with greater reported group implementation success.

Finally, I combined the remaining variables in a set of three nested (hierarchical) regression models (see Table 4.10). In Model 1, group-level characteristics have only minimal explanatory power. Local plan authority is still significant and positive. The strongest variable in Model 1 is the frequency of attendance variable, which appears to have a strong positive relationship with perceptions of group implementation success. Interestingly, in Model 2 the effect of attendance frequency is mitigated by inclusion of the “early success” variable. This suggests that, net the effects of early success, frequency of attendance is no longer of particular note.

Table 4.9 Regression of Group-Level Success on Group Characteristics

	<i>Standardized Regression Coefficients</i>				
	Model A	Model B	Model C	Model D	
Internal and External Group Level					
Neutral facilitator present	-0.058				
Group age (duration)	0.094				
Log (ln) of area covered	0.161				
Private Land ownership	0.151				
Authority: local plan has more	0.494 **				
Diversity ratio	0.115				
Investment Variables					
Frequency of attendance (mean)		0.352 **			
Early Success Stages (mean)			0.653 ***		
Psychological Ownership (mean)				0.605 ***	
	Adjusted R ²	0.136	0.107	0.415	0.354
	F	2.40 *	7.34 **	37.96 ***	30.07 ***
	df	53	53	52	53

^a p<0.1; *p < .05; **p < .01; ***p<.001

Table 4.10 Regression of Group-Level Success on Group Characteristics: Hierarchical Combined Model

	<i>Standardized (and Unstandardized) Regression Coefficients</i>			
	Model 1	Model 2	Model 3	
Internal and External Group Level				
Neutral facilitator present	0.285 (0.78) ^a	0.194 (0.53)	0.296 (0.81) *	
Group age (duration)	0.117 (0.05)	0.077 (0.03)	0.122 (0.05)	
Log (ln) of area covered	0.142 (0.15)	0.192 (0.20) ^a	0.138 (0.14)	
Private Land ownership	0.122 (0.81)	0.068 (0.45)	0.074 (0.49)	
Authority: local plan has more	0.410 (1.20) **	0.350 (1.03) **	0.219 (0.64)	
Diversity ratio	-0.112 (-0.82)	-0.002 (-0.01)	-0.056 (-0.41) ^a	
Investment: Meeting Attendance Freq. (mean)	0.637 (1.73) ***	0.277 (0.75) ^a	-0.041 (-0.11)	
Early Success Stages (mean)		0.489 (0.26) ***	0.300 (0.16) *	
Psychological Ownership (mean)			0.596 (0.25) **	
	Adjusted R ²	0.391	0.547	0.646
	F	5.77 ***	8.83 ***	11.53 ***
	df	52	52	52

^a p<0.1; *p < .05; **p < .01; ***p<.001

The final model adds a variable for the group mean score on the psychological ownership scale. This variable is significant, positive, and increases the explanatory power of the overall model. An increase of one in the group psychological ownership mean is likely to cause an associated increase in the mean of implementation success of 0.25. Practically speaking, this means that a *collective* increase of one “unit” of psychological ownership, which is measured on a scale of 7 to 35, could be expected to relate to a corresponding increase in magnitude of collective reports of group implementation success (measured on a scale of 2 to 10).

Model 3 also shows that early stage successes and neutral facilitation are significantly related to implementation success. The presence of a neutral, paid facilitator is significant at the $p < 0.05$ level, as is the predictive power of group-level means on the early-stage successes scale. These results closely parallel the individual-level results, in which facilitation and early success are the most significant predictors of individual success predictions. Interestingly, the addition of psychological ownership decreases the influence of the plan authority variable and reinstates the significance of the neutral facilitation, which again shows a positive relationship with successful implementation.

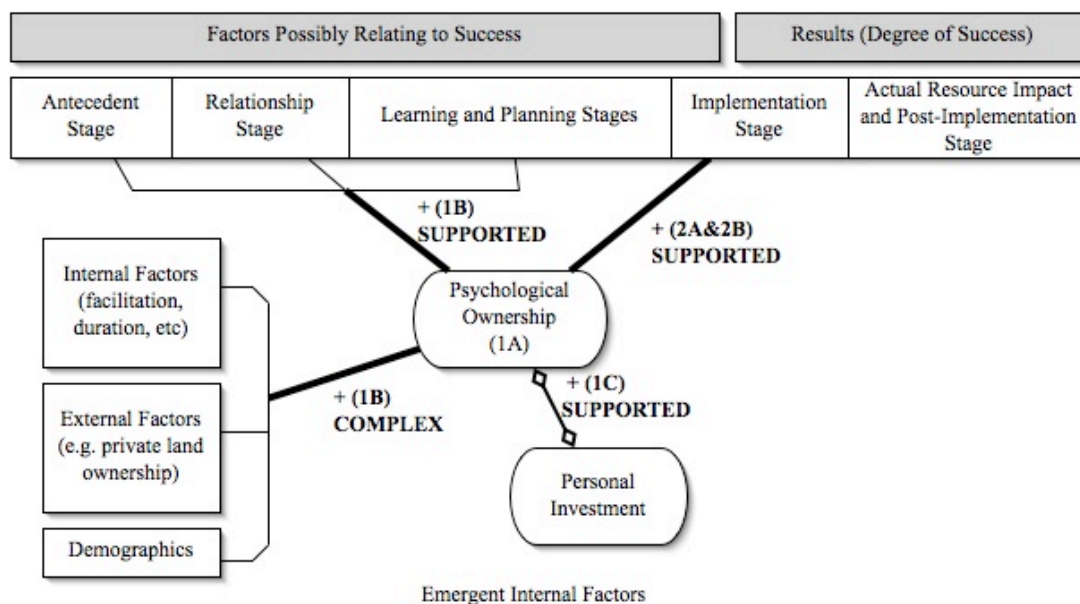
The overall model fit for the final model is very high, with an adjusted R-squared value of 0.646. As noted previously, this is not directly comparable to the individual level (hypothesis 2A) final model’s adjusted R-squared of 0.274, given the considerably smaller number of cases in the group-level model. However, both values indicate that a substantial and highly significant amount of variance in the amount of implementation success reported for each group can be explained using the key variables in this research.

CHAPTER 5

DISCUSSION AND CONCLUSIONS

For the first time in the collaborative natural resource management literature, my research empirically explores the concept of psychological ownership. This research follows numerous references to ‘ownership’ in the literature, and the implicit or explicit assumption that this psychological state might contribute to success in collaborative management ventures. Using survey responses from almost 700 participants in 54 sage-grouse local working groups across the western United States, I demonstrated that the phenomenon of psychological ownership can be captured using multiple attitudinal items on a survey (Hypothesis 1A). In addition, I documented the significance of several predictors of psychological ownership at the individual level, (Hypothesis 1B), and evaluated the relationship between investment behaviors and psychological ownership (1C). Third, my findings suggest that a variable capturing psychological ownership can improve models predicting group success at the implementation stage (2A and 2B).

Figure 5.1 situates the findings in the context of my broader hypothesized model of the factors influencing working group success. Note that the figure is designed to highlight the role of psychological ownership, controlling for the effects of various group and individual characteristics. As such, it does not make explicit the relationships of independent variables other than psychological ownership on implementation success (though these are assumed to be important). As predicted, early group-level success and investment were both positively related to psychological ownership. Psychological ownership, in turn, is related positively to implementation success, as predicted in the



Line labels represent relationship directions, hypothesis reference numbers, and results.

Figure 5.1 Hypothesis Model Results Overview

model. While ownership and investment are related, the results do not suggest that indicators of personal investment alone contribute much to explaining variability in implementation success.

Key Findings and Implications

The analyses presented in the previous chapter suggest several conclusions that confirm most of the key research hypotheses outlined in the model above.

