

Group Analysis of Collaborative Conservation Partnerships
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ABSTRACT

Collaborative conservation partnership frequency is increasing in natural resources management; however, few successful examples exist in the United States. These groups seek to address land stewardship through cooperative, communicative, bottom-up approaches that engage local stakeholders. A better understanding of member characteristics and successful group characteristics may enhance collaborative conservation partnership outcomes.

A survey was conducted to quantify partnership member characteristics and advertising mediums. Results were compared with the National Woodland Owner Survey. Collaborative conservation partnership members tend to be well-educated, middle-aged, upper-middle class individuals with large landholdings. They span previously identified family forest owner clusters but may be classified as earlier adopters by Diffusion of Innovations theory. Word-of-mouth is the most common way members learn about partnership opportunities.

Qualitative data was analyzed to identify key features related to the ability to achieve group goals. Multi-disciplinary literature review points to the likely influences of leadership, task type, social capital, resource inputs, processes, and temporal change attributes on collaborative conservation partnership goal achievement. Key informant interviews demonstrate that resource and social capital inputs derive disproportionately from particular actors, partnerships need flexibility to adapt to changes in available resources, leaders establish partnership activity levels, social capital is the foundation of resource access, and groups are diverse in the ways they deal with context-specific tasks,

resources, and processes.

Overall, collaborative conservation partnerships demonstrate potential to positively influence land stewardship and technology transfer. Growth requires expanding membership, establishing partnerships as a legitimate conservation medium, and maintaining diverse groups tailored to local contexts.

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Chapter 1: Introduction to Thesis

The purpose of this study is to document the characteristics of collaborative conservation partnerships in Southwestern Virginia. Specifically, this study examines collaborative conservation partnership member characteristics and functional attributes related to partnership success.

Collaborative conservation partnerships are locally-focused, grassroots groups that promote land stewardship by linking together community members for education, planning, and implementation (Curtis and Lacy 1996; Coughlin *et al.* 1999; Conley and Moot 2003; Berkes 2007; Christoffersen *et al.* 2008). They have been given many different names, including community-based collaborative resource management (Wagner and Fernandez-Gimez 2008), community-based conservation (Berkes 2007), collaborative natural resource planning (Cheng and Mattor 2010), LandCare (Curtis and Lockwood 2000), collaborative natural resource partnerships (Coughlin *et al.* 1999), and rural place-based grassroots citizen groups (Morton 2008), among others. The label “collaborative conservation partnership” was developed by the author to describe these diverse groups and derives from several of these pre-existing terms. “Collaborative” was chosen to highlight the central role of interpersonal communication, networking, and other interactions to accomplish group goals. “Conservation” is an inclusive term that includes forestry, agriculture, water quality, and even policy-level goals with an aim toward sustainable land uses and a corresponding land ethic. Finally, “partnership” signifies the long-term nature and somewhat structured cooperation necessary for these groups to make substantial impacts without adding the connotations sometimes ascribed to words like “cooperative” or “alliance.”

This study was catalyzed by the formation of the Forest Farming Network (FFN), a collaborative conservation partnership currently conducting field trials with native medicinal plants. This group hopes to grow into a cooperative-type entity that helps members grow and sell these plants. The leader of this collaborative conservation partnership is seeking information on how to develop the alliance.

Initially, this study set out to define a blueprint for collaborative conservation partnership success. As research continued, it became evident that successful collaborative programs evolve via different pathways and that generic blueprints likely do not exist (Gray 1989; Berkes 2007). Instead, many group mechanisms show interdependent fluctuations that adapt with changing conditions. Our research goals correspondingly changed to determine patterns shared by successful groups and characterize members. To study these diverse topics, research employed a two-fold descriptive case-study strategy. Qualitative and quantitative data were collected on diverse collaborative conservation partnerships in the region and analyzed for patterns that span group age, structure, size, tasks, and activities.

Snowball sampling identified six collaborative conservation partnerships in the region not currently under research by university faculty. Semi-structured interviews were conducted with key leaders from each group. Some groups offered supporting documentation and participant observation for further detail. Using this data, case studies were developed for each group.

The study's first purpose was to characterize current collaborative conservation partnership membership. Member characteristics offer insight into who participates and why, both of which influence group processes and outcomes. The catalyst Forest Farming

Network deals only with forestland owners; therefore members of 5 collaborative conservation partnerships with a forestland conservation focus were surveyed. Survey results illustrate member motivations, collaborative conservation partnership advertising mediums, and demographic comparisons with Virginia's family forestland owners. Participants are mainly early adopters and innovators according to Rogers (1976; 2003); they are relatively informed and active property managers; and they learn about opportunities mainly through social contacts.

The second purpose was to inductively analyze these collaborative conservation partnerships by operationalizing groups using functional theories (Hollingshead *et al.* 2005). Functional theory proffers that small groups are input-processing-output systems that turn input resources into product goal-oriented outputs via cooperative processes between group members. Input and processes were categorized and analyzed by leadership, task type, social capital, group processes, resources, and temporal change. These attributes were found to influence group outputs. Appropriate attribute characteristics were generally found to be context-specific, but disproportionality, flexibility, social capital, and temporal change were apparent in all cases studied.

The remainder of this document contains four interrelated chapters. Chapter two gives a comprehensive literature review of collaborative conservation partnerships, their use in the forestry sector, past research, and relevant group theories. Chapter three begins with an abbreviated review of collaborative conservation partnerships in the forestry sector and relevant landowner research, presents the survey methodology used, and discusses results and conclusions from this study's Collaborative Conservation Partnership Member Survey. Chapter four similarly begins with a shortened overview of

cross-disciplinary perspectives, describes this study's methodology, and presents qualitative findings from the collaborative conservation partnerships studied. The concluding chapter summarizes key findings and their implications for the FFN and collaborative conservation partnerships in general.

Chapter 2: Literature Review

This study employs multiple methodologies and frameworks, therefore this literature review is broken into 4 sections and a conclusion. Section 1 discusses collaborative conservation partnerships and their definitions. Section 2 characterizes the region and sector in which the collaborative conservation partnerships studied operate. This section covers the potential for collaborative conservation partnerships in family forestlands and Southern Appalachia. Section 3 discusses current research into collaborative conservation partnership functionality, including user demographics and attributes of successful partnerships. Section 4 transitions into relevant findings from group, partnership, network, community of practice, and alliance studies. Where applicable, references are made back to existing collaborative conservation partnership literature demonstrating their similarities. This section covers functional perspectives, network structure, leadership, member composition, social capital, legitimacy, task type, communication, governance structure, social identity, and group development. The conclusion then reiterates key literature review concepts and the addition this research can make to the collaborative conservation partnership field of study.

Section I: Collaborative Conservation Partnerships

Collaborative conservation partnerships are being implemented worldwide to improve management of public and private lands (Moles 2011). These partnerships connect diverse stakeholders to improve coordination, empower citizens, and influence land management practices (Broussard and Schaaf 2004; Forbes and O'Hara 2008; Prager 2010). Collaborative conservation partnerships have been used to positively impact local conflict reduction, ecosystem restoration, policy changes, local economic infrastructure,

and community capacity (Fisher 1995; Christoffersen *et al.* 2008) and to improve the coordination and marketability of small producers in the natural resources sector (Everett 1996/1997; Anderson 2003). They may help spread new innovations by connecting landowners with expert knowledge and technologies (Curtis *et al.* 2000; Wilson 2004; Lauber, Decker, and Knuth 2008) and facilitate community-based stewardship by promoting a conservation-oriented philosophy (Dolisca *et al.* 2009).

Collaborative conservation partnerships are diverse and range from vertically integrated businesses to citizen scientist networks, from informal communities of practice to resource distribution companies. For example, collaborative conservation partnerships in the Western United States (U.S) historically formed to influence public lands management, while collaborative conservation partnerships in the East, South, and Midwest have historically aimed at technical assistance, wood products marketing, landowner education, and conservation on private lands (Christoffersen *et al.* 2008). The Massachusetts Family Forest Cooperative formed as a for-profit low-impact landowner assistance business, while the Watershed Research and Training Center in the Pacific Northwest links public and private resources to coordinate ground-level restoration, planning, education, and monitoring (Danks and Everett 1996/97; Barten *et al.* 2001). Collaborative conservation partnerships vary in size and may have only a few members or a mailing list of hundreds.

Different collaborative conservation partnerships excel at different activities. For example, research on watershed collaboratives indicates that mixed government-citizen groups are more effective than pure citizen groups at writing management plans and including diverse stakeholders (Moore and Koontz 2003). Groups seeking these

outcomes may be advised to adopt mixed public-private participation. Similarly, Landcare, a common collaborative conservation partnership type in Australia, that participate in larger multi-group networks may attract more government resources but give up some of their autonomy and flexibility in ground-level task implementation (Sobels, Curtis, and Lockie 2001; Colliver, Lucas, and Moore 2008). Thus individual Landcare groups may do well to weigh the value of government support versus autonomy when deciding whether to participate in larger networks. And groups seeking to connect conflicting parties may benefit from third-party leaders, while small homogenous groups may more effectively govern themselves with shared leadership (Provan and Kenis 2007). Optimal choice of group structure, tasks, and resources depend on the situation-specific goals and context of each individual partnership.

Though diverse, collaborative conservation partnerships are defined by several consistent qualities. Collaborative conservation partnerships, by definition, involve constructive exchanges between local stakeholders seeking solutions to benefit the broader environment and community (Gray 1989; Selin and Chavez 1995). These partnerships revolve around commitments to land management problem-solving, facilitate peer-to-peer learning, and remain responsive to stakeholders by maintaining distinct geographic relevance (Weber 2000; Sagor, Broussard, and Kueper 2008; Cheng and Mattor 2010; Prager 2010). These groups may employ economic incentives, education, peer pressure, policy, planning, monitoring, or any combination of the above to engender conservation (Coughlin *et al.* 1999).

In some areas like Australia, the Phillipines, and Europe, collaborative conservation has achieved widespread success (Curtis and Lacy 1996; Curtis and

Lockwood 2000; Curtis *et al.* 2000; Kittredge 2005; Colliver, Lucas, and Moore 2008). Australian LandCare groups have successfully attracted government resources for ground-level conservation tasks, enhanced landowner management knowledge, increased feelings of community, and boosted implementation of soil and water conservation practices among participants (Curtis and Lacy 1996; Curtis *et al.* 2000; Sobels, Curtis, and Lockie 2001; Wilson 2004). LandCare in the Philippines has enhanced landowner adoption of conservation practices (Agustin R Mercado, Garrity, and Catacutan 1999). European landowner cooperatives have helped private landowners capitalize on economies of scale, share equipment and infrastructure, manage wildlife habitat for connectivity, and diffuse information (Kittredge 2005). In Sweden alone, approximately 90,000 non-industrial private landowners with 14.8 million acres of forestland are enrolled in forest cooperatives (Bagley 2010). Globally, collaborative conservation partnerships succeed at positively influencing private land stewardship.

Collaborative conservation partnerships in the U.S, however, have a less robust record (Berkes 2007). While hundreds of partnerships have been documented, relatively few have achieved long-term success (Conley and Moot 2003; Berkes 2007). As of 2010, for example, only twenty forest cooperatives with a total of 500 members were estimated to be operating nationwide (Bagley 2010). Perhaps one of the most significant challenge for collaborative conservation partnerships in the U.S. is their incredible diversity. They include but are not limited to public lands management planning councils, watershed committees, Landcare groups, forest cooperatives, Landtrusts, and community research partnerships (Danks 1996/1997; Coughlin *et al.* 1999; Curtis and Lockwood 2000; Kellert *et al.* 2000; Conley and Moot 2003; Kittredge 2005; Berkes 2007; Colliver,

Lucas, and Moore 2008). The range of possible structures, programs, stakeholders, objectives, and cultures involved in these groups is immense. As Coughlin *et al.* (1999, 1-8,1-9) wrote:

It is no wonder people are confused and that a few groups that make it into the news become models of both what to expect, as well as what to criticize or to support. There is a need to describe the landscape of collaborative partnerships, clearly defining the differences and similarities between the many groups that exist in order to better inform the current debate about these processes.

Coughlin *et al.* (1999) developed a comprehensive list of U.S. collaborative resource management partnerships that contained over 450 groups. To describe these groups, 31 scaled variables were used to codify: (1) group origins, (2) issues addressed, (3) organizational structure, (4) group processes, and (5) outcomes. According to this framework, partnerships focus on forest conservation, farmland management, water quality, planned rural development, recreation on public lands, and job loss in the natural resource sector, among many other objectives. They may be long-lived institutionalized groups, or short-lived point-counterpoints to specific laws or practices. Some involve only voluntary community members, while others connect government employees and paid employees. Some have been successful. Others have not.

Section II: Family Forests and Southern Appalachia

The forestry sector, in particular, is increasingly emphasizing the use of collaborative conservation partnerships to engage family forestland owners. Though private families own around 42% of the U.S. forestland base and 60% of Virginia's forestlands, few family landowners actively and intentionally manage their forests according to scientific principles (Butler 2009). Only 3% of family forest owners nationwide and 4% of southern family forest owners have written management plans, and

professional foresters only oversee 22% percent of family forest timber harvests (Butler and Leatherberry 2004; Butler, Miles, and Hansen 2011). Several studies over the course of 2 decades indicate that most harvesting activities on family forests are defined by unsustainable timber extraction and poor or nonexistent regeneration practices, though most owners express a desire to manage their forests sustainably (Egan and Jones 1993; Fajvan, Grushecky, and Hassler 1998; Munsell *et al.* 2006; Munsell *et al.* 2009). These trends indicate that traditional forest management outreach only reaches a fraction of the family forestland base (Sagor, Broussard, and Kueper 2008; Davis and Fly 2010).

Private forestland owner associations have been proposed as a new way to reach America's family forestland landowners that may potentially be more effective than traditional outreach (Kittredge 2005; Wolf and Hufnagl-Eichiner 2007; Sagor, Broussard, and Kueper 2008). Collaborative conservation partnerships can connect individual landowners with other institutions, resources, and policy makers to coordinate diverse objectives and practices (Weber 2000; Berkes 2007). Family forestland collaborative conservation partnerships commonly serve as educational outlets that host wildlife or forest management speakers, connect landowners with professionals, and showcase management demonstrations (Curtis *et al.* 2000; Wilson 2004; Lauber, Decker, and Knuth 2008). They can also connect neighboring landowners for mutual resource-sharing, problem-solving, innovation, and social support for their management decisions (Weber 2000). Landowners interested in active management but currently not practicing it are particularly likely to be "receptive to messages about land stewardship, particularly if... disseminated through one of these types of organizations (Butler *et al.* 2007, 355)." These land stewardship organizations may offer landowners more agreeable ways of

learning about and engaging in land management.

Southern Appalachia, including Southwestern Virginia, is a prime region for collaborative conservation partnerships aimed at the forested and agricultural landscape. It is a natural resource-dependent region characterized by poverty, low educational attainment, young adult out-migration, retiree in-migration, economic undercapitalization, and land fragmentation (McLaughlin, Lichter, and Matthews 1999; Turner *et al.* 2003; The HTC Group 2004; Appalachian Regional Commission 2010, 2011). Natural resources, including timber, recreation, and aesthetics, are often considered the region's greatest assets and the foundation of the region's in-migration (The HTC Group 2004; Kendra and Hull 2005). Because Southwest Virginia includes the headwaters for the Roanoke, Upper Tennessee, and New River watersheds, land management practices directly influence water quality along thousands of miles of downstream waterways and urban areas (Virginia Department of Game and Inland Fisheries 2011). The region's need for community capacity and natural resource management make it a prime location for natural resource stewardship groups, such as the Forest Farming Network.

Section III: Collaborative Conservation Partnership Research Trends

Many researchers, including Coughlin *et al.* (1999), have sought to develop a blueprint for how to successfully establish and operate cooperative conservation partnerships. It appears, however, that the incredible diversity of group goals, resources, embedding contexts, structures, and processes prohibit the development of universal blueprints (Berkes 2007). Instead, researchers have been more successful linking context-

specific attributes to group outputs. The following sub-sections describe the major characteristics found in earlier research on collaborative conservation partnerships.

Member Composition

Understanding member composition is a key component to understanding how collaborative conservation partnerships function. Membership size generally relates to the resources available, communication norms, and cooperation levels of groups (Abrams *et al.* 2005; Katz, Arrow, and Contractor 2005). Homogenous group composition may enhance interpersonal trust and cohesiveness, while heterogeneous groups may enhance diversity of member skills, knowledge, and outside contacts (Dailey 1977; Jarillo 1988; Wheelan 1994; Soda, Usai, and Zaheer 2004). And because members tend to attract new members with similar cultural backgrounds and attributes, composition influences group member development over time (McPherson, Popielarz, and Drobnic 1992). Previous studies of collaborative conservation alliance member characteristics in America and elsewhere indicate that participation may be limited to specific demographics. As a whole, conservation alliances appear most prominent among higher-income, middle-aged persons with high education levels and relatively large properties (Black and Reeve 1993; Sperry 1997; Curtis and Nouhuys 1999; Rickenbach 2009).

Community Capacity

Community capacity is the collective ability of a locale to respond to changes or new developments (Flint, Luloff, and Finley 2008). This capacity results from “the diverse groups and organizations that exist within a locale, the communication and information flows that enable or create barriers to the kind and amount of science and knowledge exchanged, and the social pressures of legal and social norms for citizens to

act on behalf of the community rather than their own personal interests alone (Morton 2008, 753).” Community capacity can help collaborative conservation partnerships connect with new members and resources, motivate active participation, and empower members with feelings of self-efficacy (Christoffersen *et al.* 2008). This capacity both feeds into and is shaped by successful collaborative conservation partnerships. So it goes that these partnerships are more likely to succeed in communities with a well-connected civic structure and conservation-oriented norms, and partnerships may help communities develop stewardship norms and dense interpersonal networks (Danks and Everett 1996/97; Coughlin *et al.* 1999; Flint, Luloff, and Finley 2008; Morton 2008).

Funding

Funding resources are thought to be the most important collaborative conservation partnership inputs (Nadeau, Howard, and Edberg 2005; Lauber, Decker, and Knuth 2008). Funding may be necessary to hire staff members, offer financial assistance for conservation practices, invest in infrastructure to conduct land management or help stakeholders market products, or pay professional speakers to educate members. Community based forestry partnerships, for example, appear to do best when connected with well-organized local groups and private financial investments (Christoffersen *et al.* 2008). And European cooperatives often develop alongside governmental financial and staffing inputs (Kittredge 2005). It is often important to obtain outside funding because local sources are typically insufficient to complete tasks (Nadeau, Howard, and Edberg 2005; Lauber, Decker, and Knuth 2008). Efforts may be constrained or fail when faced with significant funding limitations.

Boundary Spanners

Boundary spanners are an important way that collaborative conservation partnerships develop social capital and obtain resources (Bodin, Crona, and Ernstson 2006). Boundary spanners are members who bring in access to complementary ideas and resources that would be otherwise inaccessible to the group. In the vernacular, boundary spanners “have a foot in the door” of multiple complementary organizations or social groups. Linkages with other institutions and organizations allow collaborative conservation partnerships to tackle larger, more complex tasks that require broad collaboration (Christoffersen *et al.* 2008). Case studies of community-initiated grassroots natural resource programs found that just a few key stakeholders often act as vital bridges in obtaining funding and permission for group activities (Nadeau, Howard, and Edberg 2005; Lauber, Decker, and Knuth 2008).

Representative Stakeholder Participation

Representative stakeholder participation is often cited as important to partnership success because it adds legitimacy to group decisions and brings in access to wider community resources (Leach and Pelkey 2001; Prell, Hubacek, and Reed 2009). Attracting these stakeholders may be aided by legitimate conflict-resolution strategies, bottom-up leadership, flexible rules, incentives for participation, ease of membership, and accountability for outcomes (Leach and Pelkey 2001; Nadeau, Howard, and Edberg 2005).

Network Structure

The network structure of collaborative conservation partnerships also correlates with success, with different structures maximizing different outcomes. Literature review of social network analysis in resource management settings indicates that strong ties help

maintain trust, facilitate complex information sharing, foster shared norms, and encourage reciprocity; however, strong ties typically exist between similar actors with similar ideas rather than innovative new information. Weak ties, on the other hand, typically bridge diverse actors and enhance novel idea transfer; however, these weak ties may hinder complex communications, often preclude enduring ties, and typically only develop low levels of trust (Prell, Hubacek, and Reed 2009). Highly centralized networks can quickly enact changes and coordinate resources, but they may hinder direct learning and information dissemination between diverse actors. Dense networks, on the other hand, enhance trust, minimize the risks of collaboration, and reduce the costs of collaborating, and foster compliance with norms. But dense networks often result in homogenous actors and information sharing, which reduces innovation and change (Bodin, Crona, and Ernstson 2006).

While member composition, community capacity, funding, boundary spanners, representative participation, and appropriate governmental structure are important predictors of collaborative conservation partnership outcomes, this list is not comprehensive. Other features identified in other research disciplines point to several other salient attributes likely to influence outcomes.

Section IV: Multi-Disciplinary Perspectives

Because collaborative conservation partnerships are examples of groups, partnerships, networks, communities of practice, and alliances, it stands to reason that theories from these diverse fields may further inform the development of collaborative conservation partnerships. Groups are defined here as interdependent actors working collectively toward shared goals (Wheelan 1994). Partnerships are stakeholders who

assemble periodically to discuss and negotiate specific topics (Leach and Pelkey 2001), while networks are webs of interconnected individuals linked together by common contacts (Scott 2000), and communities of practice are “groups of people who share a concern, a set of problems, or a passion about a topic and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (Wenger, McDermott, and Snyder 2002, 4).” Alliances will be defined here as voluntary partnerships between legal entities to share or exchange tangible or intangible goods (Gulati 2004). The following paragraphs will introduce findings and theories from these fields that are potentially useful to the development of collaborative conservation partnership theory.