Measuring Psychological Ownership

Initially, the psychological ownership scale developed for this research appears to reflect three distinct but inter-related sub-components: control, responsibility, and caring. Combining these concepts resulted in a coherent, single measure of psychological

ownership that appears to behave in ways predicted in the collaborative natural resource management literature. Bringing together literature from organizational development and from natural resource management adds depth to our understanding of psychological ownership as a complex but distinct attribute of individuals in collaborative situations.

Factors That Increase Psychological Ownership

Several group and individual-level characteristics seem to be related to the emergence of individual psychological ownership over the working group process. Some of these relationships were expected, based on background research and theory; others emerged unexpectedly from the results. Participants who reported being involved with the groups from the start scored somewhat higher on the ownership scale than did more recent joiners. In addition, participants in groups whose local plans had more authority or influence in relationship to the state-level plan also scored higher on the psychological ownership scale, possibly due to the relationship between perceived control and higher psychological ownership, although this result is mitigated considerably by measures of early success.

Individuals in representative (“appointed”) local working groups also expressed stronger levels of psychological ownership. Because this variable is a strongly significant predictor of psychological ownership, it is important to speculate somewhat as to the potential reasons for this significance. As hypothesized, greater psychological ownership by participants in representative membership groups may reflect an increased sense of responsibility that comes of being asked to participate as a formal representative. However, other alternative explanations should be considered and tested in future

research. In particular, the possibility exists that representative (appointed) membership not only creates a greater sense of formal responsibility in participants, but that the nature of seeking out and appointing members gives state wildlife agencies greater confidence in the groups, thus making it more likely that greater formal authority will be given to these groups. Also, while this is mere speculation, one can imagine a situation where a carefully chosen appointed group of individuals does represent greater formal authority (from any of the represented groups) than a self-selecting group of interested individuals who are not necessarily able to represent the authority of their respective interest groups. Because perceived control/influence is part of the ownership scale construct developed in this research, an attribute of membership type which imbues participants with a greater sense of authority could be one driving force for the strong relationship between psychological ownership and membership type.

Similarly, open representative type groups may have attributes which either directly or indirectly influence psychological ownership. On the one hand, groups with open invitations might see more turnover in participation over time, which can undermine a sense of personal ownership over the process. On the other hand, some of this relationship may simply reflect differences in the types of “membership” lists provided for the various types of groups. For example, because lists of open membership groups included larger proportions of individuals who no longer attend, responses from sampled individuals from open groups may reflect more individuals whose lesser involvement with the group correlates to decreased psychological ownership.

Future research which explores and ideally disaggregates the effects of membership type from the types of individuals included in lists (attending versus no

longer attending), perceived or real authority, and the responsibility that comes with being appointed, could help address these questions.

Taken together, my research findings suggest that if high psychological ownership among group participants is a goal, then appointing members, taking steps to ensure greater longevity of participation, and giving local groups real authority over the design and implementation of their plans may contribute positively to this outcome.

While feelings of ownership emerge at the individual participant-level in a collaborative process, they also appear to be a collective product of group-level activities and experiences. In support of the theory that ownership may be an emergent group characteristic, arising from early group successes, I found that individuals in groups with higher early success scores expressed higher feelings of ownership over the group's work. Several other relationships were not as intuitive: younger participants and agency participants reported higher feelings of ownership. In addition, although not always significant, the presence of a neutral facilitator was consistently negatively related to ownership scale scores. The elusive meaning of these relationships points to a need for additional research, either using this data or in other contexts.

Psychological Ownership's Influence on Group Success

The results in Chapter 4 examined the relationship between psychological ownership, group implementation success, and many other factors previously explored in the literature as predictors of group success. The results are clear: psychological ownership has a strong, positive relationship with a group's success at implementing projects. Even when many other key factors—such as the presence of a neutral

facilitator, group age, membership type, and diversity of group membership—are controlled, psychological ownership dramatically improves the explanatory power of models predicting implementation success. This finding remains consistent when measured at both the individual level and the group level. Consistency at both levels allows me to be additionally confident that results are meaningful and valid.

An important point to note is that slightly different combinations of group- and individual-level factors predict psychological ownership and implementation success. Early group-level success has a consistent positive influence on both the emergence of ownership and later-stage group success. However, other factors relate differently to the two concepts. Neutral facilitation is a good example: a strong positive predictor of success, its relationship with psychological ownership is usually insignificant (and even appears negative). Similarly, the strong, positive relationship between psychological ownership and a respondents' early involvement in the group appears to be very different from the small, negative relationship between early involvement and implementation success. These differences suggest that the emergence of psychological ownership concept is distinct from, although related to, group success and the other aspects of these complex relationships.

In addition to the focus on psychological ownership, the work presented here also extends past research on factors related to success. Because the dataset provided a large number of groups with several key attributes naturally controlled (all groups working on local sage-grouse management planning for similar reasons), it provided an unusually robust arena in which to conduct statistical analyses of factors related to group success. One of the more intriguing findings is the general insignificance of diversity in group

membership as a predictor of group implementation success. This is particularly unexpected given the previous work that has found measures of diversity to be linked to a variety of success measures in collaborative contexts. While this may be due to differences in the approach to measuring diversity between this and other studies, it also could be the result of controlling for many other factors that are more important than membership diversity. Regardless of the cause, it is one of the more surprising findings to emerge from this research.

Findings about other factors were more predictable. Neutral facilitation, for example, emerged as a strong predictor of success. Similarly, membership type, as was assumed would be the case, had a strong relationship with success. I found that the representative-type membership, which in an earlier study (Dakins et al. 2005) was not reported to be significantly different than open types, does appear to relate to differential implementation success in the sage-grouse local working group context.

As was discussed above, there remain questions regarding the meaning of the strong coefficients associated with the group ‘membership type’ variable. Given that membership type is one of the strongest predictor of both psychological ownership and individual level reports of group success at the implementation stage, it is important to consider whether membership type itself is of particular importance, or whether this variable served unwittingly as a proxy measure for other group characteristics that remained unmeasured in my research.

First, several characteristics of groups may inherently be associated with membership type (at least in this set of working groups). For example, the number of official participants in representative membership groups was invariably smaller than in

open representative types. This means that the entire core group of most involved decision makers in representative groups was automatically included in the sample (all representative groups were fully sampled because all had fewer than 30 names on their lists). In contrast, open membership groups which were not fully sampled likely only had a portion of their core membership included in the sample. Although it is unclear exactly how this might bias any results, it is nonetheless important to note.

Second, representative membership type was characteristic of groups primarily found in Wyoming and Oregon. Therefore, unmeasured state-level characteristics (either of these states or of states with open representation types) may have unknowingly been correlated with membership type. For example, coordination levels, funding levels, and management style used by state wildlife agencies also vary by state. Because I did not measure these characteristics, it is impossible to eliminate the chance that they might be the driving force behind the predictive power of the membership type variable.

Regardless, membership type, or some unmeasured variable closely related to it, is an important key to understanding group implementation success. Further research on these or other groups should seek to differentiate between the relationships of membership type and other possibly related group or state-level characteristics.

Generalizability of Findings

One of the strengths of the data used for this research is the relatively large number of groups that share many attributes (the focus on sage-grouse protection, for example), while also providing a degree of variability along key group attributes across

and within states. This strength, however, also limits the generalizability of my results to collaborative group settings that approximate those found in this study.

Perhaps the most important of these factors is the policy environment surrounding the sage-grouse, and its influence on how and why individuals become participants in local working groups. Across all the groups, the same “threat” exists: the possibility of a formal listing of sage-grouse under the Endangered Species Act. Because sage-grouse are not currently listed, however, the sage-grouse local working groups remain a voluntary and preemptive endeavor, and the involvement of participants likely follows different patterns than it might in situations where land management practices and working group decisions are regulated by strict federal mandates. As such, the results of this study may not be generalizable to collaborative wildlife management groups operating in a different policy environment, either with an already listed species, or with a species not under consideration for listing.

Outside the wildlife management context, some of the characteristics of sage-grouse working groups – voluntary, incentive-based approaches which seek to prevent future regulatory action – are common in watershed management settings. This suggests that the role of participant’s psychological ownership in affecting group success at implementing projects might be a productive area to explore in future collaborative watershed research as well.

Management Implications

In order to make the results of my research as applicable as possible to the realities and challenges faced by local working groups, the measure of group success I

explored most fully was success at the *implementation stage* of group progress. The literature on collaborative processes often assumes that early stage successes (building relationships, learning, and creating a plan) and actual biological/environmental outcomes go hand in hand. However, while early stage success may indeed be crucial to later success, group meetings and plans are clearly insufficient without actual impacts on land management or other relevant behaviors (which themselves serve as preconditions to the desired changes in ecosystem conditions). In order to determine if collaborative natural resource management can succeed on the ground, and what factors influence that success, it is crucial to examine more than just the process outputs, and to critically examine whether groups successfully implement projects that have the potential to change the targeted natural resource conditions. Gauging the impact on sage-grouse habitat or bird populations goes well beyond the scope of this thesis, but my findings with respect to understanding implementation actions by these groups is a step in the right direction. In this research, participant reports of implementation stage success were the closest measurable indicator of natural resource outcomes.

What applied suggestions follow from this research? Although this research makes no claims of causality, managers or planners interested in creating psychological ownership among the participants of collaborative wildlife management groups might do well to consider the relationships explored here as they design new collaborative groups projects or programs. For example, they might consider involving as many individuals as possible at the start of these processes, and discuss the potential benefits of a formal representative membership type. Long-term, consistent support of the working groups, from those at the early stages to older, more mature groups, may increase the likelihood

of participants' psychological ownership in the work of the group. Finally, giving groups as much authority as is legal or reasonable, also may increase participants' feelings of ownership in the group's work.

Similar recommendations could be advanced for creating atmospheres conducive to implementation success. Supporting groups at all stages of development, especially including older groups (which might appear to be less in need of continuing support), could be supported by the results of this research. The positive influence of a neutral, paid facilitator for collaborative groups is also well supported by my results. Finally, groups with higher psychological ownership report greater implementation success, suggesting that the above recommendations for the development of ownership may also contribute positively to group implementation success.

Future Research Directions

Clearly, this research is only a beginning. Ample opportunities exist to refine and test the psychological ownership scale developed here, to explore the psychological ownership concept in other research mediums, such as in a case study format, and to apply the concept to other types of collaborative resource management such as watershed groups or community forestry. Exploring additional links between collaborative natural resource management and the organizational development literature discussed in the literature review also seems to be an area ripe for further inquiry.

Additional refinement of the psychological ownership concept and its subcomponents may be of value. For example, work that explores how the "caring" subcomponent of psychological ownership can be more effectively measured would be of

potential interest. Similarly, as Lachapelle and McCool (2005) indicate, an investigation of any differences between ownership of problems, processes, or outcomes, may be a critical distinction worthy of further inquiry. Additional research might also explore the relationship between psychological ownership and other emergent group characteristics such as social learning, which has been shown to relate to similar factors (Tippett et al. 2005), or trust (Haight and Ginger 2000), as well as extending the exploration of investment as an emergent behavioral indicator of psychological ownership. Longitudinal research could extend the results of this study by examining in more detail how ownership emerges, and how the various factors and subcomponents of ownership identified here (appointments to group, early group experiences, actual and felt responsibility, etc.) contribute to increased psychological ownership.

To extend the applicability of these findings, additional research might explore other potentially relevant factors not addressed in this study. For example, a study focused more narrowly on contrasting psychological ownership between current and formerly attending rancher/landowner participants might net further insights about the relationship between ownership and willingness to stay involved in the group process. Similarly, it would be helpful to be able to control for or measure additional factors raised in the literature review that are particularly (though not uniquely) relevant to collaborative wildlife management, such as individuals' motivations for participation, their involvement in monitoring and data collection, the level of data uncertainty about the resource in question, and varying property rights structures. In addition to considering additional factors, future analysis of the data using structural equation modeling or other more complex analysis methods suited to hierarchical and non-linear relationships, may

be of tremendous value in further exploring the causal relationships between success stages, psychological ownership, and other group factors.

Extensions of this research might also incorporate data on land management practices, biological conditions, or external evaluations of collaborative group successes to see if emergent feelings of ownership are a good predictor of those outcomes as well. Research along these lines would also serve to increase our understanding of the relationship between participant perceptions of group success at the implementation stage, and other more objective measures of project implementation. For example, this dataset could be used to project numbers of projects fully implemented by a local working group. It might also, with extremely careful study design, potentially be expanded to predict sage-grouse numbers, provided that sufficient data on biological control variables were available.

Conclusions

The key message from my research, I believe, is a simple one: that psychological ownership is more than a theoretical, anecdotal concept. It can be measured and included in examinations of what makes collaborative natural resource management work. It even appears to be related in the way many authors have supposed: that felt ownership in the work of a group *does* relate to how successful that group believes itself to be at accomplishing specific goals. In this research, we have gained insight into one of the more difficult-to-measure factors in collaborative management. With a sharper eye toward the part it plays, perhaps we will learn how to increase psychological ownership in collaborative groups, improving natural resource management along the way.

REFERENCES

- Alagona, P. S. and S. Pincetl. 2008. "The Coachella Valley Multiple Species Habitat Conservation Plan: A Decade of Delays." *Environmental Management* 41:1-11.
- Beatley, T. 1995. "Preserving Biodiversity Through the Use of Habitat Conservation Plans." Pp. 34-74 in *Collaborative Planning for Wetlands and Wildlife*, edited by D. R. Porter and D. A. Salvesen. Washington, D.C.: Island Press.
- Bentrup, G. 2001. "Evaluation of a Collaborative Model: A Case Study Analysis of Watershed Planning in the Intermountain West." *Environmental Management* 27:739-748.
- Bidwell, R. D. and C. M. Ryan. 2006. "Collaborative Partnership Design: The Implications of Organizational Affiliation for Watershed Partnerships." *Society & Natural Resources* 19:827-843.
- Bleizeffer, D. 2008. "Grouse Need More Help, Biologists Agree." In *Casper Star-Tribune*. Casper, Wyoming.
- Bonnell, J. E. and T. M. Koontz. 2007. "Stumbling Forward: The Organizational Challenges of Building and Sustaining Collaborative Watershed Management." *Society & Natural Resources* 20:153-167.
- Bouwen, R. and T. Taillieu. 2004. "Multi-Party Collaboration as Social Learning for Interdependence: Developing Relational Knowing for Sustainable Natural Resource Management." *Journal of Community & Applied Social Psychology* 14:137-153.
- Brick, P., D. Snow, and S. van de Wetering. 2001. *Across the Great Divide: Explorations in Collaborative Conservation and the American West*. Washington, D.C.: Island Press.
- Brook, A., M. Zint, and R. De Young. 2003. "Landowners' Responses to an Endangered Species Act Listing and Implications for Encouraging Conservation." *Conservation Biology* 17:1638-1649.
- Bryan, T. A. 2004. "Tragedy Averted: The Promise of Collaboration." *Society & Natural Resources* 17:881-896.
- Burger, J., C. Field, R. Norgaard, E. Ostrom, and D. Policansky. 2001. "Common Pool Resources and Commons Institutions." Pp. 1-15 in *Protecting the Commons: A framework for resource management in the Americas*, edited by J. Burger, E.