Functional Group Perspective

The functional group perspective is “a normative approach to describing and predicting group performance that focuses on the functions of inputs and/or processes (Hollingshead *et al.* 2005, 24).” In other words, this take on groups sees them as systems that process inputs into outputs. Inputs include resources such as labor, skills, and money. Processes are the member interactions and infrastructure that turn labor, money, and raw products into outputs such as an educational pamphlet, a conservation easement, or a salad from local produce. Outputs are these tangible and intangible tasks that groups turn out to accomplish their goals. According to the functional perspective, group performance is determined by group outputs, and outputs are a function of inputs and processing behaviors. This group perspective presents a framework for understanding how collaborative conservation partnerships operate. They must be able to access the necessary resource inputs to create useful outputs, and their success may be measured by their abilities to create goal-oriented outputs.

Network Structure

Network structure refers to the web of interconnected ties between members and may be broken into centrality, density, tie strength, and cliques (Scott 2000). Network centrality refers to the degree that ties and communications between members are vetted through a core individual. Density refers to the number of member-member ties relative to the potential number of member-member ties if everyone interacted with everyone else. Tie strength refers to the durability and frequency of a connection, and cliques are sub-groups with 100% density and strong ties. Each of these features has been found to influence inputs and processes in collaborative-type efforts.

Centrality refers to how focal a core actor is to the whole group's interactions. In a totally centralized group, all communications are vetted through a central player or clique. In a completely decentralized group, all individuals interact and add to the group equally (Scott 2000). Most groups fall somewhere between these extremes. Highly centralized networks can quickly enact changes and coordinate resources, but they may hinder direct learning and information dissemination between diverse actors (Bodin, Crona, and Ernstson 2006). Decentralized groups are typically more efficient at accomplishing complex tasks and sharing knowledge, while centralization is usually the most efficient structure for solving simple tasks (Wheelan 1994). Highly centralized natural resource alliances have been found to quickly enact changes and coordinate resources but hinder direct learning and information dissemination between diverse actors (Bodin, Crona, and Ernstson 2006). Collaborative conservation partnerships may maximize their abilities to share knowledge, adapt, and implement changes by choosing an appropriately centralized or decentralized network structure.

Groups with high internal density between actors, that is actors are connected to one another and communicate amongst themselves, tend to be more productive than low density groups (Brass *et al.* 2004). Dense networks enhance trust, promote cooperation, increase productivity, and foster compliance with norms (Wheelan 1994). While typically the most efficient at accomplishing goal-oriented tasks, dense groups often result from homogenous actors and information sharing, reducing innovation and change (Brass *et al.* 2004). Overly dense groups, in fact, may succumb to group-think and stifle creativity, dissension, or the addition of new knowledge to the group. Lower density, on the other hand, promotes a more open atmosphere and may enhance sharing of diverse ideas. Assuming low turnover in membership, density within a group grows over time as members get to know one another (Provan, Fish, and Sydow 2007). These findings have been substantiated in both collaborative conservation partnership and other group research (Bodin, Crona, and Ernstson 2006). Productive collaborative conservation partnerships must balance their density and openness to promote knowledge-transfer, productivity, and cooperation.

Tie strength refers to the volume and durability of interactions between two connected actors. Weak ties are loose, while strong ties refer to redundant, frequently utilized, enduring connections. Strong ties promote trust, cooperative norms, and detailed communication, but they may stifle creativity and addition of new knowledge to a group (Provan and Sebastian 1998; Borgatti and Foster 2003). Weak ties, on the other hand, develop and dissolve more regularly but give actors access to new resources, effectively spread new ideas, and facilitate creativity (Granovetter 1973; Soda, Usai, and Zaheer 2004). However, these weak ties hinder complex communications, often preclude

enduring ties, and typically only develop low levels of trust. Analysis of tie strength in resource management settings indicates that strong ties help maintain trust, facilitate complex information sharing, foster shared norms, encourage reciprocity but typically exist between similar actors with similar ideas rather than innovative new information (Prell, Hubacek, and Reed 2009). Similar to the structural attributes listed above, collaborative conservation partnerships should be aware of the potential benefits and drawbacks of strong versus weak ties and cultivate their connections accordingly.

Stable networks usually have a core clique that drives network evolution, while unstable networks tend to have more peripheral actors than core actors (Araujo and Brito 1998; Provan, Fish, and Sydow 2007). Cliques form when a sub-group of similar members form strong bonds with one another. Cliques within a group have very strong, trusting internal ties and a high degree of communication but may develop aversion to outside actors (Brass *et al.* 2004; Bodin, Crona, and Ernstson 2006). Assuming collaborative conservation partnerships function similarly to business alliances, they may enhance their stabilities by engendering a stable leadership clique.

Leadership

Leader skills correlate strongly with group successes (Rogers and Burdige 1972; Cremer and Knippenberg 2002; Miles and Mangold 2002; Steinhilber 2008). Leaders set the foundation for success by facilitating productive interactions, attracting resources, and motivating participants. Effective leaders are typically charismatic generalists with knowledgeable contacts. They tend to be skilled at hammering out operational details, teaching, selecting appropriate boundary-spanners, coordinating, fundraising, and keeping relationships adaptable to unexpected changes (Niederkofler 1991). Charismatic

leaders enhance member cooperation and performance by personally investing in the group, sacrificing for group good, and articulating group goals (Cremer and Knippenberg 2002). Leaders who maintain many inter-personal ties are most successful at allying their partnerships with other organizations for legitimacy and resource building. Individuals with a propensity to form many ties, particularly weak and bridging contacts, tend to become group leaders because these individuals have higher social capital, higher credibility, and more resource contacts (Totterdell, Holman, and Hukin 2008). Well connected leaders improve their group's capacity and resource access while also deriving credibility and power from their diverse network ties (Brass *et al.* 2004; Provan and Kenis 2007). Collaborative conservation partnerships led by charismatic, energetic generalists with large social networks may find it easier to access input resources and foster member cooperation than groups with less skilled or resource-rich leaders.

Member Composition

Volume and diversity of member inputs is influenced by the size and diversity of a group's membership (Hollingshead *et al.* 2005). Larger and diverse groups tend to have more difficulty productively interacting than small, homogenous groups because larger groups foster more social loafing and inequality of participation (Hollingshead *et al.* 2005). Diverse groups also tend to experience interpersonal conflict because dissimilar participants must negotiate between competing goals, communication norms, and background cultures (Wheelan 1994). Homophily – defined as homogenous group composition – eases developing communication norms, trust, and shared goals, but homogeneous groups may lack access to diverse potential members and resources (Granovetter 1973; McPherson, Popielarz, and Drobnic 1992; Brass *et al.* 2004).

Successful collaborative conservation partnerships must balance homophily and heterogeneity – defined as diversity-- and small and large memberships to develop sufficiently efficient processes along with access to a sufficient volume and diversity of inputs. Because collaborative conservation partnerships often seek diverse stakeholder networking, they are likely to experience intragroup conflict as dissimilar individuals interact.

Group stability, the amount of turnover in members, also influences group processes. Stable groups tend to function more productively than other groups because they allow members to build trust, interpersonal relationships, and communication norms over time (Ring and Van De Ven 1994; Provan and Milward 1995; Borgatti and Cross 2003). This is particularly important among central actors and leaders. Turnover in key players can temporarily hinder group productivity until actors rebuild trust, relationships, and communication norms. Lack of turnover, however, can also stifle group growth and lead to burnout of key members. Collaborative conservation partnerships should cultivate stable memberships while also cultivating new leaders to avert burnout.

Social Capital

Social Capital is the network ties and associated resources accessible to a group (Woolcock and Narayan 2000). Social capital derives from networking with outside actors, demonstrating legitimacy, building trust, working within the embedding context, and utilizing boundary spanners (Lofstrom 1999). Startup ventures have higher failure rates than established groups because they lack the social capital necessary to access stable resource networks. As groups form more connections, they become more robust and resilient because this social capital bolsters a group's resource base and connects a

group to even more outside actors (Galaskiewicz 1985; McPherson, Popielarz, and Drobnic 1992; Brass *et al.* 2004; Venkatraman and Chi-Hyon 2004). Perhaps for this reason, groups with prior networking experience tend to form more outside ties than groups without prior collaborative experience (Brass *et al.* 2004). Thus, the more ties a group has, the more likely it is to form new ties, the more resources it can access, and the more likely it is to succeed. Collaborative conservation partnerships have higher success rates when they have social capital and ties with outside resources because these ties and influences expand available inputs (Bodin, Crona, and Ernstson 2006).

Legitimacy

Legitimacy is the general perception by members and outside actors that the activities, structure, and actions of a group are appropriate and desirable. Legitimacy is both a process and a precursor to accessing input resources. It has been identified as a linchpin to group success (Human and Provan 2000; Brass *et al.* 2004; Provan, Fish, and Sydow 2007).

Groups must prove their legitimacy to members in order to motivate participation and investment. Without this internal legitimacy, partnerships may have little influence over their members. Leaders derive their internal legitimacy from the ability to punish deviants, ability to reward, superior skills or abilities, respect or attraction from members, and/or a normative belief that the leader has the right to expect compliance (Wheelan 1994).

Groups must also establish external legitimacy. External legitimacy refers to how outsiders like funders and customers view a partnership (Human and Provan 2000). Without external legitimacy, partnerships lack influence in the larger community and

with beneficiaries or suppliers. External legitimacy may derive from alliance with powerful or otherwise credible actors, responsiveness to member and larger community needs, institutionalization of credible formal structures, identification with cultural symbols, or endorsements such as third-party certifications (Galaskiewicz 1985; Brass *et al.* 2004; Provan and Kenis 2007; Wolf and Hufnagl-Eichiner 2007). Collaborative conservation partnerships may employ any of the above-mentioned methods to establish internal and external legitimacy. Proving legitimacy may be important in order to prove partnership efficacy, grow membership, and develop influence among stakeholders and the local community.

Legitimacy levels change over time as group outcomes demonstrate the efficiency and value of a group. Human and Provan (2000) modeled legitimacy development over time. According to this framework, partnerships begin in a pre-partnership organizational field, form, experience early growth, come to face legitimacy deficiencies, and finally end in either success or demise. The pre-partnership organizational field is the environment preceding alliance startup, including existing cooperation norms, industry legitimacy, and key stakeholder support. During formation, alliances must prove the legitimacy of their cooperative organizational structure. Alliances primarily accomplish this through the actions and credibility of their leadership. The early growth phase solidifies these legitimacy-building strategies. Monitoring group legitimacy ultimately becomes important in order to overcome legitimacy-building setbacks.

Emerging legitimacy deficiencies occur when major setbacks upset the legitimacy built by partnerships. These deficiencies may be either overcome or lead to partnerships demise. Maintaining legitimacy in the face of changes and deficiencies determines

whether a partnership eventually results in sustainment or demise (Human and Provan 2000). Because collaborative conservation partnerships are a relatively new phenomena in the U.S., they are likely to have difficulty proving the legitimacy of their cooperative structures. Leaders should be aware that their personal actions and reputations along with the tasks accomplished by their partnerships will reflect in the credibility of their partnerships.

Task Type

Researchers generally agree that group processes and necessary inputs relate to group tasks, and many different models and methods have been developed to explain the interaction between tasks and processes (Hollingshead *et al.* 2005). The most widely used model breaks tasks into four mutually exclusive categories: generating solutions, negotiating through disagreements, choosing a solution, and executing chosen solutions (McGrath 1984). Different tasks require different levels of member interdependence and cooperation; different tasks require different interaction levels with the surrounding environment; and different tasks require different skillsets. Appropriate processes and inputs are thus task-specific and likely vary between different collaborative conservation partnerships with different goals and activities.

Communication

Communication is fundamental to group processing; members must communicate in order to work together, and groups must communicate with the outside environment to advertize to new members, educate the public, and interact with land managers. Communication is enhanced in the presence of knowledgeable actors, homophily, and physical proximity. The more knowledge actors have, the more likely they are to

communicate. This communication is typically more accessible and timely when participants are geographically proximate. Even homogenous, geographically proximate groups with a history of interpersonal contact, however, must build collaboration slowly over time as members develop interpersonal ties and trust (Provan and Kenis 2007).

Collaborative conservation partnerships, like other collaborative ventures, must facilitate communication in order to efficiently function and process inputs into outputs. They may be able to enhance their communication by including knowledgeable professionals and keeping activities localized.

Governance Structure

Provan and Kenis (2007) identified three types of collaborative governance: participant governance, lead-organization governance, and network administrative organization (NAO) governance. Participant governance is the simplest and most common type of governance in which all members vote and lead equally; this is the quintessential “one-member one-vote” cooperative. In lead-organization governance, one member or member organization takes charge of the group. And in NAO governance, an outside third party leads the partnership (Provan and Kenis 2007). Each governance structure has unique strengths and is best suited to different circumstances.

Participant governance tends to have the best short-term success because of its adaptability, responsiveness to internal legitimacy needs, and dense decentralized relations between actors. However, participant governance requires high levels of trust between members, adherence to shared goals, geographic centrality, and groups with typically less than eight members. Burnout among key members can also be an issue in participant governance. Participant governance often evolves into lead-member

governance as players burnout or groups grow too large to effectively govern collectively (Provan and Kenis 2007). Collective partnerships are often initiated and led by a committed core group with the rest of the membership mostly passive (Araujo and Brito 1998).

Lead-member governance works well with larger groups, is the most effective structure for gaining external legitimacy, can stabilize short-term conflicts over group tasks and goals, and results in a highly centralized pattern of relations. Lead-organization governance requires high levels of trust in the governing member and can potentially cause unbalanced goal accomplishment if the lead organization stops responding to general member preferences.

NAO governance is a balance between participant and lead-organization governance. NAO structures tend to be the most stable and long-lived. They are responsive to both internal and external legitimacy needs, can broker complex member goals and tasks, can manage groups that lack interpersonal trust, and can handle large groups. NAOs, however, tend to be the most bureaucratic, which can hurt a group's adaptability to changing a changing environment.

Collaborative conservation partnerships should choose their governance structures based on their intended sizes, processes, and outputs. For example, NAO governance may be best in diverse, conflicting communities, while participant governance may be best suited to partnerships with small, homogeneous memberships.

Social Identity

Social identity focuses on the interplay between identification with a group and cooperative group behavior. The underlying assumption is that a group provides a

common social identity to its members and that this identification motivates members to maintain the group and its defining characteristics. Maintaining member involvement means maintaining meaningful, respectful, inclusive group norms. Participation is thus partially motivated by social and psychological reasons (Abrams *et al.* 2005).

Social identity may help explain voluntary participation levels at both the individual and group level (Cremer and Knippenberg 2002; Tyler and Blader 2003; Cremer, Tyler, and Ouden 2005). Identification with the partnership intrinsically motivates individuals to cooperate and invest time and resources in the partnership. Voluntary cooperation is maximized in groups with open communication, high interpersonal supportiveness, active leadership, shared decision-making, charismatic leadership, respectful member interactions, high group prestige, and predictable actions (Gladstein 1984; Ring and Van De Ven 1994; Cremer and Knippenberg 2002; Miles and Mangold 2002). These factors appear to enhance feelings of group belongingness and security within a group, which fosters identification with the group and motivates cooperative behavior. Cooperation is key to collaborative conservation partnerships because these groups are built around voluntary mutual assistance in order to process inputs.

Group Development

All of the aspects above—group composition, legitimacy, leadership, structure, etc.-- change over time. Changes in member composition, networking, leadership, social capital, and social identity mean changes in group inputs. Similarly, changes in network structure, communication, and governance structure change group processes. According to the functional perspective, these process and input changes cause ensuing changes in

outputs.

Hundreds of small group development models have been created to explain changes in group outputs and processes over time (Rond 2003). Many of these models share key traits and can be functionally classified into five different categories.

According to Arrow (2004; 2005) small group development models may be classified by their primary drivers of change and continuity. The five categories and key concepts are found in Table 1.

Model Type	Description	Source of Continuity	Source of Change
Sequential Stage	5-stage hierarchical developmental path	Internal	Internal
Adaptive Response	Relationships and tasks develop at different rates with different breakpoints	External	External
Repeating Cycle	Ongoing cycles of (re-)organization, productivity, and metamorphosis	Neither	Neither
Robust Equilibrium	Members settle on a stable structure that is maintained in the face of changes	Internal	External
Punctuated Equilibrium	Long stagnant period followed by a quick transition to a new stagnant stage	External	Internal

Sequential stage theories model group development as a linear advancement through progressively more productive stages that are driven by inherent internal forces (Tuckman 1965; Tuckman and Jensen 1977; Bennis and Shepard 1978; Neilson 1978; Lacoursiere 1980; Wheelan 1994; Wheelan, Davidson, and Tilin 2003; Whelan-Berry, Gordon, and Hinings 2003; Steinhilber 2008). Adaptive response theory, on the other hand, finds no consistent or universal phases in group development; instead, group evolution is context-specific, resulting from outside influences (Poole 1981, 1983b, 1983a; McGrath 1990, 1991; McGrath 1997; McGrath, Arrow, and Berdahl 2000; Sydow

2004). Cyclic theories show groups rehashing the same issues over and over, resulting in ongoing change that does not necessarily progress toward an eventual stable “mature” stage (Bradford 1978; Zajac and Olsen 1993; Ring and Van De Ven 1994; Worchel 1994; Doz 1996; Marks, Mathieu, and Zaccaro 2001; Raak and Paulus 2001). Robust equilibrium theories model groups as intentionally choosing an equilibrium structure that they maintain until termination even in the face of external forces (Bales and Strodtbeck 1951; Carley 1991; Arrow 1997). Punctuated equilibrium states that groups spend most of their time in stasis but periodically undergo massive deep culture transitions that result in a new stasis (Gersick 1988, 1989; Gersick 1991).

Authors have suggested multiple explanations for the variety of group development models. Some authors have suggested that different models predict development in different types of groups (Poole 1981; Arrow 1997; Chang, Bordia, and Duck 2003) and that models share key characteristics pointing to development of a potentially unified theory (Mennecke, Hoffer, and Wynne 1992; Arrow *et al.* 2004; Akrivou, Boyatzis, and McLeod 2006). Understanding how collaborative conservation partnerships evolve may help participants and leaders plan for and respond to partnerships changes.

Section V: Conclusions

Collaborative conservation partnerships, local stakeholder groups that convene to improve sustainable land management practices, are becoming more widespread as a way to facilitate participatory conservation learning, planning, and implementation. Collaborative conservation partnerships such as Australian Landcare groups, Europe’s forest cooperatives, and U.S. watershed initiatives have demonstrated potential to

enhance sustainable practices. Because of the region's need for land stewardship and community capacity, Southern Appalachia is a particularly promising area for collaborative conservation partnerships.

Collaborative conservation partnerships are diverse in terms of origins, structures, objectives, and desired outcomes. This diversity makes it difficult for participants and potential participants to navigate between the varieties of possible groups and may help explain why U.S. attempts at collaborative conservation partnerships have inconsistent survival and goal-achievement rates. Though the sector's diversity appears to prohibit the development of universal blueprints, understanding the dynamics of group inputs, processes, and outputs may inform future collaborative conservation partnerships to more effectively plan and operate.

Previous research has described the influences of member composition, community capacity, boundary spanners, financial resources, legitimacy, management structures, network structure, leadership, social capital, task type, communication, social identity, and group development on group outputs. These characteristics interact with one another and optimize different outcomes in different situations. Only a handful of these characteristics have been studied in a specifically collaborative conservation context, which points to multiple avenues for ongoing collaborative conservation partnership research.

References

- Abrams, D, M A Hogg, S Hinkle, and S Otten. 2005. "The social identity perspective on small groups." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Agustin R Mercado, Jr, Dennis P Garrity, and Delia Catacutan. 1999. Technical and institutional innovations to conservation farming and agroforestry: Components of

- sustainable watershed management. In *Upland NGO Assistance Committee Lakbay-Aral*. Claveria Research Site, MOSCAT Campus, Claveria, Misamis Oriental, Philippines.
- Akrivou, Kleio, Richard E Boyatzis, and Poppy McLeod. 2006. "The evolving group: Towards a prescriptive theory of intentional group development." *Journal of Management Development* no. 25 (7):689-706.
- Alwin, Duane F, and Jon A Kronsnick. 1991. "The reliability of survey attitude measurement." *Sociological Methods Research* no. 20 (1):139-181.
- Anderson, Nathaniel M. 2003. Enhancing the growth and economic viability of landowner cooperatives to improve sustainable forest management in the United States. College Park: Maryland.
- Appalachian Regional Commission. 2010. Socioeconomic overview of Appalachia 2010. Washington, DC: Appalachian Regional Commission.
- . 2011. County economic status in Appalachia, Fiscal year 2012. In *Research, Maps, and Data*, edited by Appalachian Regional Commission. Washington, DC.
- Applied statistics handbook*. 2011. AcaStat Software, Inc 1999 [cited April 27, 2011 2011]. Available from <http://www.acastat.com/index.htm>.
- Araujo, Luis, and Carlos Brito. 1998. "Agency and constitutional ordering in networks: A case study of the port wine industry." *International Studies of Management & Organization* no. 27 (4):22-46.
- Arrow, H, K B Henry, M S Poole, S Wheelan, and R Moreland. 2005. "Traces, trajectories, and timing: A temporal perspective on groups." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Arrow, Holly. 1997. "Stability, bistability, and instability in small group influence patterns." *Journal of Personality and Social Psychology* no. 72 (1):75-85.
- Arrow, Holly, Marshall Scott Poole, Kelly Bouas Henry, Susan Wheelan, and Richard Moreland. 2004. "Time, change, and development: The temporal perspective on groups." *Small Group Research* no. 35 (1):73-105.
- Ashton, Sarah F. 2006. *A study of cooperative ventures addressing the needs of forest landowners in southern Appalachia*, Forestry, Virginia Tech, Blacksburg, VA.
- Bagley, Scott. 2010. *Forestry Cooperatives*. United States: Forestry and Natural Resource Webinar Portal. Powerpoint Presentation.
- Bailey, D, and K M Koney. 2000. *Strategic alliances among health and human services organizations: From affiliations to consolidations*. London: Sage Publications.
- Bales, Robert F., and Fred L. Strodbeck. 1951. "Phases in group problem-solving." *The Journal of Abnormal and Social Psychology* no. 46 (4):485-495. doi: 10.1037/h0059886.
- Báles, Robert F., Fred L. Strodbeck, Theodore M. Mills, and Mary E. Roseborough. 1951. "Channels of Communication in Small Groups." *American Sociological Review* no. 16 (4):461-468.
- Barten, Paul K, David Damery, Paul Catanzaro, Jennifer Fish, Susan Campbell, Adrian Fabos, and Lincoln Fish. 2001. "Massachusetts Family Forests: Birth of a landowner cooperative." *Journal of Forestry* no. 99 (March):-2330.
- Baw Baw Shire Council. *Landcare*. AusSoft Solutions 2011 [cited April 27, 2011].

- Bazzoli, Gloria J., Rita Harmata, and Cheeling Chan. 1998. "Community-based trauma systems in the United States: an examination of structural development." *Social Science & Medicine* no. 46 (9):1137-1149.
- Bennis, W G, and H A Shepard. 1978. "A theory of group development." In *Group Development, 2nd ed.*, edited by L P Bradford, 13-35. La Jolla, CA: University Associates.
- Berkes, Fikret. 2007. "Community-based conservation in a globalized world." *Proceedings of the National Academy of Sciences* no. 104 (39):15188-15193.
- Bettencourt, B A. 1996. "Grassroots organizing: Recurrent themes and research approaches." *Journal of Social Issues* no. 52 (1):207-220.
- Black, Alan W, and Ian Reeve. 1993. "Participation in Landcare groups: The relative importance of attitudinal and situational factors." *Journal of Environmental Management* no. 39:51-71.
- Blinn, C R, P J Jakes, and M Sakai. 2007. "Forest landowner cooperatives in the United States: A local focus for engaging landowners." *Journal of Forestry* no. 105 (5):245-251.
- Bodin, Orjan, Beatrice Crona, and Henrik Ernstson. 2006. "Social networks in natural resource management: What is there to learn from a structural perspective?" *Ecology and Society* no. 11 (2):r2 (online).
- Borgatti, Stephen P, and Rob Cross. 2003. "A relational view of information seeking and learning in social networks." *Management Science* no. 49 (4):432-445.
- Borgatti, Stephen P., and Pacey C. Foster. 2003. "The Network Paradigm in Organizational Research: A Review and Typology." *Journal of Management* no. 29 (6):991-1013.
- Bradford, L P. 1978. "Group formation and development." In *Group Development, 2nd ed.*, edited by L P Bradford, 4-12. La Jolla, CA: University Associates.
- Bradshaw, Ben. 2003. "Questioning the credibility and capacity of community-based resource management." *The Canadian Geographer* no. 47 (2):137-150.
- Brass, Daniel J., Joseph Galaskiewicz, henrich R. Greve, and Wenpin Tsai. 2004. "Taking stock of networks and organizations: A multilevel perspective." *Academy of Management Journal* no. 47 (6):795-817.
- Broussard, Shorna R, and Kenli A Schaaf. 2004. "A private lands perspective on collaboration." *Journal of Community Based Collaborative Research* (Spring):2004.
- Brown, Margaret, and denise Vewsell. 2010. "Using a market segmentation approach to better target agricultural extension programs-- Aligning learner needs with learning programs." *Journal of Extension* no. 48 (5).
- Burchell, Brendan, and Catherine Marsh. 1992. "The effect of questionnaire length on survey response." *Quality and Quantity* no. 26 (3):233-244.
- Burke, P J. 2003. "Interaction in small groups." In *Handbook of social psychology*, edited by J Delamater, 363-387. New York: Kluwer Academic/Plenum Publishers.
- Butler, B J, and E C Leatherberry. 2004. "America's family forest owners." *Journal of Forestry* no. 107 (7):4-9.
- Butler, B J, M Tyrell, G Feinberg, S VanManen, L Wiseman, and S Wallinger. 2007. "Understanding and reseraching family forest owners: Lessons from social marketing research." *Journal of Forestry* no. 105 (7):348-357.

- Butler, Brett J. 2009. Who owns Virginia's forests? Blacksburg, VA: Virginia Tech.
- Butler, Brett J, Earl C Leatherberry, and Michael S Williams. 2005. Design, implementation, and analysis methods for the National Woodland Owner Survey. In *General Technical Report*. Newton Square, PA: United States Department of Agriculture Forest Service Northeastern Research Station.
- Butler, Brett J., Patrick D. Miles, and Mark H. Hansen. 2011. National Woodland Owner Survey Tabler web-application version 1.0. U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Butler, Brett J., Patrick D. Miles, and Mark H. Hansen. *National Woodland Owner Survey Tabler web-application version 1.0*. U.S. Department of Agriculture, Forest Service, Northern Research Station 2009 [cited Wed Nov 18. Available from <http://fiatools.fs.fed.us/NWOS/tablemaker.jsp>.
- Byron, Ian, and Allan Curtis. 2002. "Maintaining volunteer commitment to local watershed initiatives." *Environmental Management* no. 30 (1):59-67.
- Carley, Kathleen. 1991. "A theory of group stability." *American Sociological Review* no. 56 (3):331-354.
- Chang, Artemis, Prashant Bordia, and Julie Duck. 2003. "Punctuated equilibrium and linear progression: Toward a new understanding of group development." *Academy of Management Journal* no. 46 (1):106-117.
- Cheng, Antony S, and Katherine M Mattor. 2010. "Place-based planning as a platform for social learning: Insights from a national forest landscape assessment process in Western Colorado." *Society and Natural Resources* no. 23:385-400.
- Christoffersen, N, D Harker, M W Lyman, and B Wyckoff. 2008. The status of community-based forestry in the United States: A report to the U.S. Endowment for Forestry and Communities. Silver Spring, MD: Community Forest Consortium.
- Clarke, Jeanette. 1991. "Participatory technology development in agroforestry: Methods from a pilot project in Zimbabwe." *Agroforestry Systems* no. 155:217-228.
- Colliver, R, D Lucas, and S Moore. 2008. Agent, partner or activist: The role of community Landcare in creating sustainable rural landscapes. In *Community Development and Ecology Conference*. Deakin University, Melbourne.
- Conley, Alexander, and Margaret A Moot. 2003. "Evaluating collaborative natural resource management." *Society and Natural Resources* no. 16:371-386.
- Coughlin, Christine W, Merrick L Hoben, Dirk W Manskopf, and Shannon W Quesada. 1999. *A systematic assessment of collaborative resource management partnerships*, School of Natural Resources, University of Michigan, Ann Arbor, MI.
- Cramb, R A. 2005. "The role of social capital in the promotion of conservation farming: The case of 'landcare' in the Southern Philippines." *Land Degradation and Development* no. 17 (1):23-30.
- Cremer, David De, and Daan van Knippenberg. 2002. "How do leaders promote cooperation? The effects of charisma and procedural fairness." *Journal of Applied Psychology* no. 87 (5):858-866.
- Cremer, David De, Tom R Tyler, and Nathalie den Ouden. 2005. "Managing cooperation via procedural fairness: the mediating influence of self-other merging." *Journal of Economic Psychology* no. 26:393-406.

- Curtis, Allan. 1998. "Agency-community partnership in Landcare: Lessons for state-sponsored citizen resource management." *Environmental Management* no. 22 (4):563-574.
- . 2000. "Landcare: Approaching the limits of voluntary action." *Australian Journal of Environmental Management* no. 7 (1):19-27.
- Curtis, Allan, and Terry De Lacy. 1996. "Landcare in Australia: Does it make a difference?" *Journal of Environmental Management* no. 46:119-137.
- Curtis, Allan, and Michael Lockwood. 2000. "Landcare and catchment management in Australia: Lessons for state-sponsored community participation." *Society and Natural Resources* no. 13 (1):61-73.
- Curtis, Allan, and Marike Van Nouhuys. 1999. "Landcare participation in Australia: The volunteer perspective." *Sustainable Development* no. 7:98-111.
- Curtis, Allan, Marike Van Nouhuys, Wayne Robinson, and Jacinta Mackay. 2000. "Exploring Landcare effectiveness using organisational theory." *Australian Geographer* no. 31 (3):349-366.
- Curtis, Allan, Bruce Shindler, and Angela Wright. 2007. "Sustaining local watershed initiatives: Lessons from Landcare and watershed councils." *Journal of the American Water Resources Association* no. 38 (5):1207-1216.
- Dailey, Robert C. 1977. "The effects of cohesiveness and collaboration on work groups: A theoretical model." *Group and Organization Studies* no. 2:461-469.
- Danks, Cecilia, and Yvonne Everett. 1996/97. Rural development forestry network. In *Rural Development Forestry Network Paper 20a*. London, UK: Overseas Development Institute.
- Danks, Celilia. 1996/1997. "Developing institutions for community forestry in northern California." In *Network Paper 20a*, edited by Rural Development Forestry Network. Overseas Development Institute.
- Davis, Miriam, and J Mark Fly. 2010. "Do you hear what I hear: Better understanding how forest management is conceptualized and practiced by private forest landowners." *Journal of Forestry* no. October/November:321-328.
- Diederer, Paul, Hans van Meijl, Arjan Wolters, and Katarzyna Bijak. 2003. "Innovation adopters in agriculture: Innovators, early adopters and laggards." *Cahiers d'economie de sociologie rurales* no. 67:29-50.
- Dillman, Don A. 2001. *Mail and internet surveys: the tailored design method*. 2nd Ed. ed. New York: Wiley.
- Dolisca, Frito, Joshua M McDaniel, Dennis A Shannon, and Curtis M Jolly. 2009. "A multilevel analysis of the determinants of forest conservation behavior among farmers in Haiti." *Society and Natural Resources* no. 22 (5):433-447.
- Downing, Adam K, and James K Finley. 2005. "Private forest landowners: What they want in an educational program." *Journal of Extension* no. 43 (1).
- Doz, Yves L. 1996. "The evolution of cooperation in strategic alliances: Initial conditions or learning processes." *Strategic Management Journal* no. 17:55-83.
- Egan, A, and S Jones. 1993. "Do landowner practices reflect beliefs." *Journal of Forestry* no. 91 (10):39-45.
- Egan, Andrew F, and A E Luloff. 2000. "The exurbanization of America's forests: Research in rural social science." *Journal of Forestry* no. 98 (3):26-30.

- Everett, Y. 1996/1997. Building community capacity for a sustained non-timber forest products industry in the Trinity Bioregion: Lessons drawn from international models. In *Network Paper 20a*, edited by Rural Development Forestry Network: Overseas Development Institute.
- Fajvan, Mary Ann, Shawn T Grushecky, and Curt C Hassler. 1998. "The effects of harvesting practices on West Virginia's wood supply." *Journal of Forestry* no. 96 (5):33-39(7).
- Finholt, T, L Sproull, and S Keisler. 1990. "Communication and performance in ad hoc task groups." In *Intellectual teamwork: Social and technological foundations of cooperative work*, edited by J Galegher, R E Kraut and C Egidio, 291-325. Hillsdale, NJ: Lawrence Erlbaum Assoc.
- Finley, Andrew O, and David B Kittredge. 2006. "Thoreau, Muir, and Jane Doe: Different types of private forest owners need different kinds of forest management." *Northern Journal of Applied Forestry* no. 23 (1).
- Fisher, R J. 1995. Collaborative Management of forests for conservation and development. In *Issues in Forest Conservation*. Bellegarde, France: International Union for the Conservation of Nature and Natural Resources and World Wide Wildlife Fund for Nature.
- Flint, Courtney G, A E Luloff, and James C Finley. 2008. "Where is "community" in community-based forestry?" *Society & Natural Resources* no. 21 (6):526-537.
- Forbes, Peter, and Danyelle O'Hara. 2008. Building a new movement: Land conservation and community. Fayston, VT: Center for Whole Communities.
- Gabarro, J J. 1990. "The development of working relationships." In *Intellectual Teamwork: Social and Technological Foundations of Cooperative Work*, edited by J Galegher, R E Kraut and C Egidio, 79-110. Hillsdale, NJ: Lawrence Erlbaum Assoc.
- Galaskiewicz, J. 1985. "Interorganizational relations." *Annual Review of Sociology* no. 11:281-304.
- Galaskiewicz, Joseph. 2007. "Has a Network Theory of Organizational Behaviour Lived Up to its Promises?" *Management & Organization Review* no. 3:1-18. doi: 10.1111/j.1740-8784.2007.00057.x.
- Gates, Stephen. 1993. Strategic alliances: guidelines for successful management. In *The Conference Board Report: The Conference Board Inc*.
- Gersick, C J G. 1988. "Time and transition in work teams: Toward a new model of group development." *Academy of Management Journal* no. 31 (1):9-41.
- . 1989. "Marking time: Predictable transitions in task groups." *The Academy of Management Journal* no. 32 (2):274-309.
- Gersick, Connie J. G. 1991. "Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm." *The Academy of Management Review* no. 16 (1):10-36.
- Gill, Nicholas, Peter Klepeis, and Laurie Chisholm. 2010. "Stewardship among lifestyle oriented rural landowners." *Journal of Environmental Planning and Management* no. 53 (3):317-334.
- Gladstein, Deborah L. 1984. "Groups in Context: A Model of Task Group Effectiveness." *Administrative Science Quarterly* no. 29 (4):499-517.

- Granovetter, M S. 1973. "The strength of weak ties." *American Journal of Sociology* no. 78 (6):1360-1380.
- Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *The American Journal of Sociology* no. 91 (3):481-510.
- Gray, Barbara. 1989. *Collaborating: Finding common ground for multiparty problems*. San Francisco, CA: Jossey-Bass Inc.
- . 1990. "Building interorganizational alliances: Planned change in a global environment." *Research in Organizational Change and Development* no. 4:101-140.
- Gulati, R. 2004. "Alliances and networks." In *Strategic alliances: Theory and evidence*, edited by J J Reuer, 378-416. New York: Oxford University Press.
- Gulati, Ranjay, and Martin Gargiulo. 1999. "Where Do Interorganizational Networks Come From?" *The American Journal of Sociology* no. 104 (5):1439-1493.
- Heberlein, Thomas A, and Robert Baumgartner. 1978. "Factors affecting response rates to mailed questionnaires: A quantitative analysis of the published literature." *American Sociological Review* no. 43 (4):447-462.
- Hines-Ward, Gretchen, Eric Jokela, Lynn Starr, Hubert Hinote, Kevin L O'Hara, and Peter Womble. 1993. "Cooperative models: Educating landowners, managers, and the public." *Journal of Forestry* no. 91 (10):28-30.
- Hobbs, Stephen D, A Scott Reed, and Beverly B Hobbs. 1993. "Technology transfer: Putting research into practice." *Journal of Forestry* no. 91 (10):12-14.
- Hollingshead, A B, G M Wittenbaum, P B Paulus, R Y Hirokawa, D G Ancona, R S Peterson, K A Jehn, and K Yoon. 2005. "A look at groups from the functional perspective." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Hull, Bruce, David Robertson, and Gregory J Buhyoff. 2004. "Boutique" forestry - New forest practices in urbanizing landscapes." *Journal of Forestry* no. 102 (1):14-19.
- Hull, R Bruce, and Sarah Ashton. 2008. "Forest cooperatives revisited." *Journal of Forestry* no. 98 (3):100-105.
- Human, Sherrie E, and Keith G Provan. 2000. "Legitimacy building in the evolution of small firm multilateral networks: A comparative study of success and demise." *Administrative Science Quarterly* no. 45:327-365.
- Jakes, Pamela. 2006. *Forestry cooperatives: What today's resource professionals need to know*. Saint Paul, MN: USDA Forest Service.
- Janes, Joseph. 1999. "Survey construction." *Library Hi Tech* no. 17 (3):321-325.
- Jarillo, J. Carlos. 1988. "On Strategic Networks." *Strategic Management Journal* no. 9 (1):31-41.
- Jepson, Christopher, David A Asch, John C Hershey, and Peter A Ubel. 2005. "In a mailed physician survey, questionnaire length had a threshold effect on response rate." *Journal of Clinical Epidemiology* no. 58 (1):103-105.
- Katz, N, H Arrow, and N Contractor. 2005. "The network perspective on small groups: Theory and research." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.

- Kellert, Stephen R, Jai N Mehta, Syrna A Ebbin, and Laly L Lichtenfeld. 2000. "Community natural resource management: Promise, rhetoric, and reality." *Society and Natural Resources* no. 13 (8):705-715.
- Kelso, Anna, and Michael Jacobson. 2011. "Community assessment of agroforestry opportunities in GaMothiba, South Africa " *Agroforestry Systems* no. 82 (in press).
- Kendra, A, and R B Hull. 2005. "Motivations and behaviors of new forest owners in Virginia." *Forest Science* no. 51 (2):142-154.
- Kittredge, D B. 2005. "The cooperation of private forest owners on scales larger than one individual property: International examples and potential application in the United States." *Forest Policy and Economics* no. 7:671-688.
- Kluender, R A, and T L Walkingstick. 2000. "Rethinking how nonindustrial landowners view their lands." *Southern Journal of Applied Forestry* no. 24 (3):150-158.
- Koehler, Brandi, and Tomas Koontz. 2008. "Citizen Participation in Collaborative Watershed Partnerships." *Environmental Management* no. 41 (2):143-154. doi: 10.1007/s00267-007-9040-z.
- Lacoursiere, R B. 1980. *The life cycle of groups: Group developmental stage theory*. New York: Human Sciences Press.
- Lauber, T Bruce, Daniel J Decker, and Barbara A Knuth. 2008. "Social networks and community-based natural resource management." *Environmental Management* no. 42 (677-687).
- Leach, William D, and Neil W Pelkey. 2001. "Making watershed partnerships work: A review of the empirical literature." *Journal of Water Resources Planning and Management* no. 127 (6):378-385.
- Lofstrom, S M. 1999. *Strategic alliance success: Bringing individuals' networks, knowledge and actions into the equation*, Graduate School, University of Minnesota, St. Paul.
- Lowry, Richard. 1998. *Concepts and applications of inferential statistics*. Poughkeepsie, NY: Online: <http://faculty.vassar.edu/lowry/webtext.html>.
- Magill, Daniel J, David W McGill, and Rory F Fraser. 2004. "Refining outreach to woodland owners in West Virginia-- Preferred topics and assistance methods." *Journal of Extension* no. 42 (4).
- Majumdar, I, L Teeter, and B Butler. 2008. "Characterizing family forest owners: A cluster analysis approach." *Forest Science* no. 54 (2):176-184.
- Majumdar, I, L D Teeter, and B J Butler. 2009. "Using extant data to determine management direction in family forests." *Society and Natural Resources* no. 22:867-883.
- Marks, Michelle A., John E. Mathieu, and Stephen J. Zaccaro. 2001. "A Temporally Based Framework and Taxonomy of Team Processes." *The Academy of Management Review* no. 26 (3):356-376.
- McGrath, Joseph E. 1984. *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall, Inc.
- . 1990. "Time matters in groups." In *Intellectual teamwork: Social and technological foundations of cooperative work*, edited by J Galegher, R E Kraut and C Egido. Hillsdale, NJ: Laurence Erlbaum Association.

- . 1991. "Time, interaction, and performance (TIP): A theory of groups." *Small Group Research* no. 22 (2):147-174.
- McGrath, Joseph E, Holly Arrow, and Jennifer L Berdahl. 2000. "The study of groups: Past, present, and future." *Personality and Social Psychology Review* no. 4 (1):95-105.
- McGrath, Joseph E. 1997. "Small group research, that once and future field: An interpretation of the past with an eye to the future." *Group Dynamics: Theory, Research, and Practice* no. 1 (1):7-27. doi: 10.1037/1089-2699.1.1.7.
- McLaughlin, Diane K, Daniel t Lichter, and Stephen A Matthews. 1999. Demographic diversity and economic change in Appalachia.
- McPherson, J Miller, Pamela A Popielarz, and Sonja Drobnic. 1992. "Social networks and organizational dynamics." *American Sociological Review* no. 57 (April):153-170.
- Mennecke, B E, J A Hoffer, and B E Wynne. 1992. "The implications of group development and history for group support system theory and practice." *Small Group Research* no. 23 (4):524-572.
- Miles, S J, and G Mangold. 2002. "The impact of team leader performance on team member satisfaction: the subordinate's perspective." *Team Performance Management* no. 8 (5/6):113-121.
- Moles, Jerry. 2011. New River LandCare. Paper read at New River Symposium, May 20, 2011, at Concord University, Athens, WV.
- Moore, Elizabeth A., and Tomas M. Koontz. 2003. "Research Note A Typology of Collaborative Watershed Groups: Citizen-Based, Agency-Based, and Mixed Partnerships." *Society & Natural Resources: An International Journal* no. 16 (5):451 - 460.
- Morton, Lois Wright. 2008. "The role of civic structure in achieving performance-based watershed management." *Society and Natural Resources* no. 21 (9):751-766.
- Munsell, John F, Rene H Germain, Eddie Bevilacqua, and Rudy M Schuster. 2006. "Voluntary best management practice implementation by nonindustrial private forestland owners in New York City's water supply system." *Northern Journal of Applied Forestry* no. 23 (2):133-140.
- Munsell, John F, Rene H Germain, Valerie A Luzadis, and Eddie Bevilacau. 2009. "Owner intentions, previous harvests, and future timber yield on fifty working nonindustrial private forestlands in New York state." *Northern Journal of Applied Forestry* no. 26 (2):45-51.
- Munsell, John F, Rene H Germain, and Ian A Munn. 2008. "A tale of two forests: Case study comparisons of sustained yield management on Mississippi and New York nonindustrial private forestland." *Journal of Forestry* no. 106 (8):431-439.
- Nadeau, E G, E Howard, and K Edberg. 2005. Taking care of family forests: Lessons for Minnesota. Vital Forests/Vital Communities Initiative of the Blandin Foundation.
- Nadeau, E G, Isaac Nadeau, M E Myers, J Padgham, P Guillery, and K Fernholz. 2002. Balancing ecology and economics: A start-up guide for forest owner cooperation. edited by University of Wisconsin Center for Cooperatives. Madison, WI.
- Nadeau, E G, and P Pingrey. 2001. What's new in forest owner cooperation? In *The Timberline*: Wisconsin Department of Natural Resources, Division of Forestry.