- Ostrom, R.B. Norgaard, D. Policansky and B.D. Goldstein. Washington, D.C.: Island Press.
- Burkardt, N. and P. D. Ponds. 2006. "Using Role Analysis to Plan for Stakeholder Involvement: A Wyoming Case Study." *Wildlife Society Bulletin* 34:1306-1313.
- Cash, K. 2001. "Malpai Borderlands: The Searchers for Common Ground." Pp. 112-121 in *Across the Great Divide: Explorations in Collaborative Conservation and the American West*, edited by P. Brick, D. Snow, and S. van de Wetering. Washington, D.C.: Island Press.
- Christiansen, T. 2004. "Sage-Grouse Job Completion Report." Pp. 1-48. Unpublished Report. Wyoming Game and Fish Department. Available from: http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/index.asp. Retrieved Jan. 20, 2008.
- Clark, B. T., N. Burkardt, and M. D. King. 2005. "Watershed Management and Organizational Dynamics: Nationwide Findings and Regional Variation." *Environmental Management* 36:297-310.
- Coggins, G. C. 1999. "Regulating Federal Natural Resources: A Summary Case Against Devolved Collaboration." *Ecology Law Quarterly* 25:602-610.
- . 2001. "Of Californicators, Quislings, and Crazies: Some Perils of Devolved Collaboration." Pp. 163-171 in *Across the Great Divide: Explorations in Collaborative Conservation and the American West*, edited by P. Brick, D. Snow, and S. van de Wetering. Washington, D.C.: Island Press.
- Conley, A. and M. A. Moote. 2003. "Evaluating Collaborative Natural Resource Management." *Society & Natural Resources* 16:371-386.
- Connelly, J.W., S.T. Knick, M.A. Schroeder, and S.J. Stiver. 2004. "Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats." Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.
- Dakins, M. E., J. D. Long, and M. Hart. 2005. "Collaborative Environmental Decision Making in Oregon Watershed Groups: Perceptions of Effectiveness." *Journal of the American Water Resources Association* 41:171-180.
- Daniels, S. E. and A. S. Cheng. 2004. "Collaborative Resource Management: Discourse-based Approaches and the Evolution of TechnoReg." Pp. 125-136 in *Society and Natural Resources: A Summary of Knowledge*, edited by M. J. Manfredo, J. J. Vaske, B. L. Bruyere, D. R. Field, and P. J. Brown. Jefferson, MO: Modern Litho.

- Daniels, S. E. and G. B. Walker. 2001. Working Through Environmental Conflict: *The Collaborative Learning Approach*. Praeger Publishers: Westport, CT.
- Dewulf, A., M. Craps, and G. Dercon. 2004. "How Issues Get Framed and Reframed When Different Communities Meet: A Multi-Level Analysis of a Collaborative Soil Conservation Initiative in the Ecuadorian Andes." *Journal of Community & Applied Social Psychology* 14:177-192.
- Dillman, D.A. 2000. Mail and Internet Surveys: *The Tailored Design Methods*. Second edition. New York: John Wiley & Sons, Inc.
- Druskat, V. U. and A. T. Pescosolido. 2002. "The Content of Effective Teamwork Mental Models in Self-Managing Teams: Ownership, Learning and Heedful Interrelating." *Human Relations* 55:283-314.
- Elizondo-Montemayor, L, C. Hernandez-Escobar, F. Ayala-Aguirre, and G. Medina Aguilar. 2008. "Building a Sense of Ownership to Facilitate Change: The New Curriculum." *International Journal of Leadership in Education* 11:83-102.
- Fejes, K. E. and D. Miller. 2002. "Assessing Gender-Specific Programming for Juvenile Female Offenders: Creating Ownership, Voice, and Growth." *Journal of Correctional Education* 53:58-64.
- Genskow, K. D. 2001. "Critical Factors for Watershed Partnerships: An Analysis of Actions and Accomplishments." Dissertation. Urban and Regional Planning, University of Wisconsin.
- Gray, B. 1989. *Collaborating: Finding Common Ground for Multiparty Problems*. San Francisco: Jossey-Bass.
- . 2004. "Strong Opposition: Frame-Based Resistance to Collaboration." *J. Community and Applied Psychology* 14:166-176.
- Haight, D. and C. Ginger. 2000. "Trust and Understanding in Participatory Policy Analysis: The Case of the Vermont Forest Resources Advisory Council." *Policy Studies Journal* 28:739-759.
- Hershdorfer, M. E., M. E. Fernandez-Gimenez, and L. D. Howery. 2007. "Key Attributes Influence the Performance of Local Weed Management Programs in the Southwest United States." *Rangeland Ecology & Management* 60:225-234.
- Huntington, C. and S. Sommarstrom. 2000. "An Evaluation of Selected Watershed Councils in the Pacific Northwest and Northern California." Trout Unlimited and Pacific Rivers Council. Available at <http://www.pacrivers.org>.

- Imperial, M. T. 1999. "Institutional Analysis and Ecosystem-Based Management: The Institutional Analysis and Development Framework." *Environmental Management* 24:449-465.
- Innes, J. E. and D. E. Booher. 1999. "Consensus Building and Complex Adaptive Systems - A Framework for Evaluating Collaborative Planning." *Journal of the American Planning Association* 65:412-423.
- Kenney, D. S. 2000. *Arguing About Consensus*. Boulder, Colorado: Natural Resources Law Center, University of Colorado Law School.
- Kleiman, D. G. and J. J. C. Mallinson. 1998. "Recovery and Management Committees for Lion Tamarins: Partnerships in Conservation Planning and Implementation." *Conservation Biology* 12:27-38.
- Knight, R. L. and G. K. Meffe. 1997. "Ecosystem Management: Agency Liberation from Command and Control." *Wildlife Society Bulletin* 25:676-678.
- Koontz, T. M. 2005. "We Finished the Plan, So Now What? Impacts of Collaborative Stakeholder Participation on Land Use Policy." *Policy Studies Journal* 33:459-481.
- Koontz, T. M. and C. W. Thomas. 2006. "What Do We Know and Need to Know About the Environmental Outcomes of Collaborative Management?" *Public Administration Review* 66:111-121.
- Lachapelle, P. R. and S. F. McCool. 2005. "Exploring the Concept of "Ownership" in Natural Resource Planning." *Society & Natural Resources* 18:279-285.
- . 2007. "Claiming Ownership: A Response to Manning and Ginger." *Society & Natural Resources* 20:193-197.
- Lachapelle, P. R., S. F. McCool, and M. E. Patterson. 2003. "Barriers to Effective Natural Resource Planning in a "Messy" World." *Society & Natural Resources* 16:473-490.
- Leach, W. D. 2006. "Collaborative Public Management and Democracy: Evidence from Western Watershed Partnerships." *Public Administration Review* 66:100-110.
- Leach, W. D. and N. W. Pelkey. 2001. "Making Watershed Partnerships Work: A Review of the Empirical Literature." *Journal of Water Resources Planning and Management* 127:378-385.
- Leach, W. D., N. W. Pelkey, and P. A. Sabatier. 2002. "Stakeholder Partnerships as Collaborative Policymaking: Evaluation Criteria Applied to Watershed