- Neilson, E H. 1978. "Applying a group development model to managing a class." In *Group Development, 2nd ed.*, edited by L P Bradford, 117-131. La Jolla, CA: University Publishers.
- Neuman, W Lawrence. 2006. *Social Research Methods: Qualitative and Quantitative Approaches*. Edited by Jeff Lasser. New York: Pearson Education, Inc.
- Niederkofler, Martin. 1991. "The evolution of strategic alliances: Opportunities for managerial influence." *Journal of Business Venturing* no. 6:237-257.
- Nowak, Pete, Sarah Bowen, and Perry E Cabot. 2006. "Disproportionality as a framework for linking social and biophysical systems." *Society and Natural Resources* no. 19:153-173.
- Perkins, D D, B B Brown, and R B Taylor. 1996. "The ecology of empowerment: Predicting participation in community organizations." *Journal of Social Issues* no. 52 (1):85-110.
- Poole, Marshall Scott. 1981. "Decision development in small groups I: A comparison of two models." *Communication Monographs* no. 48 (1):1.
- . 1983a. "Decision development in small groups II: A study of multiple sequences in decision making." *Communication Monographs* no. 50:206-232.
- . 1983b. "Decision development in small groups III: A multiple sequence model of group decision development." *Communication Monographs* no. 50:321-341.
- Prager, K. 2010. "Local and regional partnerships in natural resource management: The challenge of bridging institutional levels." *Environmental Management* no. 46 (5):711-724.
- Prell, Christina, Klaus Hubacek, and Mark Reed. 2009. "Stakeholder analysis and social network analysis in natural resource management." *Society and Natural Resources* no. 22 (6):501-518.
- Provan, Keith G, Amy Fish, and Joerg Sydow. 2007. "Interorganizational networks at the network level: A review of the empirical literature on whole networks." *Journal of Management* no. 33 (3):479-516.
- Provan, Keith G, and Patrick Kenis. 2007. "Modes of network governance: Structure, management, and effectiveness." *Journal of Public Administration* no. 18:229-252.
- Provan, Keith G, and Juliann G Sebastian. 1998. "Networks within networks: Service link overlap, organizational cliques, and network effectiveness." *Academy of Management Journal* no. 41 (4):453-463.
- Provan, Keith G., and H. Brinton Milward. 1995. "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems." *Administrative Science Quarterly* no. 40 (1):1-33.
- Raak, Arno van, and Aggie Paulus. 2001. "A sociological systems theory of interorganizational network development in health and social care." *Systems Research and Behavioral Science Systems Research* no. 18:207-224.
- Rasamoelina, Maminiaina S, James E Johnson, and R Bruce Hull. 2009. Demographic analysis of family forest owners in relation to educational program participation. In *2009 IUFRO 3.08 Small-Scale Forestry Symposium*, edited by Kate Piatek, Ben Spong, Steve Harrison and Dave McGill. Morgantown, WV (USA).

- Rickenbach, M. 2009. "Serving members and reaching others: The performance and social networks of a landowner cooperative." *Forest Policy and Economics* no. 11:593-599.
- Rickenbach, Mark G, Raymond P Guries, and Daniel L Schmoltdt. 2006. "Membership matters: Comparing members and non-members of NIPF owner organizations in southwest Wisconsin, USA." *Forest Policy and Economics* no. 8 (1):93-103.
- Rickenbach, Mark, Keimberly Zeuli, and Emily Sturgess-cleek. 2005. "Despite failure: The emergence of "new" forest owners in private forest policy in Wisconsin, USA." *Scandinavian Journal of Forest Reserach* no. 20 (6):503-513.
- Ring, Peter Smith, and Andrew H. Van De Ven. 1994. "Developmental processes of cooperative interorganizational relationships." *Academy of Management Review* no. 19 (1):90-118.
- Rogers, E M, and R J Burdge. 1972. *Social change in rural societies, 2nd ed.* New York: Appleton-Century-Crofts.
- Rogers, Everett M. 2003. *Diffusion of innovations.* 5th Edition ed. New York, NY: Free Press.
- Rond, Mark de. 2003. *Strategic alliances as social facts: Business, biotechnology, and intellectual history.* New York: Cambridge University Press.
- Sagor, Eli, Shorna Broussard, and Amanda Kueper. 2008. Woodland owner networks: Assessing outcomes from several models used in the Unites States (Part II) Methodological considerations and preliminary findings. Paper read at Evolving challenges and changing expectations for forestry extension and technology transfer: Meeting the needs of people and forests around the globe, at Mattawa and Ottawa, ON.
- Sagor, Eli S, Maureen H McDonough, and Shorna Broussard Allred. 2009. Woodland owner networks and peer-to-peer learning. In *2009 IUFRO 3.08 Small-Scale Forestry Symposium*, edited by Kate Piatek, Ben Spong, Steve Harrison and Dave McGill. Morgantown, WV (USA).
- Scott, John. 2000. *Social network analysis: A handbook.* Edited by 2nd Ed. Thousand Oaks, CA: Sage Publications.
- Selin, Steve, and Deborah Chavez. 1995. "Developing a collaborative model for environmental planning and management." *Environmental Management* no. 19 (2):189-195.
- Smith, Michael D, and Richard S Krannich. 2000. "'Culture clash" revisited: Newcomer and longer-term residents' attitudes toward land use, development, and environmental issues in rural communities in the Rocky Mountain West." *Rural Sociology* no. 65 (3):396-421.
- Sobels, Jonathan, Allan Curtis, and Stewart Lockie. 2001. "The role of Landcare group networks in rural Australia: Exploring the contribution of social capital." *Journal of Rural Studies* no. 17:265-276.
- Soda, Giuseppe, Alessandro Usai, and Akbar Zaheer. 2004. "Network memory: The influence of past and current networks on performance." *Academy of Management Journal* no. 47 (6):893-906.
- Sperry, Charlie. 1997. *Community development groups: A solution to conflict in Western Montana*, Resource Conservation, University of Montana, Missoula.

- Steinhilber, S. 2008. *Strategic alliances: Three ways to make them work*. Boston, MA: Harvard Business Press.
- Stricker, D. 2008. "BrightStat.com: Free statistics online." *Computer methods and programs in biomedicine* no. 92 (135-143).
- Surendo, G C, MSayed Mehmood, and John Schelhas. 2009. "Segmenting landowners based on their information-seeking behavior: A look at landowner education on the red oak borer." *Journal of Forestry* no. 107 (6):313-319.
- Sydow, Jorg. 2004. "Network development by means of network evaluation? Explorative insights from a case in the financial services industry." *Human Relations* no. 57 (2):201-220.
- The HTC Group. 2004. *Appalachia: Turning assets into opportunities*. Asheville, NC: Appalachian Regional Commission.
- Totterdell, Peter, David Holman, and Amy Hukin. 2008. "Social networks: Measuring and examining individual differences in propensity to connect with others." *Social Networks* no. 30:283-296.
- Tuckman, B W. 1965. "Developmental sequence in small groups." *Psychological Bulletin* no. 65 (6):384-399.
- Tuckman, B W, and M A C Jensen. 1977. "Stage of small group development revisited." *Group and Organization Studies* no. 2 (4):419-427.
- Turner, Monica G, Scott M Pearson, Paul Bolstad, and David N Wear. 2003. "Effects of land-cover change on spatial pattern of forest communities in the Southern Appalachian Mountains (USA)." *Landscape Ecology* no. 18:449-464.
- Tyler, T. R., and S. L. Blader. 2003. "The group engagement model: procedural justice, social identity, and cooperative behavior." *Personality and Social Psychology Review* no. 7 (4):349-361.
- USDA Forest Service. 2008. *Forest Inventory and Analysis: Forest Inventory Data Online*. USDA Forest Service.
- Venkatraman, N., and Lee Chi-Hyon. 2004. "Preferential linkage and network evolution: A conceptual model and empirical test in the U.S. video game sector." *Academy of Management Journal* no. 47 (6):876-892.
- Virginia Department of Game and Inland Fisheries. 2011. *Virginia's watersheds: USGS hydrologic unit river systems*. In *Virginia Watersheds*. Richmond, VA.
- Weber, Edward P. 2000. "A new vanguard for the environment: Grass-roots ecosystem management as a new environmental movement." *Society and Natural Resources* no. 13:237-259.
- Weinreich, N K. 1999. *Hands-on social marketing*. London: Sage Publications.
- Wenger, Etienne, Richard McDermott, and William M Snyder. 2002. *Cultivating communities of practice*. Boston, MA: Harvard Business School Press.
- Wheelan, S A. 1994. *Group processes: A developmental perspective*. Boston, MA: Allyn and Bacon.
- Wheelan, S A, B Davidson, and F Tilin. 2003. "Group development across time: Reality or illusion?" *Small Group Research* no. 34 (2):223-245.
- Whelan-Berry, K A, J R Gordon, and C R Hinings. 2003. "Strengthening organizational change processes: Recommendations and implications from a multilevel analysis." *Journal of Applied Behavioral Science* no. 39 (2):186-207.

- Wilson, Geoff A. 2004. "The Australian Landcare movement: Towards 'post-productivist' rural governance?" *Journal of Rural Studies* no. 20:461-484.
- Wolf, S A, and S Hufnagl-Eichiner. 2007. "External resources and development of forest landowner collaboratives." *Society and Natural Resources* no. 20:675-688.
- Woolcock, Michael, and Deepa Narayan. 2000. "Social Capital: Implications for Development Theory, Research, and Policy." *The World Bank Research Observer* no. 15 (2):225-249. doi: 10.1093/wbro/15.2.225.
- Worchel, S. 1994. "You can go home: Returning group research to the group context with an eye on developmental issues." *Small Group Research* no. 25 (2):205-223.
- Zaheer, Akbar, Bill McEvily, and Vincenzo Perrone. 1998. "Does Trust Matter? Exploring the Effects of Interorganizational and Interpersonal Trust on Performance." *Organization Science* no. 9 (2):141-159.
- Zajac, Edward J, and Cyrus P Olsen. 1993. "From transaction cost to transactional value analysis: implications for the study of interorganizational strategies." *Journal of Management Studies* no. 30 (1):131-145.
- Zaller, John, and Stanley Feldman. 1992. "A simple theory of the survey response: Answering questions versus revealing preferences." *American Journal of Political Science* no. 36 (3):579-616.

Chapter 3: Characteristics of Collaborative Conservation Partnership

Members

Abstract

Collaborative conservation partnerships are increasingly utilized to educate and otherwise help private family forest landowners manage their woodlands. This study surveyed members of 5 collaborative conservation groups and compared their characteristics with statewide National Woodland Owner Survey (NWOS) data to determine differences between conservation partnership members and family forest landowners in general. Results show partnership members to be better educated, earn higher incomes, own larger acreages, be more likely to hold conservation easements, seek more professional forest management information, and be more likely to harvest trees to achieve hunting, recreation, or purposive management planning goals than the statewide family forest owner population average. This study suggests that (1) collaborative conservation partnerships are an efficient way to reach engaged, interested family forest owners; (2) these partnerships are attractive to a wide variety of landowner clusters as identified in previous studies; (3) professionals may be able to tailor their outreach to engage the multi-use interests of members; and (4) collaborative conservation partnerships are still in the early stages of social acceptance according to Rogers (2003) Diffusion of Innovations model.

Introduction

Private families own around 42% of the U.S. forest land-base, encompassing nearly 262 million acres (Butler and Leatherberry 2004). The south shows an even more pronounced trend toward private non-industrial ownership, with families owning 128

million acres or 59% of the region's forestland (Majumdar, Teeter, and Butler 2008; USDA Forest Service 2008; Butler 2009). The number of family forest owners is large and still growing (Butler and Leatherberry 2004). How these family forest owners manage this substantial land base has significant implications for the nation's forest resources (USDA Forest Service 2008; Butler 2009).

Previous research demonstrates that few family forest owners in the U.S. currently manage their forests according to sound scientific and sustained yield principles (Davis and Fly 2010). Only 3% of family forest owners nationwide and 4% of southern family forest owners have written management plans, and professional foresters only oversee 22% percent of family forest timber harvests (Butler and Leatherberry 2004; Butler, Miles, and Hansen 2011). The results of several studies over the course of 2 decades indicate that most harvesting on family forests is defined by unsustainable timber extraction and poor or nonexistent regeneration practices, though most owners express a desire to manage their forests sustainably (Egan and Jones 1993; Fajvan, Grushecky, and Hassler 1998; Munsell *et al.* 2006; Munsell *et al.* 2009). Despite this, most landowners see themselves as active forest managers (Davis and Fly 2010). The trend suggests that traditional forest management technical assistance programs such as management or stewardship plans only reach or resonate with a fraction of family forest owners, leaving most pursuing management stratagems and operations with good intentions but little familiarity with sound woodland management (Hobbs, Reed, and Hobbs 1993; Sagor, Broussard, and Kueper 2008; Munsell *et al.* 2009; Davis and Fly 2010).

Tailoring outreach to specific family forest owner types, rather than using a one-size fits all approach, has been proposed by many as a more effective way to provide

landowners with learning opportunities (Weinreich 1999). Family forest owners have previously been targeted for outreach based on characteristics such as demographics, management interests, management activities, and landholdings (Hobbs, Reed, and Hobbs 1993; Kluender and Walkingstick 2000; Finley and Kittredge 2006; Butler *et al.* 2007; Majumdar, Teeter, and Butler 2008; Munsell, Germain, and Munn 2008; Majumdar, Teeter, and Butler 2009; Brown and Vewsell 2010). They have been classified by their focus consumptive, non-consumptive, multiple-use, or unknown forestland objectives. Other work has used cluster analyses to identify diverse landowners groups with a suite of shared characteristics. Butler *et al.* (2007) characterized landowners based on their current management practices and interests; “write-offs” and “potential defectors” carry ambivalent or even negative attitudes toward stewardship, while “model owners” and “prime prospects” are interested in stewardship and innovation and are likely the easiest to reach with learning opportunities.

Tailoring education to voluntary, place-based collaborative conservation partnerships is another approach that some believe could markedly improve family forest owner capacity and better inform subsequent management (Black and Reeve 1993; Curtis and Lacy 1996; Nadeau and Pingrey 2001; Broussard and Schaaf 2004; Kittredge 2005; Blinn, Jakes, and Sakai 2007). Collaborative conservation partnerships with a private forestland focus are grassroots community groups dedicated to improving stewardship on private family lands by providing a combination of information on economic incentives, opportunities for technical education, and general social support and networking (Jakes 2006). They may focus on timber extraction, wildlife education, non-timber forest products, or any other combination of forestland conservation objectives. One important

objective of all collaborative conservation partnerships is to connect neighboring landowners for mutual resource-sharing, problem-solving, innovation, and social support for their management decisions (Weber 2000). Collaborative conservation partnerships commonly host wildlife or forest management speakers, connect landowners with each other and knowledge professionals, showcase management demonstrations, and coordinate the implementation of diverse practices (Hines-Ward *et al.* 1993; Curtis *et al.* 2000; Weber 2000; Wilson 2004; Berkes 2007; Lauber, Decker, and Knuth 2008). Family forest owner outreach and learning via collaborative conservation partnerships may help overcome some of the historical limitations of traditional technology transfer such as distrust, inefficient educational outlets, or use of jargon (Hull, Robertson, and Buhyoff 2004; Jakes 2006; Hull and Ashton 2008; Davis and Fly 2010).

Based on the documented benefits of such groups, collaborative conservation partnerships have been proposed as a potentially effective vehicle for reaching family forestland owners with sustainable land management options (Kittredge 2005; Wolf and Hufnagl-Eichiner 2007; Sagor, Broussard, and Kueper 2008). Collaborative conservation partnerships have successfully informed private forestland management in Europe for centuries (Anderson 2003; Kittredge 2005) and in Australia since the 1990s (Curtis and Lacy 1996; Curtis and Lockwood 2000; Colliver, Lucas, and Moore 2008). Munsell *et al.* (2009) concluded that collaborative conservation partnership-type groups could help forestland owners better implement sustained-use management, and participatory peer networks have been found to enhance diffusion of more progressive and complex land management systems, such as agroforestry (Clarke 1991; Kelso and Jacobson 2011).

Understanding who participates in collaborative conservation partnerships is one

potentially useful approach for tailoring outreach and learning activities and measuring the resource impacts of these groups. Shaping effective programs for family forest owners in a collaborative conservation partnership requires adequately grasping their interests, resources, and current management activities. For instance, the land base held by collaborative conservation partnership members indicates the potential amount of actual ground-level impacts; subjects of member interest are likely to attract higher participation rates; and disproportionate gaps in owner characteristics may point to untapped membership opportunities (Magill, McGill, and Fraser 2004; Downing and Finley 2005; Nowak, Bowen, and Cabot 2006).

Collaborative conservation partnership participant characteristics in Australia and Wisconsin exhibit differences but, despite being on different continents, also share key similarities (Black and Reeve 1993; Curtis and Nouhuys 1999; Rickenbach, Zeuli, and Sturgess-cleek 2005; Rickenbach, Guries, and Schmoldt 2006). Several studies found that collaborative conservation partnership members tend to be younger, have larger landholdings, be more engaged in management activities, and be better educated than typical landowners (Black and Reeve 1993; Curtis and Nouhuys 1999; Rickenbach, Zeuli, and Sturgess-cleek 2005; Rickenbach, Guries, and Schmoldt 2006). Research suggests, however, that generalizations about member characteristics may not always be robust across large scales (Black and Reeve 1993). One generalization that may hold, however, is the potential similarity between collaborative conservation partnership members and Rogers (2003) early adopter and innovator ideal types (Black and Reeve 1993).

Diffusion of Innovations shows how new ideas and technologies are spread

through a population (Rogers 2003). According to this theory, individuals can be classified into ideal types based on their willingness to adopt new innovations. Innovators and early adopters tend to be the first people to seek and try out new ideas, while the early majority, late majority, and laggard ideal types adopt at a later point in time. Early adopters of agricultural and forest management practices tend to own relatively large acreages, be financially secure, be well educated, be socially well-connected, and have substantial contact with technology transfer agents (Diederer *et al.* 2003; Rogers 2003). They often serve as community role models and are termed “opinion leaders” because of their part in spreading ideas among a population.

Categorizing current collaborative conservation partnership member characteristics may indicate the current level of social acceptance and adoption as well as potential next steps for broadening collaborative conservation partnership membership. Members may be categorized by Rogers (2003) ideal types to indicate current levels of social acceptance and diffusion, and the family forest owner clusters may indicate which types of landowners are drawn to collaborative conservation partnerships and where to tailor advertising.

Objectives

To better identify collaborative conservation partnership member resources and needs, this study measured the demographics, land holdings, management activities, motivations for participation, and educational sources among members of 5 collaborative conservation partnerships in Southwestern Virginia using the Collaborative Conservation Partnership Member (CCPM) Survey found in Appendix A. Collaborative conservation partnership member characteristics were then compared with statewide results from a

comprehensive extant database of family forest landowners compiled by the U.S. Forest Service as part of the National Woodland Owner Survey (NWOS) (Butler and Leatherberry 2004; Butler 2009; Butler, Miles, and Hansen 2009). State-level data was chosen to minimize the potential influences of varying public policies, forest-based management needs, and population-level demographics that differ over large geographic contexts. Similarities and differences between collaborative conservation partnership family forest owners and results of the NWOS help describe which family forest owner typologies are participating in the collaborative conservation partnerships in this study and how associated programs may expand their reach.

Methods

Members of 5 collaborative conservation partnerships in Southwest Virginia were surveyed to measure demographics, forestland ownership characteristics, and motivations for participating in a collaborative conservation partnership. Because the groups included in this study were small, ranging from 15 to 27 members each, high response rates were necessary to achieve useful results.

The Internal Review Board approved CCPM survey (Appendix A) included 18 focal questions to minimize burden on survey-takers and maximize response rates (Heberlein and Baumgartner 1978; Burchell and Marsh 1992; Janes 1999; Jepson *et al.* 2005; Neuman 2006). The majority of survey questions were taken directly from existing, pilot-tested non-industrial private woodland owner questionnaires (Butler and Leatherberry 2004; Butler, Miles, and Hansen 2009; Rasamoelina, Johnson, and Hull 2009). Situational questions about management practices, information sources, demographics, collaborative conservation partnership participation, and landholdings

were included to allow for comparisons with data from the extant family forest owner survey, evaluation of data using previous classification schemes, and description of case study collaborative conservation partnership members.