- Management in California and Washington." *Journal of Policy Analysis and Management* 21:645-670.
- Manning, R. and C. Ginger. 2007. "An Owner's Manual to "Ownership": A Reply to Lachapelle and McCool." *Society & Natural Resources* 20:187-192.
- Margerum, R. D. 1999. "Getting Past Yes - From Capital Creation to Action." *Journal of the American Planning Association* 65:181-192.
- . 2002. "Collaborative planning - Building Consensus and Building a Distinct Model for Practice." *Journal of Planning Education and Research* 21:237-253.
- . 2007. "Overcoming Locally Based Collaboration Constraints." *Society & Natural Resources* 20:135-152.
- . 2008. "A Typology of Collaboration Efforts in Environmental Management." *Environmental Management* Published online January 29, 2008. Retrieved February 6, 2008. (<http://www.springerlink.com/content/08t88v7w726762w0/>)
- Margerum, R. D. and D. Whitall. 2004. "The Challenges and Implications of Collaborative Management on a River Basin Scale." *Journal of Environmental Planning and Management* 47:407-427.
- Marston, E. 2001. "The Quincy Library Group: A Divisive Attempt at Peace." Pp. 79-90 in *Across the Great Divide: Explorations in Collaborative Conservation and the American West*, edited by P. Brick, D. Snow, and S. van de Wetering. Washington, D.C.: Island Press.
- Mayhew, M. G., N. M. Ashkanasy, T. Bramble, and J. Gardner. 2007. "A Study of the Antecedents and Consequences of Psychological Ownership in Organizational Settings." *Journal of Social Psychology* 147:477-500.
- Mburu, J. and R. Birner. 2007. "Emergence, Adoption, and Implementation of Collaborative Wildlife Management or Wildlife Partnerships in Kenya: A Look at Conditions for Success." *Society & Natural Resources* 20:379-395.
- McCloskey, M. 1996. "The Skeptic: Collaboration Has Its Limits." In *High Country News*. May 13, 1996. Retrieved Jun. 16, 2008. Available from: http://www.hcn.org/servlets/hcn.Article?article_id=1839.
- Moller, H., F. Berkes, P. O. Lyver, and M. Kislalioglu. 2004. "Combining Science and Traditional Ecological Knowledge: Monitoring Populations for Co-management." *Ecology and Society* 9:2. Online. Retrieved June 16, 2008. <http://www.ecologyandsociety.org/vol9/iss3/art2/>

- Moore, E. A. and T. M. Koontz. 2003. "A Typology of Collaborative Watershed Groups: Citizen-Based, Agency-Based, and Mixed Partnerships." *Society & Natural Resources* 16:451-460.
- Moote, M. A. and M. P. McClaran. 1997. "Viewpoint: Implications of Participatory Democracy for Public Land Planning." *Journal of Range Management* 50:473-481.
- Moseley, C. 2001. "The Applegate Partnership: Innovation in Crisis." Pp. 102-111 in *Across the Great Divide: Explorations in Collaborative Conservation and the American West*, edited by P. Brick, D. Snow, and S. van de Wetering. Washington, D.C.: Island Press.
- O'Driscoll, M. P., J. L. Pierce, and A. M. Coghlan. 2006. "The Psychology of Ownership - Work Environment Structure, Organizational Commitment, and Citizenship Behaviors." *Group & Organization Management* 31:388-416.
- Pagdee, A., Y-S Kim, P.F. Daugherty. 2006. "What Makes Community Forest Management Successful: A Meta-Study From Community Forests Throughout the World." *Society and Natural Resources* 19:33-52.
- Parker, S. K., T. D. Wall, and P. R. Jackson. 1997. "'That's Not My Job': Developing Flexible Employee Work Orientations." *The Academy of Management Journal* 40:899-929.
- Perry, R. I. and R. E. Ommer. 2003. "Scale Issues in Marine Ecosystems and Human Interactions." *Fisheries Oceanography* 12:513-522.
- Peterson, M. N., S. A. Allison, M. J. Peterson, T. R. Peterson, and R. R. Lopez. 2004. "A Tale of Two Species: Habitat Conservation Plans as Bounded Conflict." *Journal of Wildlife Management* 68:743-761.
- Pierce, J. L., T. Kostova, and K. T. Dirks. 2001. "Toward a Theory of Psychological Ownership in Organizations." *Academy of Management Review* 26:298-310.
- . 2003. "The State of Psychological Ownership: Integrating and Extending a Century of Research." *Review of General Psychology* 7:84-107.
- Pierce, J. L., M. P. O'Driscoll, and A. M. Coghlan. 2004. "Work Environment Structure and Psychological Ownership: The Mediating Effects of Control." *Journal of Social Psychology* 144:507-534.
- Pierce, J. L. and L. Rodgers. 2004. "The Psychology of Ownership and Worker-Owner Productivity." *Group & Organization Management* 29:588-613.

- Raik, D. B., D. J. Decker, and W. F. Siemer. 2006. "Capacity Building: A New Focus for Collaborative Approaches to Community-Based Suburban Deer Management?" *Wildlife Society Bulletin* 34:525-530.
- Schultz, B., M. Ryan, S. Lewis, J. Buk, R. Davis, S. Emm, M. Havercamp, M. Rebori, and S. Swanson. 2006. "Nevada Sage Grouse Conservation Planning Facilitation Study." University of Nevada Cooperative Extension.
- Selin, S. 2004. "Natural Resource Partnerships: Bridging Practice and Science." Pp. 137-146 in *Society and Natural Resources: A Summary of Knowledge*, edited by M. J. Manfredo, J. J. Vaske, B. L. Bruyere, D. R. Field, and P. J. Brown. Jefferson, MO: Modern Litho.
- Selin, S. and D. Chavez. 1995. "Developing a Collaborative Model for Environmental-Planning and Management." *Environmental Management* 19:189-195.
- Selin, S. W., M. A. Schuett, and D. Carr. 2000. "Modeling Stakeholder Perceptions of Collaborative Initiative Effectiveness." *Society & Natural Resources* 13:735-745.
- Stiver, S. J., A. D. Apa, J.R. Bohne, S.D. Bunnell, P. A. Deibert, S. C. Gardner, M.A. Hilliard, C.W. McCarthy, and M. A. Schroeder. 2006. "Greater Sage-grouse Comprehensive Conservation Strategy." Western Association of Fish and Wildlife Agencies, Cheyenne, WY.
- Tippett, J., B. Searle, C. Pahl-Wostl, and Y. Rees. 2005. "Social Learning in Public Participation in River Basin Management - Early Findings from HarmoniCOP European Case Studies." *Environmental Science & Policy* 8:287-299.
- Turner, J. F. and J. C. Rylander. 1998. "The Private Lands Challenge: Integrating Biodiversity Conservation and Private Property." Pp. 92-137 in *Private Property and the Endangered Species Act: Saving Habitats, Protecting Homes*, edited by J. F. Shogren. Austin, TX: University of Texas Press.
- United States Geological Service (USGS). 2008. "Sage Grouse Local Working Group Locator." <http://greatbasin.wr.usgs.gov/LWG/>. Retrieved May 13, 2008.
- Van Dyne, L. and J. L. Pierce. 2004. "Psychological Ownership and Feelings of Possession: Three Field Studies Predicting Employee Attitudes and Organizational Citizenship Behavior." *Journal of Organizational Behavior* 25:439-459.
- Waage, S. 2003. "Collaborative Salmon Recovery Planning: Examining Decision Making and Implementation in Northeastern Oregon." *Society & Natural Resources* 16:295-307.