Attitudinal questions found in other forest landowner surveys were minimized because: (1) attitudinal responses can be unstable, particularly among smaller samples (Zaller and Feldman 1992); and (2) reliable measures of attitude may require lengthy or redundant questions that may negatively impact response rates (Alwin and Kronsnick 1991). Five questions pertaining to collaborative conservation partnership engagement were developed specifically for this study and could not be compared with NWOS results. These questions asked members about their motivations for collaborative conservation partnership involvement, involvement in other conservation groups, collaborative conservation partnership advertising mediums, and an exploratory self-rating of innovativeness to group respondents into diffusion ideal types.

Leaders of 5 collaborative conservation partnerships that cover a total of 18 counties in southwest Virginia were contacted for permission to survey their members. Anonymous surveys and personalized cover letters were sent via U.S. mail to the member mailing lists of 4 of the collaborative conservation partnerships, and leaders of the 5th collaborative conservation partnership requested that surveys be completed and collected in person at a group meeting. Survey recipients who belonged to multiple collaborative conservation partnerships were asked to complete only one survey. Though the initial survey design included follow-up reminders as recommended by Dillman (2001), researchers ultimately chose not to send reminders because: (1) a high response rate of 87% had already been achieved; and (2) researchers were cautioned that inundating

members with reminders may damage institutional relationships with the groups.

Extant statewide data on Virginia's family forestland owners were collected from the 2004 National Woodland Owner Survey (NWOS) online database (Butler, Miles, and Hansen 2011). NWOS data were employed statistically as an estimated statewide population distribution of family forest owners; while not a census, NWOS represent the best available population approximation. NWOS is a U.S. Forest Service program that characterizes U.S. family forestland owners and their land holdings through periodic surveys of random family forestland owners in each state. Results are available online in a tabular format broken down by question and response categories. This database is widely cited and has been utilized in several previous landowner classification studies (Butler *et al.* 2007; Majumdar, Teeter, and Butler 2008; Majumdar, Teeter, and Butler 2009). For more information on the procedures and analysis of NWOS data, please refer to Butler, Leatherberry, and Williams (2005).

Descriptive statistics were calculated to characterize collaborative conservation partnership participants. These statistics were calculated by mean and mode, and comparisons were made between family forest owning members and non-owning collaborative conservation partnership members. Items left blank were discarded pairwise when calculating descriptive statistics.

To run comparative statistics between statewide NWOS respondents and CCPM respondents, multiple choice responses were tallied by category for both the NWOS and collaborative conservation partnership surveys. For a few questions, this required re-coding numerical data from the CCPM survey (ex. acreage owned) into predetermined NWOS categories. NWOS responses were used as population-level expected goodness of

fit values, and a goodness of fit test was run for each question comparing actual CCPM results to the expected values derived from NWOS data. Yates corrected chi-square values were used for goodness of fit tests because the small CCPM sample size resulted in some expected values of less than five (Lowry 1998).

Because the NWOS responses were used as statewide family forest owner population estimates, the very remote possibility that some respondents may have filled out both surveys should not skew results. Had all CCPM respondents been intentionally removed from the NWOS data, the resulting expected values would no longer have represented a random, unbiased sample predictive of population-level characteristics.

Chi-square values were compared to critical values at the 95th or greater percent confidence level for each multiple choice question to determine whether significant differences exist between NWOS and CCPM responses. Standard residuals were then calculated for questions showing statistically significant differences between CCPM and NWOS responses. Residual values greater than 2 were interpreted as major influences to the statistical difference (1999; Stricker 2008).

Results

Out of the 84 paper surveys administered, 68 were returned completed and usable for an 87% overall response rate. 4 surveys were returned as undeliverable, and 1 was returned from blank from its recipient. Individual collaborative conservation partnership response rates ranged from 67% to 100% completion. Descriptive statistics were calculated for all 68 completed surveys. Of the 68 surveys, only 55 were Virginia forest owners. Thus chi-square goodness of fit tests were administered using only 81% of respondents.

Descriptive Results, All Respondents

To describe collaborative conservation partnership members as a whole, regardless of forest ownership, the results in Table 2 are derived from all CCPM respondents. The mean collaborative conservation partnership member by earns \$50,000-\$99,999 annually and is 55-64 years old. Members are highly educated; all respondents have at least a GED, and almost half hold a graduate degree. All respondents are white, and the majority is male, as calculated by mode. Sixty percent of members also participate in at least one other stewardship network, and almost a third of respondents were members of at least 2 of the collaborative conservation partnerships surveyed.

Characteristic	N	Response Category	Percent of Respondents	Mean	Mode
Primary motivations for collaborative conservation partnership membership*	67	Environmental	79%		
		Educational	79%		
		Economic	46%		
		Social	44%		
Initial information source about collaborative conservation partnership*	67	Word of mouth	46%		
		Presentation	25%		
		Other organization	16%		
		Advertisement	15%		
Belong to multiple conservation groups	68		60%		
Gender	66	Male	59%		
		Female	36%		
		Both (a couple)	5%		
Household Annual Income	61			\$55,000-\$99,000	\$55,000-\$99,000
Age^A	69			55-64	55-64
Race	66				White
Educational Attainment^A	70			Bachelor's Degree	Master's Degree
* Indicates responses were not mutually exclusive					
^A Some respondents listed separate answers for husband versus wife, so N exceed 68					

Respondents were allowed to choose multiple motivations for participation. Of the options listed, both promoting environmental stewardship and learning and sharing ideas were listed as primary motivations by 79% of respondents. Economic and social purposes were less prominent, listed by only 46% and 44% of participants, respectively. Respondents were asked how they initially learned about their collaborative conservation partnership in an open-ended question. In descending order, responses included: (1) from word-of-mouth or friends; (2) through a presentation or workshop; (3) via engagement in another organization; (4) from newspaper or online advertisements; (5) by helping start the group; and (6) from a targeted mailing. Word-of-mouth was the

most prolific recruitment tool, bringing in just over 45% of the membership. Presentations accounted for 25% of recruitment, and 16% of members heard about their collaborative conservation partnership through participation in another organization. Some groups have had success advertising in newspapers, online, or other places, and 15% of respondents listed advertisements as the original information source regarding their organization. Only one respondent joined as a result of a targeted mailing.

Though the sample size was too small to calculate statistically robust differences between forestland-holding and non-forestland-owning members, a descriptive breakdown by forestland ownership showed only two potentially meaningful distinctions. First, forestland owners were a little more than three times as likely as non-landowners to become members for economic reasons (15% versus 53% of respondents). Second, non-forestland owners were nearly twice as likely to learn about collaborative conservation partnership opportunities through friends as forestland owners (69% versus 40%), while forestland owners were the only ones who joined as a result of presentations from network leaders. On all other accounts, members shared similar traits.

Descriptive Results, Forest Owner Respondents Only

Results (Table 3) were derived using responses from the 55 forest landowning CCPM respondents. Family forest owners possessed a mean of 95 acres, median of 45 acres, and a total of 5,015 acres. Median land tenure was 20 years, and 75% of respondents lived on their forestland. This high percentage of residence likely corresponds with the most frequently listed motivations for ownership. More than a quarter of CCPM respondents listed either living on site, recreation, or appreciation for the woods as their primary motivation for purchasing land. Because this was an open

ended question, respondents gave as few as 1 and as many as 4 reasons, some respondents listed all of the top responses, and motivation categories were developed inductively after responses were compiled, it was felt that numerical statistics would not accurately describe the real underlying spread of motivations, so statistics were not calculated for this question.

Table 3. Descriptive statistics about forestland-owning CCPM respondents		
Characteristic	N	Response
Acres forestland owned (mean)	48	95
Acres of forestland owned (median)	48	45
Years of land tenure (mean)	48	24
Years of land tenure (median)	48	20
Primary residence (percent)	48	75%
Primary ownership motivations (descending order)	48	Live there
		Appreciate the woods/aesthetics/privacy
		Recreation
Harvests (percent)	48	58%
Most common harvest objectives (percent of respondents who have conducted harvests)	26	Improve forest health (44%)
		Achieve objectives in management plan (44%)
		Obtain products for personal use (41%)
Primary information sources (percent)	39	Virginia Department of Forestry (87%)
		Conservation organizations (57%)
		Extension/university personnel (55%)
		Private consultant (49%)
Which category best describes you (percent)*	50	I like to experiment with new ideas and be the first to try something new (53%)
		I am willing to try new things but don't like to be the first (21%)
		I usually wait (26%)
* Some respondents gave different answers for husband versus wife		

A little over half of respondents had harvested trees in the past decade, and most of these harvests occurred in order to: (1) obtain products for personal use such as firewood; (2) improve forest health; or (3) achieve management plan objectives. Most respondents have sought management information, primarily from Virginia's state

forestry agency. Other common information sources were conservation organizations such as other collaborative conservation partnerships and Cooperative Extension or other university personnel. The last question sought to probe whether respondents generally saw themselves as innovative risk-takers; the 5 response categories given on the survey form are condensed above into 3 categories. 75% of respondents reported that they like to try new ideas (first and second categories), and fully 53% prefer to be the first to adopt a new innovation (first category).

Comparative Results, Forest Owner Respondents Only

The following chi-square statistics were calculated using the 55 forest owning respondents and a population parameter derived from statewide NWOS data . Expected and observed values by percent, derived from NWOS data and collaborative conservation partnership surveys respectively, are shown in Tables 4 and 5 along with corrected chi-square values. Age, resident versus absentee ownership, and harvest levels did not differ significantly between collaborative conservation partnership members and the statewide family forest ownership patterns as estimated by NWOS (Butler, Miles, and Hansen 2009). The typical respondent in both surveys was 55-64 years old, resided on his or her woodland property, and had harvested trees within the past decade.

Question	Response	Expected Responses		Actual Responses		χ^2	e
		Percent	Value	Percent	Value		
What is your household's annual income?	<25,000	12%	7	7%	4		-1
	25,000-49,999	25%	14	16%	9		-1.33
	50,000-99,999	32%	18	45%	25		1.75
	100,000-199,999	19%	10	18%	10		-0.08
	>200,000	1%	1	5%	3		2.80 ^B
	No answer	11%	6	2%	1	12.82 ^A	-2.01 ^B
What is your age?	<35	1%	1	0%	0		
	35-44	4%	3	4%	2		
	45-54	29%	16	27%	15		
	55-64	32%	17	40%	22		
	65-74	15%	8	13%	7		
	75+	12%	7	13%	7		
	No answer	6%	4	0%	0	3.72	
What is the highest degree or level of school that you have completed?	<12th grade	19%	10	0%	0		-3.20 ^B
	High school/GED	16%	9	11%	6		-0.89
	Some college	15%	9	11%	6		-0.85
	Associate/technical degree	11%	6	7%	4		-0.91
	Bachelor's	15%	8	24%	13		1.61
	Graduate	20%	11	47%	26		4.62 ^B
	No answer	4%	2	0%	0	34.12 ^A	-1.48
What is your sex?	male	76%	42	60%	33		-1.33
	Female	15%	8	35%	19		3.69 ^B
	Both (a couple)	6%	3	5%	3		-0.16
	No answer	3%	2	0%	0	14.86 ^A	-1.33

^A indicates a significant results at the 0.05 level
^B indicates a major influence to statistically significant results
* indicates that answers were not mutually exclusive, so totals may not equal 100%

Table 5. Yates corrected chi-square and standard residual values comparing CCPM respondent to NWOS respondent forestland characteristics							
Question	Response	Expected Responses		Actual Responses		χ^2	e
		Percent	Value	Percent	Value		
How many acres of woodland do you own in Virginia?	1 to 9	56%	31	20%	11		-3.60 ^B
	10 to 49	32%	18	29%	16		-0.42
	50 to 99	6%	3	25%	14		6.12 ^B
	100 to 499	5%	3	22%	12		5.60 ^B
	500 to 999	0%	0	2%	1		2.33 ^B
	1000 to 4999	0%	0	2%	1		2.33 ^B
	>5000	0%	0	0%	0		0
	No answer	0%	0	0%	0	76.47 ^A	0
Is your primary residence on your woodland property?	Yes	73%	40	75%	41		
	No	23%	13	25%	14		
	No answer	4%	2	0%	0	1.5	
Do you have a conservation easement?	Yes	1%	1	31%	17		17.86 ^B
	No	95%	52	69%	38		-1.94
	No answer	4%	2	0%	0	304.15 ^A	-1.43
Have trees been harvested or removed from any of your woodland in the last ten years?	Yes	51%	28	58%	32		
	No	47%	26	42%	23		
	No answer	2%	1	0%	0	0.55	
Why have you harvested or removed trees from your woodlands in the past ten years?*	Part of plan	11%	6	25%	14		3.35 ^B
	Trees mature	27%	15	22%	12		-0.72
	Money	12%	7	11%	6		-0.27
	Personal Use	15%	8	25%	14		1.96
	Clear Land	16%	9	18%	10		0.37
	Right Price	2%	1	5%	3		1.4
	Hunting	1%	0	9%	5		7.16 ^B
	Improve Recreation	2%	1	9%	5		4.13 ^B
	Natural Catastrophe	9%	5	11%	6		0.42
	Improve Quality	15%	9	20%	11	68.96 ^A	0.86
	What sources of information have you ever used to get information for managing your forest?*	VDOF	4%	2	75%	41	
Extension		1%	1	47%	26		34.41 ^B
Private consultant		4%	2	42%	23		14.62 ^B
Industry		1%	0	11%	6		8.72 ^B
Neighbor		1%	1	18%	10		12.78 ^B
Logger		8%	4	7%	4		-0.12
No answer		4%	2	15%	8	2282.9 ^A	3.72 ^B

^A indicates a significant results at the 0.05 level
^B indicates a major influence to statistically significant results
* indicates that answers were not mutually exclusive, so totals may not equal 100%

Significant differences were found between CCPM and NWOS landowners in the following attributes: (1) household income; (2) educational attainment; (3) presence of conservation easements; (4) gender; (5) acres of woodland owned; (6) management information sources; and (7) motivations for harvests. The last columns in Tables 3 and 4 show deviance in statistically significant response categories calculated by standard residuals.

Demographically, CCPM respondents were more likely to make more than \$200,000 annually. Perhaps correspondingly, CCPM respondents were more likely to have advanced graduate degrees and less likely to not have graduated high school. Relatively more women were observed in the CCPM than the NWOS survey.

Several significant differences were found between the landholdings and management activities of CCPM respondents and NWOS-based population estimates. CCPM respondents were much more likely to own large forested tracts of greater than 50 acres and less likely to own small parcels under 10 acres. CCPM respondents were also more likely to have conservation easements on their properties. They sought more management information in general, particularly from state foresters, universities and extension programs, private consultants, industrial foresters, and other landowners. And CCPM respondents were more likely to harvest trees for recreational, hunting, personal use, and management plan purposes than NWOS respondents. Though CCPM respondents indicated more diverse motivations for harvesting, it is important to keep in mind that harvest levels were similar for NWOS and CCPM respondents, hovering just over 50%.

Discussion

Collaborative conservation partnerships are a relatively new phenomena in the U.S., and results from this survey indicate that the collaborative conservation partnerships that were studied are likely in the early stages of diffusion (Anderson 2003; Bradshaw 2003; Conley and Moot 2003; Rogers 2003; Ashton 2006). Members claimed to seek new ideas and technologies, and their demographic characteristics parallel Rogers' (2003) innovator and early adopter ideal types. In particular, members share high socioeconomic status, high education levels, significant contact with technology transfer agents, large landholdings, high levels of social participation, and age distributions reflective of the general family forest owner population.

Partnership members do not fit neatly into any of the pre-determined landowner clusters identified in previous landowner classification studies (Kluender and Walkingstick 2000; Majumdar, Teeter, and Butler 2008; Majumdar, Teeter, and Butler 2009; Surendo, Mehmood, and Schelhas 2009; Brown and Vewsell 2010). Their timber harvest levels match those of Butler *et al.*'s (2007) "working the land" category, while their educational levels mirror that of Surendra *et al.*'s (2009) "passive urban" landowner. CCPM respondents have almost twice the rate of conservation easements of any previous landowner cluster. Attempts at comparison place the CCPM respondents straddling Majumdar *et al.*'s (2008) non-timber and multiple-objectives classifications as well as Butler *et al.*'s (2007) "working the land" and "woodland retreat" owners. The CCPM respondents in this survey appear most similar to Kluender and Walkingstick's (2000) timber managers, though the percents residing on-property and harvesting timber still vary considerably. This lack of fit suggests that collaborative conservation partnerships have potentially broad appeal among landowners. Innovators and early adopters from a

wide range of previously identified family forest owner clusters appear to be joining collaborative conservation partnerships.

The fact that some of the collaborative conservation partnerships studied were over 10 years old and still composed of earlier adopters indicates that these groups are, in general, spreading slowly among family forest owners. Results show that these groups have done little to market themselves, which could be a significant inhibitor. To date, it appears that most awareness of collaborative conservation partnership opportunities is engendered through interpersonal ties. Forty-six percent of CCPM respondents learned about collaborative conservation partnership opportunities through friends and word-of-mouth, while other methods were less than half as common. This finding underscores the importance of social networks in the expansion of collaborative conservation partnerships and points to the potential for growth among a wide forest owner demographic through diversification of marketing mediums.

One potentially new marketing strategy is the addition of social activities at collaborative conservation partnership events. Collaborative conservation partnerships known as Landcare groups, for example, often link social and educational activities (Curtis and Nouhuys 1999; Curtis 2000; Baw Baw Shire Council 2011). Socializing with like-minded individuals was the least powerful standalone motivation for joining a collaborative conservation partnership in this study; social motivations were found to resonate only in conjunction with other reasons. This suggests that socially-oriented segments of landowners are largely untapped by the collaborative conservation partnerships in this study. Increasing social opportunities may attract new, different members and expand the collaborative conservation partnership member base. Future

research could test whether member demographics and preferences change as a result of introducing more socially-oriented interactions.

Though this analysis only demonstrates correlation and not causation, it nevertheless appears that the CCPM respondents are much more involved in landowner education than the typical NWOS family forest owner. CCPM respondents have higher contact with state foresters, Extension staff, university employees, private consultants, industrial foresters, and other landowners. Members also listed conservation organizations as a major source of information, so they are gaining knowledge either through involvement in collaborative conservation partnerships or other conservation and certification groups such as LandTrusts or Tree Farmer. Further, CCPM respondents indicated education as one of their top motivations for belonging to collaborative conservation partnerships. Presumably, collaborative conservation partnerships are fulfilling this education need. Ultimately, it is evident that the collaborative conservation partnerships in this study effectively bring together, and perhaps grow, educationally-oriented landowners and their interests in forest management information and technology.

The fact that they bring together educationally-motivated landowners indicates that collaborative conservation partnerships in this study are serving as forestry education channels. Landowners in these groups appear to be motivated and eager for technology transfer and education. Findings suggest that environmental and educational motivations are the most common drivers of membership in these groups, so members are likely to seek management knowledge through their collaborative conservation partnerships. With this in mind, it seems reasonable to suggest that in this respect members represent

“model” and “prime prospect” landowners as identified by Butler *et al.* (2007), making them receptive candidates for education outreach and contact with forestry professionals.

The collaborative conservation partnerships we studied are also most likely to seek professional advice on topics of interest to their members. It appears likely that these groups seek advice on management for recreation and aesthetics rather than legacy or timber profit. Forest owning CCPM respondents were particularly likely to report that they manage their land for personal use, hunting, recreation, and scenic benefits, while harvests for income purposes occur at the same frequency as statewide averages. Similar to nationwide trends, survey respondents are less motivated by economic objectives than other management interests (Butler and Leatherberry 2004; Majumdar, Teeter, and Butler 2008; Butler 2009; Majumdar, Teeter, and Butler 2009). Unlike southwide trends, CCPM respondents are not particularly motivated by legacy (Butler and Leatherberry 2004). It is probable that this difference is a result of an intensive focus on current management rather than passive, perhaps more amenity-oriented objectives which would lend themselves to a greater immediate interest in estate issues. Forest management professionals involved in collaborative conservation partnership programs should keep in mind member motivations, adapt their materials to address multiple management objectives, and tailor instruction to stewardship, privacy, and recreation-oriented individuals who live on large forested properties.

CCPM respondents are also much more likely to hold conservation easements than the typical NWOS family forestland owner. There are 2 potential explanations for this phenomenon. Because conservation easements are a relatively new stewardship technology, they are most likely to be held by early adopters and innovators. The fact that

a relatively high proportion of the CCPM respondents have conservation easements may correlate with earlier adopter status. Alternatively, the high proportion of conservation easements may result from positive CCPM respondent attitudes toward use of social programs to achieve larger conservation objectives, which fits hand-in-hand with their stated interests in environmental stewardship and multiple-use forest management objectives. Regardless of cause, the fact that a third of CCPM respondents have conservation easements indicates that they are seeking out and implementing stewardship options.

Critical for the future of collaborative conservation partnerships will be growth, both in terms of forest owner participation and general community involvement. The former may help shape better and more sustainable forest management practices, while the latter could add credibility, build capacity, and foster acceptance of local, place-based forest management. A significant percent of CCPM respondents were not family forest owners, many of whom (1) owned farmland without woodlots, (2) were interested in ecological education as a hobby, or (3) wanted to support conservation initiatives in general. Some of them actively attend meetings, while others support the collaborative conservation partnerships mainly through economic donations. Achieving growth in all collaborative conservation partnership member types and the realization of the potential benefits will require tailored programs, materials, and overall goals to also account for diverse member backgrounds.

Conclusions

Collaborative conservation partnerships have been identified as a potentially effective medium for engaging landowners (Sagor, McDonough, and Allred 2009).

Results from a survey of 5 collaborative conservation partnerships in southwestern Virginia indicate that these groups are comprised of family forest owners and other interested citizens who are eager for knowledge and interaction centered on forest management practices and principles. Family forest owning collaborative conservation partnership members have a high proportion of conservation easements, seek management information from various sources, and are likely to harvest timber for multiple objectives. Results demonstrate that collaborative conservation partnerships could be prime outlets for dedicated educational outreach and technical assistance.

It has been suggested that educational materials for collaborative conservation partnerships may be most effective if tailored to member interests and characteristics. Results from this study indicate that tailored materials should focus on environmental sustainability, be applicable to large acreages, and either improve or preserve the wildlife, aesthetic, and recreational values of woodlands. Collaborative conservation partnership members tend to own large acreages, be open to innovative ideas, and have the economic means to implement conservation practices.

Multiple other social marketing studies have classified family forest owners to enhance the effectiveness of outreach. Some incongruence between existing landowner social marketing clusters and the collaborative conservation partnership members in our study indicate that collaborative conservation partnerships may be uniting landowners from diverse management backgrounds. Forest owning CCPM respondents in this study have little interest in issues of estate planning, but similar to previous studies of family forest owners, they expressed notable interest in the hunting, recreation, aesthetic, privacy, and stewardship benefits of their forestlands.

Though not falling within family forest owner clusters, CCPM respondents share characteristics of early adopter and innovator idea types, indicating that collaborative conservation partnerships may not yet be a commonly accepted medium among previously defined landowner types. The collaborative conservation partnerships in our study currently include highly educated, middle-aged, upper-middle class, white community members. Forest-owning members tend to live on large forested properties and be interested in multiple-objective management, while non-owner members appear mostly interested in learning about forest management and supporting conservation initiatives. The relative newness of collaborative conservation partnerships in the region could be the primary driver of the demographic profiles of both member types. If they are to grow, additional marketing methods that span social networks may increase the diffusion and adoption of collaborative conservation partnerships in southwestern Virginia and other forested regions of the United States.

This study points to several future research directions related to collaborative conservation partnerships. Further efforts are needed to address: (1) whether collaborative conservation partnership adoption is continuing to expand and reach new adopter categories; (2) the effects of advertising on collaborative conservation partnership growth and demographics; (3) whether members share common characteristics that could be used to distinguish them as a distinct social marketing cluster; (4) if participation in a collaborative conservation partnership influences the forest management objectives of members; and (5) the forest-level impacts of collaborative conservation partnerships. Following the demographic profiles of collaborative conservation partnership members may help professionals engage collaborative conservation partnerships and adequately

tailor their messages. If collaborative conservation partnerships can continue to expand their membership and land base, they have the potential to become a driving force in land management, useful mediums for landowner learning and community capacity building, and ultimately a thriving and effective arm of the community conservation movement.

References

- Alwin, Duane F, and Jon A Kronsnick. 1991. "The reliability of survey attitude measurement." *Sociological Methods Research* no. 20 (1):139-181.
- Anderson, Nathaniel M. 2003. Enhancing the growth and economic viability of landowner cooperatives to improve sustainable forest management in the United States. College Park: Maryland.
- Applied statistics handbook*. 2011. AcaStat Software, Inc 1999 [cited April 27, 2011 2011]. Available from <http://www.acastat.com/index.htm>.
- Ashton, Sarah F. 2006. *A study of cooperative ventures addressing the needs of forest landowners in southern Appalachia*, Forestry, Virginia Tech, Blacksburg, VA.
- Baw Baw Shire Council. *Landcare*. AusSoft Solutions 2011 [cited April 27, 2011].
- Berkes, Fikret. 2007. "Community-based conservation in a globalized world." *Proceedings of the National Academy of Sciences* no. 104 (39):15188-15193.
- Black, Alan W, and Ian Reeve. 1993. "Participation in Landcare groups: The relative importance of attitudinal and situational factors." *Journal of Environmental Management* no. 39:51-71.
- Blinn, C R, P J Jakes, and M Sakai. 2007. "Forest landowner cooperatives in the United States: A local focus for engaging landowners." *Journal of Forestry* no. 105 (5):245-251.
- Bradshaw, Ben. 2003. "Questioning the credibility and capacity of community-based resource management." *The Canadian Geographer* no. 47 (2):137-150.
- Broussard, Shorna R, and Kenli A Schaaf. 2004. "A private lands perspective on collaboration." *Journal of Community Based Collaborative Research* (Spring):2004.
- Brown, Margaret, and denise Vewsell. 2010. "Using a market segmentation approach to better target agricultural extension programs-- Aligning learner needs with learning programs." *Journal of Extension* no. 48 (5).
- Burchell, Brendan, and Catherine Marsh. 1992. "The effect of questionnaire length on survey response." *Quality and Quantity* no. 26 (3):233-244.
- Butler, B J, and E C Leatherberry. 2004. "America's family forest owners." *Journal of Forestry* no. 107 (7):4-9.
- Butler, B J, M Tyrell, G Feinberg, S VanManen, L Wiseman, and S Wallinger. 2007. "Understanding and reseraching family forest owners: Lessons from social marketing research." *Journal of Forestry* no. 105 (7):348-357.
- Butler, Brett J. 2009. Who owns Virginia's forests? Blacksburg, VA: Virginia Tech.
- Butler, Brett J, Earl C Leatherberry, and Michael S Williams. 2005. Design, implementation, and analysis methods for the National Woodland Owner Survey.

- In *General Technical Report*. Newton Square, PA: United States Department of Agriculture Forest Service Northeastern Research Station.
- Butler, Brett J., Patrick D. Miles, and Mark H. Hansen. 2011. National Woodland Owner Survey Tabler web-application version 1.0. U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Butler, Brett J., Patrick D. Miles, and Mark H. Hansen. *National Woodland Owner Survey Tabler web-application version 1.0*. U.S. Department of Agriculture, Forest Service, Northern Research Station 2009 [cited Wed Nov 18. Available from <http://fiatools.fs.fed.us/NWOS/tablemaker.jsp>].
- Clarke, Jeanette. 1991. "Participatory technology development in agroforestry: Methods from a pilot task in Zimbabwe." *Agroforestry Systems* no. 155:217-228.
- Colliver, R, D Lucas, and S Moore. 2008. Agent, partner or activist: The role of community Landcare in creating sustainable rural landscapes. In *Community Development and Ecology Conference*. Deakin University, Melbourne.
- Conley, Alexander, and Margaret A Moot. 2003. "Evaluating collaborative natural resource management." *Society and Natural Resources* no. 16:371-386.
- Curtis, Allan. 2000. "Landcare: Approaching the limits of voluntary action." *Australian Journal of Environmental Management* no. 7 (1):19-27.
- Curtis, Allan, and Terry De Lacy. 1996. "Landcare in Australia: Does it make a difference?" *Journal of Environmental Management* no. 46:119-137.
- Curtis, Allan, and Michael Lockwood. 2000. "Landcare and catchment management in Australia: Lessons for state-sponsored community participation." *Society and Natural Resources* no. 13 (1):61-73.
- Curtis, Allan, and Marike Van Nouhuys. 1999. "Landcare participation in Australia: The volunteer perspective." *Sustainable Development* no. 7:98-111.
- Curtis, Allan, Marike Van Nouhuys, Wayne Robinson, and Jacinta Mackay. 2000. "Exploring Landcare effectiveness using organisational theory." *Australian Geographer* no. 31 (3):349-366.
- Davis, Miriam, and J Mark Fly. 2010. "Do you hear what I hear: Better understanding how forest management is conceptualized and practiced by private forest landowners." *Journal of Forestry* no. October/November:321-328.
- Diederer, Paul, Hans van Meijl, Arjan Wolters, and Katarzyna Bijak. 2003. "Innovation adopters in agriculture: Innovators, early adopters and laggards." *Cahiers d'economie de sociologie rurales* no. 67:29-50.
- Dillman, Don A. 2001. *Mail and internet surveys: the tailored design method*. 2nd Ed. ed. New York: Wiley.
- Downing, Adam K, and James K Finley. 2005. "Private forest landowners: What they want in an educational program." *Journal of Extension* no. 43 (1).
- Egan, A, and S Jones. 1993. "Do landowner practices reflect beliefs." *Journal of Forestry* no. 91 (10):39-45.
- Fajvan, Mary Ann, Shawn T Grushecky, and Curt C Hassler. 1998. "The effects of harvesting practices on West Virginia's wood supply." *Journal of Forestry* no. 96 (5):33-39(7).
- Finley, Andrew O, and David B Kittredge. 2006. "Thoreau, Muir, and Jane Doe: Different types of private forest owners need different kinds of forest management." *Northern Journal of Applied Forestry* no. 23 (1).

- Heberlein, Thomas A, and Robert Baumgartner. 1978. "Factors affecting response rates to mailed questionnaires: A quantitative analysis of the published literature." *American Sociological Review* no. 43 (4):447-462.
- Hines-Ward, Gretchen, Eric Jokela, Lynn Starr, Hubert Hinote, Kevin L O'Hara, and Peter Womble. 1993. "Cooperative models: Educating landowners, managers, and the public." *Journal of Forestry* no. 91 (10):28-30.
- Hobbs, Stephen D, A Scott Reed, and Beverly B Hobbs. 1993. "Technology transfer: Putting research into practice." *Journal of Forestry* no. 91 (10):12-14.
- Hull, Bruce, David Robertson, and Gregory J Buhyoff. 2004. "Boutique" forestry - New forest practices in urbanizing landscapes." *Journal of Forestry* no. 102 (1):14-19.
- Hull, R Bruce, and Sarah Ashton. 2008. "Forest cooperatives revisited." *Journal of Forestry* no. 98 (3):100-105.
- Jakes, Pamela. 2006. *Forestry cooperatives: What today's resource professionals need to know*. Saint Paul, MN: USDA Forest Service.
- Janes, Joseph. 1999. "Survey construction." *Library Hi Tech* no. 17 (3):321-325.
- Jepson, Christopher, David A Asch, John C Hershey, and Peter A Ubel. 2005. "In a mailed physician survey, questionnaire length had a threshold effect on response rate." *Journal of Clinical Epidemiology* no. 58 (1):103-105.
- Kelso, Anna, and Michael Jacobson. 2011. "Community assessment of agroforestry opportunities in GaMothiba, South Africa." *Agroforestry Systems* no. 82 (in press).
- Kittredge, D B. 2005. "The cooperation of private forest owners on scales larger than one individual property: International examples and potential application in the United States." *Forest Policy and Economics* no. 7:671-688.
- Kluender, R A, and T L Walkingstick. 2000. "Rethinking how nonindustrial landowners view their lands." *Southern Journal of Applied Forestry* no. 24 (3):150-158.
- Lauber, T Bruce, Daniel J Decker, and Barbara A Knuth. 2008. "Social networks and community-based natural resource management." *Environmental Management* no. 42 (677-687).
- Lowry, Richard. 1998. *Concepts and applications of inferential statistics*. Poughkeepsie, NY: Online: <http://faculty.vassar.edu/lowry/webtext.html>.
- Magill, Daniel J, David W McGill, and Rory F Fraser. 2004. "Refining outreach to woodland owners in West Virginia-- Preferred topics and assistance methods." *Journal of Extension* no. 42 (4).
- Majumdar, I, L Teeter, and B Butler. 2008. "Characterizing family forest owners: A cluster analysis approach." *Forest Science* no. 54 (2):176-184.
- Majumdar, I, L D Teeter, and B J Butler. 2009. "Using extant data to determine management direction in family forests." *Society and Natural Resources* no. 22:867-883.
- Munsell, John F, Rene H Germain, Eddie Bevilacqua, and Rudy M Schuster. 2006. "Voluntary best management practice implementation by nonindustrial private forestland owners in New York City's water supply system." *Northern Journal of Applied Forestry* no. 23 (2):133-140.
- Munsell, John F, Rene H Germain, Valerie A Luzadis, and Eddie Bevilacqua. 2009. "Owner intentions, previous harvests, and future timber yield on fifty working

- nonindustrial private forestlands in New York state." *Northern Journal of Applied Forestry* no. 26 (2):45-51.
- Munsell, John F, Rene H Germain, and Ian A Munn. 2008. "A tale of two forests: Case study comparisons of sustained yield management on Mississippi and New York nonindustrial private forestland." *Journal of Forestry* no. 106 (8):431-439.
- Nadeau, E G, and P Pingrey. 2001. What's new in forest owner cooperation? In *The Timberline: Wisconsin Department of Natural Resources, Division of Forestry*.
- Neuman, W Lawrence. 2006. *Social Research Methods: Qualitative and Quantitative Approaches*. Edited by Jeff Lasser. New York: Pearson Education, Inc.
- Nowak, Pete, Sarah Bowen, and Perry E Cabot. 2006. "Disproportionality as a framework for linking social and biophysical systems." *Society and Natural Resources* no. 19:153-173.
- Rasamoelina, Maminaiaina S, James E Johnson, and R Bruce Hull. 2009. Demographic analysis of family forest owners in relation to educational program participation. In *2009 IUFRO 3.08 Small-Scale Forestry Symposium*, edited by Kate Piatek, Ben Spong, Steve Harrison and Dave McGill. Morgantown, WV (USA).
- Rickenbach, Mark G, Raymond P Guries, and Daniel L Schmoltdt. 2006. "Membership matters: Comparing members and non-members of NIPF owner organizations in southwest Wisconsin, USA." *Forest Policy and Economics* no. 8 (1):93-103.
- Rickenbach, Mark, Keimberly Zeuli, and Emily Sturgess-cleek. 2005. "Despite failure: The emergence of "new" forest owners in private forest policy in Wisconsin, USA." *Scandinavian Journal of Forest Reserach* no. 20 (6):503-513.
- Rogers, Everett M. 2003. *Diffusion of innovations*. 5th Edition ed. New York, NY: Free Press.
- Sagor, Eli, Shorna Broussard, and Amanda Kueper. 2008. Woodland owner networks: Assessing outcomes from several models used in the Unites States (Part II) Methodological considerations and preliminary findings. Paper read at Evolving challenges and changing expectations for forestry extension and technology transfer: Meeting the needs of people and forests around the globe, at Mattawa and Ottawa, ON.
- Sagor, Eli S, Maureen H McDonough, and Shorna Broussard Allred. 2009. Woodland owner networks and peer-to-peer learning. In *2009 IUFRO 3.08 Small-Scale Forestry Symposium*, edited by Kate Piatek, Ben Spong, Steve Harrison and Dave McGill. Morgantown, WV (USA).
- Stricker, D. 2008. "BrightStat.com: Free statistics online." *Computer methods and programs in biomedicine* no. 92 (135-143).
- Surendo, G C, MSayeed Mehmood, and John Schelhas. 2009. "Segmenting landowners based on their information-seeking behavior: A look at landowner education on the red oak borer." *Journal of Forestry* no. 107 (6):313-319.
- USDA Forest Service. 2008. Forest Inventory and Analysis: Forest Inventory Data Online. USDA Forest Service.
- Weber, Edward P. 2000. "A new vanguard for the environment: Grass-roots ecosystem management as a new environmental movement." *Society and Natural Resources* no. 13:237-259.
- Weinreich, N K. 1999. *Hands-on social marketing*. London: Sage Publications.

- Wilson, Geoff A. 2004. "The Australian Landcare movement: Towards 'post-productivist' rural governance?" *Journal of Rural Studies* no. 20:461-484.
- Wolf, S A, and S Hufnagl-Eichiner. 2007. "External resources and development of forest landowner collaboratives." *Society and Natural Resources* no. 20:675-688.
- Zaller, John, and Stanley Feldman. 1992. "A simple theory of the survey response: Answering questions versus revealing preferences." *American Journal of Political Science* no. 36 (3):579-616.

Chapter 4: Group-level Functional Analysis of Collaborative Conservation Partnerships

Abstract

Collaborative conservation partnerships have demonstrated large potential to positively influence knowledge and implementation of conservation practices worldwide, but their success rates in the U.S. are inconsistent. Using multi-disciplinary theories as a framework for deconstructing collaborative conservation partnerships, this study attempted to document key factors relating to their success in Southwestern Virginia. Qualitative data was obtained from key informant interviews and secondary documentation. Groups were operationalized as input-process-output systems composed of leadership, tasks, social capital, resources, processes, and changes over time. Results show that partnerships must remain flexible in order to adapt to changing situations and resources available over time, that leader energy dictates partnership activity level, that resources and social capital derive disproportionately from key actors, and that social capital is the foundation of most resource access. While flexibility and social capital appear important to partnership success, collaborative conservation partnerships exhibit great diversity and must structure themselves around context-specific factors within their membership and their embedding environments. This study paves the way for future research on collaborative conservation partnerships that utilizes multi-disciplinary perspectives to inform data analysis and further tests the universality of disproportionality, social capital, flexibility, and adaptive temporal responses within this type of group.

Justification

Many now contend that effectively dealing with the added complexities [of the environmental sector], while avoiding the problems associated with top-down approaches and free markets, requires complex, collaborative partnerships among diverse government, civic, and business actors at the state and local levels (Weber 2000).

This take on environmental management has resulted in the expansion of collaborative conservation partnerships that seek to influence practices through grassroots interaction and empowerment (Broussard and Schaaf 2004; Prager 2010). Collaborative conservation partnerships have been used to positively impact local conflict reduction, ecosystem restoration, policy changes, local economic infrastructure, and community capacity (Fisher 1995; Christoffersen *et al.* 2008) and to improve the coordination and marketability of small producers in the natural resources sector (Anderson 2003). They may help spread new innovations by connecting landowners with expert knowledge and technologies (Curtis *et al.* 2000; Wilson 2004; Lauber, Decker, and Knuth 2008) and facilitate community-based stewardship by promoting a conservation-oriented philosophy (Dolisca *et al.* 2009).

Collaborative conservation partnerships, by definition, involve constructive exchanges between local stakeholders seeking solutions to benefit the broader environment and community (Gray 1989; Selin and Chavez 1995). These partnerships may vary in their constitution but ultimately revolve around commitments to land management problem-solving, facilitate peer-to-peer learning, and remain responsive to stakeholders by maintaining distinct geographic relevance (Weber 2000; Sagor, Broussard, and Kueper 2008; Cheng and Mattor 2010; Prager 2010). These groups may employ economic incentives, education, peer pressure, policy, planning, monitoring, or any combination of the above to engender conservation (Coughlin *et al.* 1999). In some areas like Australia and Europe, collaborative conservation has achieved widespread

success (Curtis and Lacy 1996; Curtis and Lockwood 2000; Curtis *et al.* 2000; Kittredge 2005; Colliver, Lucas, and Moore 2008).

Collaborative conservation efforts in the U.S, however, have a less robust record (Berkes 2007). While hundreds of cases of collaborative conservation have been documented, relatively few have achieved long-term success. As of 2010, for example, only twenty forest cooperatives with a total of 500 members were estimated to be operating nationwide (Bagley 2010). Perhaps one of the most significant challenges for collaborative conservation partnerships is their incredibly diversity. They include but are not limited to public lands management planning councils, watershed committees, Landcare groups, forest cooperatives, Landtrusts, and community research partnerships (Danks 1996/1997; Coughlin *et al.* 1999; Curtis and Lockwood 2000; Kellert *et al.* 2000; Conley and Moot 2003; Kittredge 2005; Berkes 2007; Colliver, Lucas, and Moore 2008). The range of possible structures, programs, stakeholders, objectives, and cultures involved in these groups is immense. As Coughlin *et al.* (1999) succinctly wrote:

It is no wonder people are confused and that a few groups that make it into the news become models of both what to expect, as well as what to criticize or to support. There is a need to describe the landscape of collaborative partnerships, clearly defining the differences and similarities between the many groups that exist in order to better inform the current debate about these processes.

To work toward understanding the collaborative conservation partnership landscape, this research will use multi-disciplinary theories and a multiple case-studies methodology to identify patterns between diverse partnerships. Context-specific group attributes will thus be linked to context-specific group achievements.

Introduction

Collaborative Conservation Partnership Studies

Coughlin *et al.* (1999) developed a comprehensive list of U.S. collaborative resource management partnerships that contained over 450 groups. To describe these groups, 31 scaled variables were used to codify: (1) group origins, (2) issues addressed, (3) organizational structure, (4) group processes, and (5) outcomes. According to this framework, partnerships focus on forest conservation, farmland management, water quality, planned rural development, recreation on public lands, or job loss in the natural resource sector, among many other objectives. They may be long-lived institutionalized groups, or short-lived point-counterpoints to specific laws or practices. Some involve only voluntary community members, while others connect government employees and paid employees. Some have been successful. Others have not.

Many researchers, in addition to Coughlin *et al.* (1999), have sought to develop a blueprint for successfully establishing and operating cooperative conservation partnerships. Success in this paper will be defined as the ability to meet group objectives and operationalized as either (1) groups that are ongoing and able to accomplish goal-oriented tasks or (2) groups that have terminated because objectives were met and continuation was deemed unnecessary. It appears, however, that the incredible diversity of group goals, resources, embedding contexts, structures, and processes prohibit the development of universal blueprints (Berkes 2007). Natural resource partnerships are instead characterized by diverse, evolving sets of actors, interests, and resources that differ between groups and over time within groups (Black and Reeve 1993; Coughlin *et al.* 1999).