- Wagner, M. W., U. P. Kreuter, R. A. Kaiser, and R. N. Wilkins. 2007. "Collective Action and Social Capital of Wildlife Management Associations." *Journal of Wildlife Management* 71:1729-1738.
- Wagner, S. H., C. P. Parker, and N. D. Christiansen. 2003. "Employees That Think and Act Like Owners: Effects of Ownership Beliefs and Behaviors on Organizational Effectiveness." *Personnel Psychology* 56:847-871.
- Weber, E. P. 2000. "A New Vanguard for the Environment: Grass-roots Ecosystem Management as a New Environmental Movement." *Society & Natural Resources* 13:237-259.
- Weber, E.P., N.P. Lovrich, and M. Gaffney. 2005 "Collaboration, Enforcement, and Endangered Species: A Framework for Assessing Collaborative Problem-Solving Capacity." *Society & Natural Resources* 18:677-698.
- Weber, E. P. 2008. "Reality and Better Mousetraps: A Research Agenda for New Environmental Governance Institutions." *Society & Natural Resources* 21:91-93.
- Western Governors' Association (WGA). 2005. "National Conference for Sage-grouse Local Working Grouse Conference Proceedings Report." Western Governors' Association.
- Western Governors' Association (WGA) and Natural Resources Conservation Service (NRCS). 2004a. "Conserving the Greater Sage Grouse: A compilation of efforts underway on state, tribal, provincial, and private lands." Western Governors' Association and the Natural Resource Conservation Service. Available online at www.westgov.org.
- . 2004b. "Conserving the Greater Sage Grouse: Examples of Partnerships and Strategies at Work Across the West." Western Governors' Association and the Natural Resource Conservation Service. Available online at www.westgov.org.
- Williams, E. M. and P. V. Ellefson. 1997. "Going into Partnership to Manage a Landscape." *Journal of Forestry* 95:29-33.
- Wilson, P. I. 2001. "Deregulating Endangered Species Protection." *Society & Natural Resources* 14:161-171.
- Wondolleck, J. M. and S. L. Yaffee. 2000. *Making Collaboration Work: Lessons from Innovation in Natural Resource Management*. Washington, D.C.: Island Press.
- Yaffee, S. L. 1994. "The Northern Spotted Owl: An Indicator of the Importance of Sociopolitical Context." Pp. 41-71 in *Endangered Species Recovery: Finding the*

Lessons, Improving the Process, edited by T. W. Clark, R. P. Reading, and A. L. Clarke. Washington, D.C.: Island Press.

APPENDICES

Appendix A. Survey Instrument

**LOCAL APPROACHES
TO WILDLIFE MANAGEMENT:**

***Assessing the Needs of
Sage-Grouse Local
Working Groups***



Please return your completed questionnaire in the enclosed envelope to:

Institute for Social Science Research on Natural Resources
Dept. of Sociology, Social Work and Anthropology
0730 Old Main, Utah State University
Logan, UT 84322-0730

If you have any questions, please call us at: (435) 760-5545.
We would be happy to speak with you.

Your Involvement

You have received this survey because your name was included in lists associated with sage-grouse local working groups in Utah or southern Colorado. We are interested in learning from people who worked with these groups.

1. Have you ever attended a Sage-Grouse Local Working Group meeting?

- No → *You do not need to fill this survey out. Please return the survey to us in the enclosed postage-paid envelope. We appreciate your time.*
- Yes → **Please indicate which group or groups you have attended.**
Check all that apply. If you attend groups in other states, please list them also.
- West Box Elder Adaptive Resource Management (ARM) group
 - Cache/East Box Elder ARM
 - Castle County ARM
 - Color Country ARM
 - Dove Creek/Monticello ARM (formerly San Juan)
 - Morgan/Summit ARM
 - Parker Mountain ARM
 - Strawberry Valley ARM
 - Southwest Desert ARM
 - Uinta Basin ARM
 - West Desert ARM
 - Rich County Collaborative Resource Management (CRM) group
 - Others (specify: _____)

2. Circle the group above in which you have been most involved.

If you are involved in multiple groups, please respond to the following questions about the SINGLE group above that you just circled.

- 3. When did you start attending this group's meetings?** _____ (year)
- 4. How did you first get involved in the group?** *(Check the ONE category that best applies.)*
- I participated in initial group formation
 - The group was created as a subcommittee of an already existing group I was attending
 - Someone from the group asked me to join
 - I heard about it from a friend/neighbor and decided to attend a meeting
 - I heard about it in a newsletter or other media and decided to attend
 - Other (describe: _____)
- 5. Has your attendance increased, decreased or remained the same since you first became involved?**
- Increased
 - Remained the same
 - Decreased

6. How important were the following reasons to you when you joined the group?

REASON	Very Important	Somewhat Important	Not Important
Attendance was part of my job	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was concerned about maintaining sage-grouse populations ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to access funding for projects on land I own/operate ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was frustrated with top-down wildlife management decisions..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to ensure local control over land management.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to protect local ranches and businesses from the effects of an endangered species listing for sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

7. Do you still actively attend meetings of the working group?

- YES → Skip to Question 8 on the next page
- NO → Answer the questions below

a. How many of the meetings did you attend when you were actively participating?

- Almost all (90%+) Most (50-89%) Some (25-49%) Few (< 25%)

b. How many hours per month did you spend on working-group related activities?

(Include meetings, travel time, and work on other projects.)

_____ hours per month

c. Why did you stop attending the meetings? (Indicate how important each was to you.)

REASON	Very Important	Somewhat Important	Not Important
The working group stopped meeting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The meetings were held too far away	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meeting times were inconvenient.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt that a sage-grouse listing was unlikely	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My views were already represented by others	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not agree with the group's goals.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I felt that the group had achieved its goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was frustrated with how meetings were run	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not feel I was contributing.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not think the group could achieve anything	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not feel my contributions were appreciated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not enjoy working with some group members...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IMPORTANT: Even if you have stopped attending meetings, we are still very interested in your feedback about your working group experiences. **Please SKIP to Question 12 on the next page and answer questions as best you can.**

8. How consistently do you attend the meetings?

- Almost all (90%+) Most (50-89%) Some (25-49%) Few (< 25%)

9. How many hours per month do you spend on working-group related activities?

(Include meetings, travel time, and work on other projects.)

_____ hours per month

10. What is the average distance you travel to attend meetings? _____ miles one way

11. How is your participation in the local working group associated with your regular job?

- I am paid to do this as part of my regular job
- I am not paid, but I receive compensatory time from my regular job
- I am paid to participate, but this is unrelated to my regular job
- I do this as an unpaid volunteer unrelated to my regular job (on my personal time)

12. How often do you participate in group-sponsored activities *other than the meetings*?

(For example, field trips, research projects, trainings, conferences, project implementation, etc.)

- Always or almost always
- Occasionally
- Never
- The group has not had any planned activities outside of the meetings

13. Do you personally own or operate any land with sage-grouse on it?

- NO → Skip to Question 14 on the next page
- YES → Please respond to the questions below keeping this property in mind

a. Since you became involved in the working group, to what degree have you made new personal investments in response to sage-grouse concerns?

Type of Investment	Amount of Investment			
	Not Done	Small	Moderate	Major
New cash investments in fences, seed, machinery, etc. to improve sage-grouse habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
New time and labor investments to improve habitat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sacrificed income opportunities to maintain sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time or travel to discuss sage-grouse issues with others (who are not part of the same working group).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Understanding Local Working Group Activities

14. What kinds of activities does this group participate in?

Type of Activity	<i>Never Done</i>	<i>Has Occurred</i>	<i>Don't Know</i>
a. Field trips or demonstration days	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
b. Training workshops for group members	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
c. Sage-grouse population monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
d. Range/habitat condition monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
e. Development of local sage-grouse management plan(s).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
f. Allocate/Prioritize funding for project implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
g. Coordinate with other sage-grouse local working groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
h. Coordinate with state-level sage-grouse planning efforts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
i. Coordinate with range-wide sage-grouse planning efforts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

15. From the list above, circle the letter of the **ONE** activity it is **most important** for this group to do **more often**.

For the next few questions, please respond based on an AVERAGE meeting you have attended.