Though they do not exhibit blueprint-type structures, different partnership attributes facilitate different successful outcomes. For example, work with watershed-

oriented collaborative partnerships indicates mixed government-citizen groups are more effective than pure citizen groups at writing management plans and including diverse stakeholders (Moore and Koontz 2003). Groups seeking these outcomes may be advised to adopt mixed public-private participation. On the other hand, Landcare groups that participate in networks may attract more government resources but give up some of their autonomy and flexibility in ground-level task implementation (Sobels, Curtis, and Lockie 2001; Colliver, Lucas, and Moore 2008). Thus individual Landcare groups may do well to weigh the value of government support versus autonomy when deciding whether to participate in larger networks. And groups seeking to connect conflicting parties may benefit from third-party leaders, while small homogenous groups may more effectively govern themselves with shared leadership (Provan and Kenis 2007). Optimal choice of group structure, tasks, and resources depend on the situation-specific goals and context of each individual partnership.

Cross-Disciplinary Studies

Collaborative conservation partnerships are relatively new phenomena, and studies in this field only span a few decades. A larger, more developed research history exists in the fields of organizational behavior, small group, and alliance studies. Information available from these fields may be useful for informing research on collaborative conservation partnerships because these partnerships are fundamentally groups and may operate similarly to other alliances, partnerships, and cooperatives (Selin and Chavez 1995).

Historical research across diverse disciplines points to a suite of attributes that correlate with group success. As previously stated, success in this paper is defined as

groups sustainably pursuing their objectives or groups that have terminated as a result of achieving their goals. Table 6 lists a series of attributes identified in this study that cut across 49 studies from multiple disciplines and may influence cooperative partnership successes. Attributes include leadership, task type, social capital, group processes, resources, and temporal change.

Table 6. Attributes of collaborative groups and alliances that relate to successful outcomes

Study	Leadership	Task Type	Social Capital	Group Processes	Resources	Temporal Change
Abrams <i>et al</i> (2005)			1	1	1	1
Araujo and Brito (1998)					1	
Arrow <i>et al</i> (2005)		1				1
Bailey and Koney (2000)	1		1	1		
Bazzoli, Harmata, and Chan (1998)	1			1		
Berkes (2007)*			1	1	1	
Bettencourt (1996)	1		1	1		
Blinn, Jakes, and Sakai (2007)*	1		1	1	1	
Bodin, Crona, and Ernstson (2006)*			1			
Brass <i>et al</i> (2004)			1	1	1	
Burke(2003)	1			1		1
Byron and Curtis (2002)*				1	1	
Christofferson <i>et al</i> (2008)*					1	
Coughlin <i>et al</i> (1999)*	1		1	1	1	
Cremer and Knippenberg (2002)	1			1		
Cremer, Tyler, and Ouden (2005)	1			1		
Curtis (1998)			1		1	
Curtis <i>et al</i> (2000)*	1		1	1	1	
de Rond (2003)	1		1	1	1	
Gabarro (1990)	1					
Gates (1993)			1	1	1	
Gladstein (1984)	1			1	1	
Gray (1990)				1		
Gulati and Gargiulo (1999)			1			
Gulati (2004)						
Hollingshead <i>et al</i> (2005)	1	1	1	1	1	1
Kittredge (2005)*					1	
Koehler and Koontz (2008)*					1	
Lauber, Decker, and Knuth (2008)*			1		1	
Leach and Pelkey (2001)*	1		1	1	1	
Lofstrom (1999)			1	1		
McPherson, Popielarz, and Drobnic (1992)			1			1
Miles and Mangold (2002)	1			1		
Nadeau <i>et al</i> (2002)*	1			1	1	
Nadeau, Howard, and Edberg (2005)*				1	1	
Niederkofler (1991)			1			1
Perkins, Brown, and Taylor (1996)				1		
Provan and Milward (1995)			1			
Provan and Kenis (2007)	1	1	1	1		
Provan, Fish, and Sydow (2007)			1			1
Rickenbach (2009)*			1		1	
Rogers and Burdge (1972)	1			1		
Soda, Usai, and Zaheer (2004)		1	1		1	1
Sobels, Curtis, and Lockie (2001)			1	1	1	
Steinhilber (2008)	1			1		
Totterdell, Holman, and Hukin (2008)	1					
Wolf and Hufnagl-Eichiner (2007)*			1		1	
Zaheer, McEvily, and Perrone (1998)			1			
Total	20	4	27	28	24	8

* indicates study conducted specifically within the natural resources sector

Attributes of Collaborative Partnerships

Leadership refers to governance structure and multiple qualities of effective group leaders including charisma, communication skills, interpersonal connections, knowledge of the field, personal legitimacy, sacrifice, energy, and professional skills. Governance roles may be formal or informal and centralized or decentralized. Gabarro (1990) found that group leaders spend almost 80% of their time working with others and need strong interpersonal skills. Fair and respectful treatment of members has been found to bolster voluntary member cooperation, and leaders demonstrating charisma and sacrifice for their groups augment productivity levels (Cremer and Knippenberg 2002). Leaders need legitimacy for their roles, and they may derive this from their skill sets, interpersonal connections, or personalities (Brass *et al.* 2004; Provan and Kenis 2007; Totterdell, Holman, and Hukin 2008). Leaders are responsible for directing actions, developing processes, and utilizing resources to achieve successful group outcomes.

Task type determines a group's criteria for success (Hollingshead *et al.* 2005). Task type is the set of outputs implemented by a group to accomplish its objectives. Researchers generally agree that group process and resource needs relate to group tasks, and many different models have been developed to explain the interaction between tasks and processes. The most widely used model breaks tasks into four categories: generating solutions, negotiating through disagreements, choosing a solution, and executing chosen solutions (McGrath 1984). Different tasks require different levels of member interdependence and cooperation; different tasks require different interaction levels with the surrounding environment; and different tasks require different skillsets. For example, conservation tasks typically require expertise to choose appropriate solutions; integrating

stakeholders in a forestry cooperative to generate acceptable solutions requires coordination; and executing a for-profit collaborative conservation partnership requires production and marketing skill (Anderson 2003; Ashton 2006). Group tasks fundamentally determine what processes and resources a group needs to successfully achieve its goals.

Social Capital is defined here as the network ties and associated resources accessible to a group (Woolcock and Narayan 2000). Social capital derives from working within the embedding context, networking with outside actors, demonstrating legitimacy, and utilizing boundary spanners (Lofstrom 1999). The embedding context influences all other aspects of social capital and refers to the culture, economy, and other environmental factors that surround a group. The embedding context determines community capacity, who joins a group and why, and when environmental changes occur that require group-level adaptations (Hollingshead *et al.* 2005). Outside networking refers to a group's ties to complementary actors who are not members, such as grant funders or natural resource consultants. Networking typically relies on the social ties of members and leaders, group legitimacy, and the ability of members to span boundaries to link with outside individuals and resources otherwise inaccessible (Bodin, Crona, and Ernstson 2006; Lauber, Decker, and Knuth 2008; Prell, Hubacek, and Reed 2009). Legitimacy is the credibility that both members and non-members give to a group based on its track-record, member composition, outside connections, and boundary spanners and can determine how willing actors are to voluntarily participate (Human and Provan 2000).

Group Processes refer to the interactions and activities of members (Hollingshead *et al.* 2005). These processes may be broken into any number of different aspects,

including goal-setting, flexibility of actions, communication, group identification, evaluation of outcomes, and member stability. Successful goal-setting requires both adoption of concrete, manageable goals and the clear agreement of members to adhere to those goals (Bailey and Koney 2000), and assessment of outcomes means monitoring goal achievements and responding to outcome evaluations (Ring and Van De Ven 1994; Raak and Paulus 2001). Flexibility is necessary to respond to outcome assessments, and member communication refers to the openness, fairness, and consistency of interaction between members or leaders (Báles *et al.* 1951; Finholt, Sproull, and Keisler 1990). Group identification is the level of psychological commitment members have for their groups (Tyler and Blader 2003; Abrams *et al.* 2005) and actor continuity refers to the stability or instability of participants, which relates to the efficiency of working relationships (Provan and Milward 1995).

Resources are precursors to group outcomes and successes (Hollingshead *et al.* 2005). Funding inputs are the monetary capital available to a group, and expertise inputs are the sets of skills available to a group via its members, leaders, and external ties. Labor inputs refer to the man-hours available to a group, and member inputs includes the number, skills, interpersonal networks, and time dedication of members, which may grow, shrink, or change over time. Disproportionality refers to the unequal addition of resources from different sources. Voluntary groups tend to have a small number of very active members who provide most of a group's labor, and just a few individuals typically bring valuable expertise (Koehler and Koontz 2008; Prell, Hubacek, and Reed 2009).

Temporal Change refers to the fact that groups grow, shrink, terminate, alter goals, withstand leadership turnover, and adapt to changes in their embedding

environments. How groups deal with change over time determines (1) how their memberships and processes evolve, (2) whether they remain able to accomplish goals, and (3) whether they terminate or continue. Multiple competing theories have been developed to describe the ways groups change. Sequential stage models show groups advancing through 5 hierarchical stages that are increasingly productive (Tuckman 1965; Tuckman and Jensen 1977; Bennis and Shepard 1978; Neilson 1978; Lacoursiere 1980; Wheelan 1994; Wheelan, Davidson, and Tilin 2003; Whelan-Berry, Gordon, and Hinings 2003; Steinhilber 2008); adaptive response posits that relationships and tasks develop at different rates and depend on external conditions rather than becoming inherently more productive with time (Poole 1981, 1983b, 1983a; McGrath 1990, 1991; McGrath 1997; McGrath, Arrow, and Berdahl 2000; Sydow 2004); repeating cycles model groups undergoing continuous cycles of organization, productivity, and metamorphosis (Bradford 1978; Zajac and Olsen 1993; Ring and Van De Ven 1994; Worchel 1994; Doz 1996; Marks, Mathieu, and Zaccaro 2001; Raak and Paulus 2001); robust equilibrium shows members settling on a stable structure that is ultimately maintained even in the face of outside perturbations (Bales and Strodtbeck 1951; Carley 1991; Arrow 1997); and punctuated equilibrium states that groups move through long stagnant periods followed by quick, productive transitions to new stagnant stages (Gersick 1988, 1989; Gersick 1991).

Each of these temporal development models posits group success over time to relate to different group features. For example, hierarchical models show groups becoming more efficient and successful over time; punctuated equilibrium hypothesizes that groups must capitalize on brief transition periods to accomplish their goals; and

robust equilibrium posits that the structure and processes initially chosen by a group determine a group's ability to succeed over time. According to some theories, success is predictable based on initial conditions or internal factors such as levels of interpersonal conflict. According to others, success over time is dependent on environmental factors. What all these models agree on, however, is that cooperative assemblages change over time and that these changes influence group success.

This study's use of the emergent attributes in Table 6 to qualitatively study the salient characteristics of 6 collaborative conservation partnerships in southwestern Virginia is underpinned by several key questions. For instance, how do these groups change over time? What characteristics do their leaders show? Also, which resources are most important to a collaborative conservation partnership? And how do they attract resources? We will attempt to answer these correlate questions through a series of analytical procedures based on qualitative data gathered from 6 regional partnerships studied.

Methods

Study Area

Southwest Virginia lies within Southern Appalachia, a natural resource-dependent region characterized by poverty, low educational attainment, young adult out-migration, retiree in-migration, economic undercapitalization, and land fragmentation (McLaughlin, Lichter, and Matthews 1999; Turner *et al.* 2003; The HTC Group 2004; Appalachian Regional Commission 2010, 2011). Natural resources, including timber, recreation, and aesthetics, are often considered the region's greatest assets and the foundation of the region's in-migration (The HTC Group 2004; Kendra and Hull 2005). Because Southwest

Virginia includes the headwaters for the Roanoke, Upper Tennessee, and New River watersheds, land management practices directly influence water quality along thousands of miles of downstream waterways and urban areas (Virginia Department of Game and Inland Fisheries 2011). The region's need for community capacity and natural resource management make it a prime location for natural resource stewardship groups such as collaborative conservation partnerships.

Data Collection and Analysis

This research used a qualitative multiple case study approach to find key attribute patterns between collaborative conservation partnerships. Initially, all known collaborative conservation partnerships in the area of study were purposely selected. The current leaders of these groups were contacted and interviewed. Using a snowball methodology, interviewees were asked to recommend additional informants (Neuman 2006). This technique resulted in 11 key informant interviews from 6 total collaborative conservation partnerships.

Organizational alliance and network literature were used to develop interview questions, which revolved around questions of motivations, advertising mediums, communication, legitimacy, complementary outside resources, and temporal changes. Interviewees were prompted with questions about the group's transitions over time, legitimating actions, membership base, communication structures, outside influences, conflicts, and motivations. Interview questions are found in Appendix B. Responses were used to codify and evaluate *Task Type*, *Leadership*, *Social Capital*, *Group Processes*, *Resource Inputs*, *Temporal Change* attributes. Interviews were digitally recorded and transcribed. In addition to informant interviews, the researcher analyzed supplementary

information. Participant observation, member email exchanges, meeting minutes, pre-existing member interviews conducted in earlier research, and surveys were used to augment data gathered during the interviews.

A combination of (1) coding, (2) analytic comparison, and (3) illustrative method was used to analyze the case studies. Interviews were first analyzed using open coding to identify themes in the case studies. Next, data was re-analyzed and coded axially to organize key themes into linked categories and patterns. Interviews were then analyzed using the illustrative method to compare empirical findings with key themes from previous research. More specifically, the illustrative method, which considers theories to be “empty boxes” that can be filled with empirical data, was used to compare case study details with elements of group development models, functional group theories, network analysis, social identity models, community capacity themes, legitimacy topics, leadership themes, and alliance governance types. Following pattern matching methods, theories with robust empirical support from the case studies were used to frame data, and theories lacking empirical support were eliminated (Neuman 2006).

Interview and supplementary codings were then re-read for analytic comparison. Using method of agreement, only thematic categories shared between collaborative conservation groups were retained, and codes showing inconsistencies between groups were eliminated (Neuman 2006). The final framework required 4 successive rounds of coding to identify 6 constituent parts (i.e., *Task Type, Leadership, Social Capital*, etc.) from which to analyze and discuss group attributes. The objective was to identify patterns in their existence across case studies within the partnerships studied. Using these new themes, one last round of selective coding identified supporting evidence, analyzed it by

attribute, and synthesized the inductive and deductive results for presentation (Neuman 2006).¹

The following results and discussion are broken into 9 sub-sections. First, an overview of the groups and how they are classified in Coughlin *et al*'s (1999) 31-factor framework is presented. This classification situates these case studies within previous meta-analysis of collaborative conservation partnerships. After this orientation, a discussion of findings relative to emergent attributes is offered and ends with presentation of key themes found across the attributes studied. Results are then summarized in the conclusion and used to consider important cross-cutting aspects that define the groups studied in this research and future research directions.

Results and Discussion

Case Descriptions

Group 1 (G1) was a 501(c)3 non-profit split into two separate ventures that supported local foods agriculture and sustainable timber management. The agricultural program is still ongoing, but the timber program closed in 2010. This study looked solely at the now-defunct timber arm, which began with installation of a solar kiln in 1999 and grew in phases as grant money became available. The program never achieved fiscal sustainability despite the continual addition of infrastructure and processes. By 2010, it had a total of five employees, millworks, two kilns, a sawyer and sawmill, and multiple sub-contracted loggers. G1 had little trouble finding interested landowners, though meaningful engagement was limited to conducting harvests on their land. Thus the

¹ Two successive rounds of open-coding were conducted using highlighters, paper copies, and comments written in margins. Axial coding was also conducted with highlighters using paper copies of open codes typed into a word processor. The illustrative method was conducted on paper copies with highlighters, and final selective coding was conducted with use of an excel spreadsheet into which earlier codes were entered.

employees of this organization functioned as a group, but its contributing landowners did not.

Group 2 (G2) is a defunct vertically-integrated forest cooperative with fourteen members. Its CEO formerly ran a custom milling business and began the co-op as a result of client networking toward sustainable, low-impact management. A steering committee started meeting in 2002 and the cooperative incorporated in 2004, began operations in 2007, ceased harvesting after the summer 2008, and finally declared bankruptcy in 2010. The lifecycle of G2 was rife with roadblocks, including difficulties certifying co-op forests, finding interested logging firms to harvest trees, and a heavy reliance on large grants and loans to purchase its own equipment and train logging crews. Despite these setbacks, the group built up inventory and successfully partnered with a building supply firm for marketing until the 2008 recession, but by 2010, the economic situation forced the co-op to shutdown.

Group 3 (G3) is a for-profit partnership dedicated to making small farms and local food cottage industries economically viable and environmentally sustainable. G3 distributes locally-produced, organic foods to buyers via Community Support Agriculture (CSAs), direct-to-consumer farmer's markets, one small grocery store, and direct marketing to restaurants. It began in the 1990s when a handful of local farmers started compiling their produce to truck to local restaurants. G3's executive director, formerly a small farmer, never intended to become a business-person. Nevertheless, the group grew unexpectedly as new opportunities for local and sustainable farming arose and ultimately incorporated as a partnership in 1998. As potential liabilities grew, it became an LLC in 2007. Currently, this company has twelve employees, thirty to thirty-five producers, and

a mailing list of at least 600 customers. The executive director tightly coordinates all food distribution and personally knows every grower, every chef, and most family customers.

Group 4 (G4) is a civic organization incorporated in 1998 as a 501(c)3. The purpose of this group is to improve sustainable management of the area's resource base for environmental, cultural, and economic purposes. The organization is split into five different working groups that focus on forestry, water resources, alternative energy, livestock, and outreach. During its formative years, G4 had a part-time paid coordinator, but since 2008 it has been volunteer-run. Currently, it has around seventy members, thirty to forty active participants, and a core of eight to twelve highly active members. It has helped start two local agriculture and forestry businesses, annually funds a local high school scholarship competition, hosts educational speakers monthly, coordinated certification of twelve members as volunteer water monitors, and has spoken with the county's supervisor board on multiple occasions.

Group 5 (G5) is a 501(c)3 LandTrust that promotes conservation easements, land-use planning, and sustainable land management practices. The six to ten person steering group that ultimately formed G5 met monthly from 1998 until legal incorporation in 2002. At that point, the first executive director and accountant began working gratis for G5. Eventually, the group came to include an executive director, an assistant director, and two part-time staff members. Since the 2008 recession and a corresponding drop in member donations, they have dropped back to three employees. This group runs very frugally and derives its financial resources from member fees, donations, and fundraising events. To date, G5 has helped enroll over 30,000 acres of land in Southwestern Virginia in conservation easements and educated numerous landowners.

Group 6 (G6) is an unofficial, unincorporated association of residents from three adjacent counties who share an interest in sustainable natural resources management. It started in 2000, and the core leadership has since slowly turned over as new members become involved and old members move on. This group meets quarterly to eat dinner and listen to a presentation on natural resource topics such as bears, woodlot management, or landscaping with native plants. G6 has intentionally stayed away from grants or ties with public agencies, preferring instead to fund its small financial needs with membership fees and to use member connections to find speakers of interest. This group does not advertise but has sustained a membership fluctuating between fifty and one-hundred; members invite friends and neighbors who then become members.

The diversity found among these 6 geographically proximate partnerships, often overlapping in terms of the resources they focus on, supports previous findings of broad heterogeneity among collaborative conservation partnerships (Berkes 2007). Despite the diversity, however, key themes were apparent that, when considered with respect to the broad base of cross-cultural and multi-disciplinary group theory work, provide useful results regarding key functional attributes of group success as defined in this study.

Diversity and Similarities

As noted, incredible diversity was evident in the 6 partnerships studied despite our focus on one type of group in a particular region of Virginia. Nevertheless, the groups did share several key similarities. Table 7 supports this assessment using Coughlin *et al.*'s (1999) framework. More specifically, the 6 case studies included in this research differed on just over half of the 31 variables, but were identical on 13. Groups shared the same (1) trigger, (2) focus, (3) resources addressed, (4) resource responsibility, (5)

mission, (6) authority, (7) membership, (8) geographic scope, (9) duration, (10) use of facilitators, (11) representation, (12) scale, and (13) social impacts.

Table 7. Aspects of partnerships studied based on Coughlin *et al's* (1999) framework

		Group					
Criteria		G1	G2	G3	G4	G5	G6
Origins	Trigger	Proactive	Proactive	Proactive	Proactive	Proactive	Proactive
	Initiator	Non-profit	Individual	Individual	Individual	Individual	Individual
Issues	Focus	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line
	Number of issues	1	1	1	Variable	1	2
	Resources addressed	Private	Private	Private	Private	Private	Private
	Responsibility	Individuals	Individuals	Individuals	Individuals	Individuals	Individuals
	Scientific complexity	High	High	Moderate	Varying	Moderate	Low
	Visibility	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Organization	Mission	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line
	Objectives	Action	Action	Action	Education + action	Education + action	Education
	Structure	Formal	Formal	Formal	Somewhat formal	Formal	Informal
	Formality of agency links	Informal	Informal	Informal	Informal	Somewhat formal	Informal
	Strength of agency links	Moderate	Weak	Weak	Moderate	Strong	Weak
	Funding sources	Public + private	Public + private	Private	Public + private	Public + private	Private
	Funding stability	Sporadic	Sporadic + fluctuating	Stable + fluctuating	Sporadic	Stable	Stable
	Authority	None	None	None	None	None	None
	Membership	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary
	Geographic scale	Multi-county	Multi-county	Multi-county	Multi-county	Multi-county	Multi-county
	Age (years)	11	6	13	6	10	11
	Duration	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term
	Visibility	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Decision rule	Consensus	Consensus	Top-down	Consensus	Consensus	Consensus
Processes	Decision makers	Board	Board	CEO	Board	Board	Members
	Facilitation	Unassisted	Unassisted	Unassisted	Unassisted	Unassisted + assisted	Unassisted
	Transparency	Moderate	Low	Low	High	Moderate	High
	Meeting frequency	Variable+ at least quarterly	Variable + at least quarterly	Variable + at least annually	Variable + at least monthly	Variable + at least monthly	Quarterly
	Representation	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Homogeneous
	Agency involvement	None	Low	None	Low	Moderate	None
	Core member investment	High	High	High	Moderate	High	Low
	Scale	Local	Local	Local	Local	Local	Local
Outcomes	Social impact	Positive	Debatable	Positive	Positive	Positive	Positive
	Products	Tangible	Tangible	Tangible	Tangible + intangible	Tangible + intangible	Intangible

The 6 case groups were *triggered* by proactive interest in rural land conservation and chose to address private rather than public *resources*. Markedly influencing private land stewardship is a long-term *mission* and thus requires groups to have long-term *duration*. In order to influence private land management without the political *authority* to compel landowner conservation, they *focused* on a combination of ecological, social, and economic goals to address both the sources and outcomes of poor stewardship practices. Because their intents were to influence private land management through education and incentives, the *social impacts* of these groups were generally positive and, where successful, did not harm any constituent bases. All groups chose small *geographic scales*, ranging from 3 to 8 counties in southwestern Virginia, in order to keep their scope manageable and remain responsive to their member bases. Because membership was *voluntary*, member perspectives on conservation were fairly *homogenous*, with all participants believing in land conservation and stewardship. Lastly, members were generally agreeable, so none of the groups needed *facilitators*.