16. Regarding the size of the group in attendance, please indicate if you feel the group is:

- Too large About right Too small

17. Please indicate if you agree or disagree with the following statements about the meetings.

Statement	<i>Strongly Agree</i>	<i>Agree</i>	<i>Neutral</i>	<i>Disagree</i>	<i>Strongly Disagree</i>
We accomplish a lot at the meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
People are comfortable expressing opinions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meetings are uncomfortable for me	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a lot of conflict at our meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We handle differences of opinion well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our meetings are well run and facilitated.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Meetings are a waste of time.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learn a lot at our meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This group has a clear purpose	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
All the important interests are represented ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are too many agricultural landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are too many environmental interests	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There are too many agency representatives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. How would you best characterize the atmosphere at meetings?

- Very Positive Positive Neutral Negative Very Negative

19. What is your biggest single concern about this group's leadership? (Check only one box.)

- I have no concerns about this group's leadership
 It is not clear who is in charge
 The group is too dependent on one or two leaders who might leave
 It is hard to find people from the local area to serve as leaders
 Local leaders lack facilitation/leadership skills
 Coordinators are not locally based
 Other: _____

20. What impact would the following changes have on this working group?

Type of Impact	Very Positive	Positive	No Impact	Negative	Very Negative
More structured facilitation of the meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Training local leaders in meeting facilitation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Having the facilitator more involved in discussions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Giving local working group members more control.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better information on meeting times or locations..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding meetings closer to where members live ..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Including more stakeholders in the process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Including fewer stakeholders in the process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More <i>financial</i> support from federal/state gov't	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
More <i>political</i> support from federal/state gov't	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Incentives to increase landowner involvement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other: (Specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

21. Does this group have adequate access to funding? No Yes I don't know

22. How high a priority for the group is funding for each of the following areas?

Area for possible funding increase	High Priority	Medium Priority	Low Priority	Not Needed
Group meeting logistics (travel costs, meals, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Research (on sage-grouse populations, etc.).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On-the-ground projects (e.g. sagebrush treatment, etc.)...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Leadership development/training for group members.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Habitat restoration.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Information Needs

23. How useful would additional information about each of the following topics be for this group?

Type of Information	<i>Critical</i>	<i>Useful but not critical</i>	<i>Possibly Useful</i>	<i>Not Needed</i>
Sagebrush restoration techniques	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local grouse populations (numbers, migration, etc) ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sage-grouse habitat requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact of livestock grazing on sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impact of energy development on sage-grouse.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Successful examples of habitat improvement.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Experiences of other local working groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Standardized monitoring techniques	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Possible funding sources for group projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Protection for landowners in case of listing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

24. How useful would information about the following conservation practices be to this group?

Conservation Practice	<i>Very Useful</i>	<i>Somewhat Useful</i>	<i>Not Useful</i>
Sagebrush treatment (chaining, Spike, etc.).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Seeding (sagebrush or forbs).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire management.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predator management	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Biological habitat manipulation (grazing, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

25. If more information were to be provided to the group, what formats would be most useful?

Possible Format	<i>Very Useful</i>	<i>Somewhat Useful</i>	<i>Not Useful</i>
Expert presentations at working group meetings.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Websites or online databases	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fact sheets (1-2 pages)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Short technical guides (4-6 pages)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Longer documents (e.g. Technical References, Handbooks)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Technical training sessions taught "on the ground"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Web-based training sessions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Opportunities to attend regional meetings or conferences...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

26. How much have you used the following sources of information to learn about sage-grouse?

Information Source	Used a lot	Used a little	Not used
Presentations or discussions at working group meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Discussions with members of other working groups.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Statewide or regional meetings and conferences.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scientific journal articles	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government agency publications	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Popular press (magazines, newspapers)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Websites on sage-grouse, sagebrush, or working groups...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Field trips.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Conversations with private landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

27. How much do you trust information about sage-grouse management from the following?

Source of Information	Very Much	Mostly	Some-what	Not at all	No Opinion
NRCS (USDA Natural Resource Conservation Service)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
BLM (US Bureau of Land Management)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
USFWS (US Fish & Wildlife Service)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
State wildlife agencies	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
University scientists.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
State and County Cooperative Extension	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Farm and livestock organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Individual ranchers or landowners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Conservation/environmental organizations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Members of other local sage-grouse working groups.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

Views about Sage-Grouse Management and Local Working Groups

28. In your opinion, how serious are the following threats to sage-grouse in your area?

Factor	Serious Threat	Medium Threat	Small Threat	Not a Threat
Overgrazing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Predators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Energy development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other development (subdivisions, roads, etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify: _____)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

29. On a scale of +2 to -2, how much do you agree or disagree with the following statements about sage-grouse (in general), and your personal experiences with this local working group?

Statement	Strongly Agree		Neutral		Strongly Disagree
	+2	+1	0	-1	-2
I am concerned about the future of sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Concerns about sage-grouse have been overstated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sage-grouse populations are larger than agencies think.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildlife agencies are mainly responsible for sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landowners should protect sage-grouse on private lands	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This group is responsible for the fate of local sage-grouse.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel personally responsible for sage-grouse populations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It is my responsibility to participate in this group.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel pressured to participate in this group.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am personally invested in the success of this working group...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am proud of the group's accomplishments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I enjoy participating in this working group.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I disagree with the group's goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel personal ownership in the work of this group.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

30. How much do you agree or disagree with the following statements about working groups?

Statement	Strongly Agree		Neutral		Strongly Disagree
	+2	+1	0	-1	-2
This group is likely to make a difference for sage-grouse.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This group would adapt well to a new threat to sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
This group has enough authority to make critical decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The group has enough authority to implement its sage-grouse management decisions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working groups are <u>primarily</u> a way to exchange information ...	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Working groups can effectively manage sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is not enough coordination among local working groups .	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agencies are supportive of the local working group concept	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Agencies have worked well with local working groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of coordination among state and federal agencies is a problem for local working groups	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

31. How much influence have you personally had over the following working group activities?

Activity	<i>Lots of influence</i>	<i>Some influence</i>	<i>No influence</i>
Setting sage-grouse conservation goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Writing the group's sage-grouse management plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deciding how the group allocates its resources	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Deciding what projects the group implements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

32. Overall, how successful do you think this group has been in the following areas?

Activities	<i>Very successful</i>	<i>Somewhat successful</i>	<i>Not successful</i>	<i>Not a group goal</i>
Developing a local management plan	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Getting all key parties at the table	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Improving landowner-agency relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Learning about sage-grouse needs.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Monitoring local sage-grouse populations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Implementing projects on the ground	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Accessing funding to support the group's work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Adapting current plan to changing situations.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Expanding the group's attention to other species	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

33. How much of a challenge are the following activities for your group?

Challenges	<i>Large challenge</i>	<i>Modest challenge</i>	<i>Not a challenge</i>	<i>Not a group goal</i>
Agreeing on group goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Understanding local sage-grouse populations.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Learning how best to manage for sage-grouse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Working with other group members.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Finding time to hold meetings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Finding funding to support the group's work.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Engaging landowners in the process.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Dealing with groups that refuse to participate.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Adapting current plans to changing situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Prioritizing projects to implement	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Implementing projects	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Assessing project outcomes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>
Finding manpower for projects or monitoring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="radio"/>

34. How much longer do you think this group will continue to meet?

- Already has stopped meeting
- Less than one more year
- 1 to 3 more years
- 4 to 10 more years
- More than 10 more years

Information About You

Finally, to better understand the people involved in local sage-grouse working groups, we need to ask a few questions about your background. This information, as with all information provided in this survey, will remain strictly confidential.

35. How do you currently identify yourself? (Please check ALL that apply):

- Farmer or Rancher
- Rural Landowner (not actively ranching/farming)
- Federal government employee (specify agency: _____)
- State government employee (specify agency: _____)
- Local/county government employee or elected official
- SCD or RC&D representative
- Representative of a hunting/sportsmen's group
- Representative of an environmental/conservation group
- Representative of a mineral, oil, gas, or utility industry
- Representative of a livestock association
- Tribal representative
- Independent consultant
- Sage-grouse biologist or sage-steppe ecologist (including graduate student)
- Other (specify: _____)

36. How old are you?

- Less than 35
- 35 to 44
- 45 to 54
- 55 to 64
- 65 or older

37. Are you male or female? Male Female

38. What is the highest level of formal education you have completed?

- High school graduate or less
- Some college: no degree
- Technical or Associate degree
- Bachelors degree
- Graduate or professional degree

If you have additional comments or suggestions, please use the space on the following page

Appendix B. Detailed Methodological Procedures

Sampling Procedures

The steps delineated below explain how I sampled in cases where individuals appeared on multiple group lists.

- 1) Individuals listed with multiple groups were added separately into the sample frame for each relevant group, and marked as potential duplicates.
- 2) All individuals were assigned a random number, then sorted according to that number within each group.
- 3) In each group, the first 30 individuals were sampled (or all, if less than 30 in frame).
- 4) The entire list (for the state) was resorted by name to identify those sampled in multiple groups. The individual was left in the group which corresponded to the lowest random number associated with their name. All other versions of their name were marked as either “resample” so that another individual in that group could be added to the sample, or “do not add to sample” where the name appeared in other groups but had not yet been sampled.
- 5) In Colorado and Idaho, several groups had frames too small to resample. Colorado has a particular case of two groups with many overlapping members, Gunnison Basin and Gunnison Strategic. Both are considered “working groups” for the purposes of the survey because they perform similar functions at somewhat different scales, but aside from the somewhat unusual case of extreme overlap between the two groups, each functionally resembles at least one group elsewhere in the region.

- a. In the simplest cases where a “resample” order applied to a participant of a group that did not have additional members, the member was left with that group and the next lowest random numbered instance of that person was chosen to be resampled. Example: Joe is in two groups, one with 10 members and one with 80. He appears in both samples initially. The occurrence chosen by the random method suggests that another sample be found from the group with only ten members—not possible. I therefore changed the coding to allow him to remain in the smaller group, and resampled him out of the larger group.
- b. In more complicated cases, where someone was a participant in more than one group that was too small to allow resampling, the person was left technically in the sample for the group in which they received the lowest random value, and (to avoid sending duplicate surveys) removed from the other small group.
- c. I marked all such resample orders that could not be completed, switching them to other groups where they could be completed.
- d. Once these switches were made, I then resampled as needed to complete 30 individuals total in all groups with more than 30.

The re-sampling process, like the original sampling process, followed a set system: If a non-participant response came from a group with additional unsampled participants remaining, the next randomly selected participant was added to the sample, in order to consistently maintain 30 valid respondents. If a non-participant response came

from a group in which all participants had already been sampled, no action was taken. In bad address cases where no additional group participants existed to be re-sampled, I made a reasonable effort (usually a phone call or brief internet search) to identify an accurate address. In all other cases, returned mail was marked as “bad address” and re-sampled as explained above.

Response Rate Calculation Details

Response rate calculations were complicated by two factors. First, some respondents (17.5 percent) indicated a primary association with a group other than that for which they had been sampled. It is worth emphasizing that respondents were not informed of which group sample frame they were selected from. Each respondent was asked to identify all groups he or she had attended, by choosing from a list of the groups in his or her state. (Space was made available for write-in options in the rare cases of state overlap.) Then, respondents were asked to circle the group with which they were most familiar, and to fill out the survey with that one group in mind. Of the 17.5 percent who chose groups that were different than where they had been sampled, slightly less than half 40 percent confirmed that they had attended their sampled group but simply chose another as primary (which is common for state-level staff who might participate in multiple groups). Interestingly, the remaining 60 percent of those who ‘switched’ groups did not report ever having attended the group for which they were sampled.

To account for this first difficulty, responses of those who “changed” their primary group were tracked using a dual-coding method. They were recorded in both their “new” and “old” groups, using different calculations to avoid double counting them.

In the response rates for their “old” group, they were counted as responding, but as having left the group (either fully or while still remaining associated). In their “new” group, they were marked as a valid response. Group-level response rates reported in this research *include* individuals who were added into groups but *remove* from the denominator those who left the group (thus reducing the original sample frame size).

Secondly, as noted above, despite asking individuals for a primary group, it was occasionally impossible to determine which group a respondent had used as the basis for their response. In several cases (fewer than 20), several groups were chosen as primary. These respondents were only included in state-level response rates.

It is critical to note that these factors, while they create additional complexity for calculating group-level response rates, do not impact the analyses presented here, because individuals are assigned to groups for analysis based solely on the group they choose as their primary group.

Weighting Procedures

Although no weights were used in the final analyses, the following paragraphs explain the process of testing whether weights should be used.

I calculated group weights to determine whether weighting responses would be of value. These weights account for response rate, group size, and whether or not the group was fully sampled. In addition, each group’s disqualification rate was used to estimate the proportion of unsampled individuals who would have been disqualified. The weights adjusted the number of respondents in each group to be proportional to the estimated percent of the total working group population represented by each group. Weights

ranged from 0.256 for a small group with a very high response rate to 2.499 for a particularly large group with a low response rate. Nineteen groups had weights that were greater than 1; the remaining 35 had weights less than 1.

To determine the impact of the weighting on the data, weighted and unweighted respondent profiles were compared. The majority of respondent characteristics changed only slightly (by less than 2 percent) when weighted. Adjusting for sampling density and response rates, however, does influence the frequency of meeting attendance and the estimated proportion of working group participants who have stopped attending meetings. For example, without weights, 54 percent of respondents still attend meetings. Using weights, that proportion falls to 47 percent. This is not unsurprising, given that many smaller working groups – which receive lower weights – are appointed boards and were formed more recently than the average group. Lists from larger groups may also represent individuals who attended briefly but did not intend to participate long-term, unlike groups with only defined members on the list. Similarly, the average frequency of meeting attendance falls when data are weighted, indicating that individuals in higher weighted (or somewhat underrepresented) groups do not attend as consistently as respondents in lower weighted (or overrepresented) groups. For example, 52 percent of the full population reports attending all or almost all meetings. The percentage falls to 46 percent after weighting.

Overall, however, weights appear to have little impact on general respondent characteristics, suggesting that variable sampling densities and response rates across groups would not have a significant impact on the results. To confirm this assumption, the final regression analyses for Hypothesis 2A was also run using weighted data. Every

dependent variable had the same level of significance in the two versions of this model, and correlation coefficients were very similar. Thus, I am confident that the choice to use unweighted data throughout the analysis is acceptable and does not bias the results. In addition, because the data included in the third regression (2B) consists predominantly of mean scores by group, this data is already inherently weighted by the nature of means, so further weighting exercises would only complicate analysis. In addition, any fluctuation that would be normalized by weighting will likely be identified through variation in the group characteristics that may drive it. Table A.1 shows the result of weighting on the percentage of respondents from each state. Oregon, Wyoming, and Washington responses decrease in relative weight, while remaining states increase.

Table A.1 Percent Respondents by State, Weighted and Unweighted

	Percent respondents (unweighted)	Percent respondents (weighted)	Number of groups
Colorado	22.6	25.6	11
Idaho	13.2	15.1	6
Nevada/California	12.5	17.2	7
Montana	7.9	9.6	3
Oregon	4.2	1.5	5
Utah	23.6	23.9	11
Washington	4.1	2.8	3
Wyoming	11.9	4.3	8
N	687	687	54