Regarding differences, the groups ranged from 4 to 11 years old; and 2 of the 6 are now defunct. Most partnerships were initiated by an individual, though one was created by a local non-profit. While most groups chose to focus on one issue such as sustainable timber management or local organic food production, some groups had multiple overlapping objectives including wildlife management, forest management, water quality monitoring, and grass-fed beef management, among others. While the visibility of most group foci was moderate, 1 group's focus is almost unknown among the general population, and another has gained great visibility over the group's lifespan. Objectives for these groups centered on education and ground-level actions. Some had

formally incorporated structures, while others were informally held together through scheduled activities. And partnerships ranged from highly transparent to fairly closed.

Partnerships also differed significantly in their government connections, with 1 group intentionally avoiding agency contact. Funding also varied, with some groups receiving differing combinations of public and private funding from grants, product sales, membership fees, and/or agency funding. Similarly, some groups were mainly supported via sporadic grants, while others maintained fairly stable monetary flows with member donations or product sales. Most groups sought decision-consensus in their governing boards, but 2 groups were centrally run by a leader who made group choices without the help of formal board members. Formal meetings ranged from annual to monthly, though core participants and group employees often met on a daily basis. Member investment in these groups varied significantly both between groups and between members. Paid employees tended to invest the most time in group activities, while a large number of peripheral members may only show up to sporadic events. Some groups required a great deal of daily work to operate, while others required very little input even on the part of governing members.

Task Type: Defining Needs

Task type is a fundamental aspect of group functionality (Hollingshead *et al.* 2005). According to the functional perspective on groups, task type determines the inputs, processing, and outputs necessary for a partnership to succeed. For example, a partnership hosting educational speakers needs different inputs than an incorporated forest cooperative producing wood products and one dedicated to sustainable business

needs a particular process and monetary outputs, which differ part and parcel from one committed to expanding conservation easements.

The partnerships studied demonstrate a large diversity of task types that vary by expertise, costs, coordination level, and outputs. G1 and G2 ran sawmills and drying kilns to produce certified lumber, needed high levels of coordination between processing units, required skilled labor, and infused large financial inputs into their infrastructures. G3 also requires lots of coordination between growers and buyers to distribute local produce, but its infrastructure is limited to a garage and fleet of trucks, and most employees need little technical skill to pack boxes, staff farmers markets, and drive delivery vehicles. G4 and G6 need no financial inputs, minimal coordination, and minimum expertise to exist day-to-day. G4 hosts monthly educational meetings and sponsors special tasks where labor and funding allow, and G6 just provides free educational speakers. Neither group has an office or paid staff. G5 survives on a very small budget but needs expertise from its staff and complementary outside contacts to educate landowners about conservation easements.

Much of the variability in group processes, resources, and leadership can be linked back to the diverse tasks of the partnerships studied. Some of the groups studied require high levels of expertise, while other groups accomplish many of their goals with relatively unskilled voluntary labor. There were groups that required large financial investments to setup vertically integrated forestry partnerships and some that need almost no money to hold their quarterly educational meetings. Minimal labor is required in one case, while others have tasks that are all-consuming to their leadership. These diverse needs stemming from task type indicate that blueprints may lack usefulness, as the

resources and processes necessary for one conservation group appear to be unsuited for another conservation group with very different goals and tasks.

Leadership: Time commitments

A large body of research has documented the importance of leadership to groups and alliances (Niederkofler 1991; Cremer and Knippenberg 2002; Brass *et al.* 2004; Provan and Kenis 2007; Totterdell, Holman, and Hukin 2008). Analysis of these 6 case studies corroborates earlier findings that leader energy and stability are important for group success.

Within the cases studied, leadership tended to be quite stable. Most of the partnerships studied have only been through 1 or 2 leaders over their life spans. Leader stability may be particularly important given the governance structure of these groups. Most of these partnerships are highly centralized, “perhaps irrationally so” according to one CEO. Most communications are vetted through executive directors; most meetings are run by them; and leaders typically provide a great deal of the leg-work for task implementation. Leader continuity may bolster group social capital as leaders become known in the community and develop trust with members.

Group leaders also dictate the activity rhythms of their partnerships (Wenger, McDermott, and Snyder 2002). Highly active groups running monthly meetings or for-profit businesses take a lot of dedicated leader time, while other partnerships may be structured to need more moderate leader time inputs. Leaders of most of these partnerships dedicate significant time, to the point of sacrifice, in order to keep their groups running. This choice of activity levels appears to influence the activity and dedication of the group members as a whole but had no relationship with group success.

Among the cases studied, high levels of leader activity were prerequisite, though not necessarily sufficient, to developing a highly active member base. One executive director volunteers 6 to 8 days per month to group activities and another paid coordinator 60 to 70 hours per week. This group hosts monthly general meetings in addition to meetings for 5 sub-committees, helping initiate 2 corporations, running an annual scholarship, conducting 2 feasibility studies, and a host of other sporadic activities. One president jokingly explained that "many people ask me if I own [this partnership], and I'm like, 'no, no, I'm the one who's owned by this [the partnership]." The first executive director of another partnership explained retirement as, "working for a nonprofit is all consuming. And I had done it now for seven years. And I wanted a life." Not all leaders choose to sacrifice their lives for their groups. One purely volunteer partnership intentionally chose a quarterly meeting structure to avoid member and leader burnout. Early leaders spent 6 to 7 hours per quarter preparing meetings, and since the introduction of email and other electronic exchanges, preparation requires even less time. This group, however, has trouble "getting members to participate in the board work." This may be because the group is not active enough to grow new leaders are willing to undertake the group's legwork. Though high energy levels do not guarantee group success, large time investments appear to help cultivate highly active partnerships.

It should be noted that only G6 had gone through more than 2 partnership leaders at the time of the study and that 3 of the groups have been run entirely by their founding directors. Though partnerships with very active leaders appear to have less trouble engaging active members, it remains to be seen whether they will have trouble finding

new executive directors willing to dedicate the energy necessary to keep activity levels high.

Resources: Derivates of Social Capital

Key resources sought by most partnerships include funding, labor, and expertise. These needs, however, vary based on the tasks and goals of individual groups, whether fluid or static. G6, for instance, needs neither money nor expertise to run its activities. Similarly, G3 has gone through periods with coordinator funding and other periods as a 100% volunteer organization. Regardless of the mix of resources sought by a partnership, results suggest that social capital is the most common source of resource inputs.

Unlike traditional businesses that exchange money for expertise, advertising, and labor, the partnerships studied most often rely on social capital to gain members and accomplish goals. Social capital allows groups to grow their memberships, creating both more labor for group activities and more potential beneficiaries of group successes. It gives groups credibility to educate the public and sell their products and expands group access to outside resources such as expertise and funding. In short, social capital is the foundation upon which these groups build. The following paragraphs will describe the influence of social capital on individual resources

Funding

Funding for the partnerships studied derives mainly from their garnered social capital. For instance, groups reliant on grants typically utilize their social capital to connect with a grant writer from the local area. And some of the groups have intentionally sought tailored grants from local funders with which they have a relationship. Member fees, donations, and product sales are directly proportional

visibility and legitimacy within the community. "95% of our members are members because they like what we're doing, and most of them have confidence in us," stated one executive director. Another leader described their company's ability to sell products as, "it's back to the good old way business used to be done; we trust each other... [and] it's amazing how hard earned and easily lost reputation is." And another business manager mentioned permanently losing significant market share when the partnership's product quality fell and the group's legitimacy suffered.

Labor

Labor in these groups is provided by volunteers, staff, and sometimes paid or pro-bono outside experts. Volunteers are typically members. Staffs, if they exist, are typically small and sometimes consist of just an executive director. Staff members often work long hours and must be flexible to schedule around member and stakeholder agendas. "They take a lot of flexibility in the part of our employees. And our people have been very kind to put up with insane hours, work way too long too many days in a row, also not have work when it's raining or something like that," said one executive director. "A lot of meetings were weekends, nights, whenever," said another.

Social capital is vital to enrolling members and developing a member labor pool. Most of these groups do not advertize; instead, beneficiaries hear about collaborative conservation opportunities through word-of-mouth and decide their involvement interests based on their perceptions of a group's legitimacy. "Usually what gets people there is somebody else that's involved inviting somebody they think might be interested." One executive director explained how the broader community used to be skeptical of the group but that interest has grown as they have developed credibility and shown that "we

are real people and we're doing real things." Another director explained the link between his group's social capital and advertising, "when someone starts to think about what they're going to do with their land, someone says to them, 'oh, before you make a decision maybe you should try calling these people right here.'" His group is both widely known and trusted in the broader community. "In the restaurant industry, personal referral is huge... most of our new chef accounts have been referrals from other chefs," put another successful executive director.

Social capital can also be a strong draw for staff and external labor sources. "Part of the reason I'm here is because the organization has such a good reputation. It was something I wanted to work with this organization even though they didn't have a lot to offer me at first," admitted one executive director. The employees of another partnership are drawn from locals who literally walk to work and appreciate the "good feeling" of the company. One of the defunct partnerships, on the other hand, was never able to attract subcontractors because it never developed social capital in the sector and was seen with skepticism by many of those familiar with it. Lack of social capital inhibits finding labor, while developing strong social capital expands labor availability.

Expertise

"Land conservation takes a lot of expertise." These groups all work in fields that require a great deal of expertise, and they typically meet expertise needs via their social capital. Though most group leaders are skilled, groups must also ally themselves with complementary outside actors to fulfill their suite of expertise needs. For example, one group subcontracted with loggers and sawyers, while another sought public directors with backgrounds in grant writing and field forestry. Another recently expanded its selection

when a local trout farmer joined and another connected with Virginia's Department of Environmental Quality to certify a dozen volunteer water quality monitors and one more works closely with a sister non-profit and another brings in a different expert speaker to each meeting. Social capital underlies their abilities to connect with experts.

Enrolling the help of outside professionals requires social capital. Not only do these groups need to know who to contact for input, they must also prove their legitimacy to allure expert assistance. For instance, one of the study groups that is no longer in existence never fully proved its credibility and subsequently had trouble finding complementary professionals because "they either seemed disinterested or they didn't understand what the co-op was trying to do or why we were trying to do it or they thought it would fail or they didn't want to be associated with it." On the other hand, another group was able to build a strong reputation and extensive lists of contacts over its 13 years in operation. This group is offered more outside opportunities than it can undertake; "our job has been to pick up what's been laid at our feet and say 'yessah, yessah, I'd be delighted. How fast can I figure out how to do this? Oh my god, what did I just say yes to?'"

Social Capital: Building Legitimacy and Interpersonal Networks

As established above, social capital appears to be the most important source of resources in the 6 collaborative natural resource partnerships studied. Similar results have been found in previous research (Sobels, Curtis, and Lockie 2001; Borgatti and Foster 2003; Cramb 2005; Prell, Hubacek, and Reed 2009). How, then, do groups build their social capital? Social capital is typically specific to a group's embedding context and, in the cases studied, derives from a combination of legitimacy and boundary spanners.

All of the groups studied share a similar embedding context. Embedding context refers to the culture, community capacity, resources, and norms of a group's environment (Granovetter 1985; Curtis, Shindler, and Wright 2007; Galaskiewicz 2007). Southwestern Virginia, like many rural areas in the U.S. and beyond, contains two divergent cultures with different attitudes toward conservation (Egan and Luloff 2000; Smith and Krannich 2000; Gill, Klepeis, and Chisholm 2010). Locals have lived in the area most of their lives and are typically embedded within local culture. They are often stereotyped as agricultural, lower-income, and conservative. The second community is composed of exurbanites who have retired in the country or commute between homes in the countryside and professional jobs in nearby urban centers. They are stereotyped as upper-middle class and typically more liberal. The latter tends to be newer community members with smaller local social networks than those that have greater proximate history. These newer residents may be more likely to have backgrounds in management and funding but often lack active land management skills. Conversely, entrenched residents typically have more land management knowledge and experience but fewer economic resources. This embedding context produces polarized social capital challenges for the region's collaborative conservation organizations.

Results suggest that those groups achieving success have united these 2 typecasts, and failure to engage diverse stakeholders appears to have hurt other less successful groups. For instance, one group was initiated by rooted residents who used their substantial personal contacts to initially advertize the group and find speakers. As word of the group has continued to spread, an increasing number of new-resident participants have joined the group and even become group leaders. Another group, though, was

initiated by new residents and has expanded its membership to include historical families. According to the leader, “we work with a lot of good ole boys. It's really fun. Originally, this company was young alternative growers who came to here from other places. Lots of education, a fair amount of experience, lots of ideas, but as we've grown over the years, it's really become a cultural blend, and it's become a bunch of old guys, a lot of old guys some as much as 85.” Other successful groups also founded by new residents attribute their legitimacy within the larger community to early entrenched leadership with strong community connections, “respect,” and credibility. G4's initial members “put together a brochure and sent it out to everybody on our Christmas list, and asked them to join, start raising money, and start operating.” G2 was also initiated by new residents and did manage to enroll a few” locals”, but those members remained peripheral and did little to promote the group. G2 has since gone defunct, partly due to inability to adapt to its changing external environment and inability to tap into the sector's existing capacity. G1, also now defunct, was unable to connect with local markets “because you need to go to an enlightened community, and, I'm sorry, but this area isn't there yet.”

Successful case study groups use 2 different methods to prove their legitimacy to the local community. Some groups have gained legitimacy by enrolling boundary spanners, while others have proven their legitimacy with a successful track-record. G4, for example, was initially “just a handful of people, and it wasn't representative of the county” because it included mainly exurbanites. Enrolling a single community leader from the county's local culture, however, has brought in twenty-five members from the local culture. G5 intentionally identified and brought in boundary-spanning board members early-on because “it's very important in your group that you have local people

with good contacts in the community.” The group's first executive director was also boundary spanner and admits that “95% of our members... they either know me, they know [a board member], they know [another employee].” The director of G3 mentioned cultural progression, stating, "...as we've grown over the years, it's really become a cultural blend." G2, on the other hand, found it hard to network with the existing forestry sector because many “were relatively dismissive from the start” or “didn't want to be associated with it.” G3 has built an extensive network of growers and buyers by establishing an excellent track record, and the network continues spreading the word and expanding the group’s customer and grower base. G5 quickly developed local credibility after helping establish an easement on a large, high-visibility property owned by a community leader. The two terminated groups, on the other hand, were unable to build legitimacy with successful performance. G1 lost and never regained many of its customers when its product quality fell, and G2 never demonstrated its long term economic viability to landowners. Nor were these two groups led by or allied with mainstream actors able to draw in credibility with the mainstream resource management sector. Other groups, however, have successfully leveraged the credibility of group leaders and network ties to gain legitimacy. The groups studied appear to develop legitimacy by demonstrating successful performance and developing ties with other legitimate entities such as government agencies or community leaders.

Temporal Change: Flexibility, Stasis, and Harmony

Traditional group development models show groups growing in linear, predetermined paths with an early period of conflict when goals are set (Tuckman 1965; Tuckman and Jensen 1977; Bennis and Shepard 1978; Neilson 1978; Lacoursiere 1980;

Wheelan 1994; Wheelan, Davidson, and Tilin 2003; Whelan-Berry, Gordon, and Hinings 2003; Steinhilber 2008). None of the groups studied follow these hierarchical development processes. Instead, initial goal-setting in these collaborative natural resource partnerships is straightforward and typically harmonious, similar to the punctuated equilibrium model of group development (Gersick 1988, 1989; Gersick 1991). These partnerships seem to coalesce around a specific issue and attract members with similar views on that issue. As one interviewee from G6 stated, “the goal of the group was clear cut and never up for debate.”

Rare conflicts do occur sporadically within these partnerships, typically as a result of politically contentious environmental policies, and serve to re-affirm group objectives similar to robust equilibrium models (Bales and Strodtbeck 1951; Carley 1991; Arrow 1997). G5 lost a board member who was interested in pursuing partisan environmental action, and G6 was briefly sidetracked by some contentious actions within a state agency. But group leaders mention making special effort to minimize tangential issues, and all boards resolve such debates with consensus. All 4 groups that met with politically-driven conflict quickly chose to reject the issues and focus on their core educational and ground-level implementation goals.

While overarching group goals show stability, non-contentious group processes like member communication, field days, or outreach activities are highly flexible. These group processes develop similarly to adaptive response models (Poole 1983b). They adapt to changes in internal and external conditions, such as funding, member preferences, or tasks available. “Situations are very fluid,” stated one CEO, “and you're trying to respond to new opportunities and react to unanticipated consequences.” “This is

a minute by minute creation, I'll put it that way," added another director, "the thing I most like about being a private business is our ability to be flexible and to move fast... this is a very fast moving scene." G3 survived one particularly poor growing season because its leaders decided over the course of 3 days to start up a CSA, and G4 sees frequent swings in meeting attendance correlating to a "summer slump," special tasks, interesting speakers, and the enthusiasm of sub-committee leaders. G1 and G2 saw flurries of activity when grants came in, and G5 has adapted its outreach activities over the years.

Temporal change happens in the partnerships studied. Contentious issues appear to crop up and then diminish sporadically without substantial deep structural changes, while resources and processes adapt more frequently in relation to evolving conditions. Change appears to happen most similarly to adaptive response models, demonstrating the need for flexibility to adapt to member, economic, or other changes.

Processes: Flexibility

The partnerships studied utilize various processes to accomplish their diverse tasks and goals. All groups utilize face-to-face meetings to communicate, accomplish tasks, and coordinate. Most partnerships employ electronic and mailed communications to stay in touch. Several groups hold periodic social events for members, while others do not. Some groups meet with landowners individually to tailor conservation efforts, while others educate via larger meetings. Half of the partnerships studied perform ground-level management such as timber harvesting or organic farming, while the remaining three groups employ intangible tasks such as education, land-use planning, or stream monitoring to improve local land stewardship.

Though diverse processes are utilized, groups appear to share a need for flexibility in their processes. G4 grows and implements tasks based solely on the drive of community members, which has meant pursuing a succession of low-impact forestry, grass-fed beef, alternative energy, and water quality monitoring goals. G3 has seized many unexpected opportunities, such as a CSA, fruit shares, and a small grocery store, that its CEO would never have imagined including in strategic plan. "Anything you've ever known about business, you need to leave it behind before we talk because I'm not going to say anything about our business that makes sense in anyone else's model. And the first thing I'm going to say is that we didn't mean to start a business. We're just a couple of farmers; we just wanted to get product off our farm to where we needed to go," admitted G3's CEO. Currently, 2 of the groups studied are in the process of documenting their past accomplishments and developing strategic plans; 2 partnerships lacking strategic plans have gone defunct; and the remaining 2 partnerships have no intention to develop plans.

Group flexibility may be important for developing a committed member base. One group coordinator shared his take on the "key" to volunteer group success: "if you don't have things for people to do, they're not going to participate. It has to be rewarding to them." The groups studied appear to benefit from flexibly involving members in group activities and to suffer when unable to adapt to member inputs. G2 had trouble engaging members because its activities required a great deal of expertise that members lacked, leaving them feeling "terribly unqualified" for the work. G6 has such low activity levels because of trouble growing new leadership. "If we have [any] problems," stated one informant, "it is to get people to serve on the leadership board." Other groups, like G4

and G5, always have potential volunteer opportunities for interested individuals. G4 and G5 have both grown their active volunteer base over the past few years. Collaborative conservation partnerships benefit from having appropriate roles to engage members and grow new leadership.

These groups also demonstrate remarkable flexibility in their outcomes assessments. Previous research has established the beneficial effects of outcomes assessments in boosting group outcome successes, partnership durations, and member commitments (Gray 1990; Bailey and Koney 2000; Curtis *et al.* 2000; Byron and Curtis 2002; Provan and Kenis 2007). None of the groups studied, however, developed mechanisms to measure their goal accomplishments. In a few cases, this lack of strategic planning resulted in bankruptcy because groups did not respond to “red flags” until their situations were irreversible. The majority of groups, however, benefit from having flexible, non-concrete goals.

Synthesis

The analysis using Coughlin *et al.*'s (1999) framework demonstrates the breadth of collaborative conservation partnership constitution in the U.S. Such diversity can dramatically complicate the creation of a blueprint for success within this particular partnership type. However, group theory offers a well-developed framework for analyzing collaborative conservation partnerships. This approach was used to study partnerships based on constituent attributes of *Leadership, Task Types, Social Capital, Resources, Processes, and Temporal Change*.

Key themes relating to group success emerged within and between these constituent attribute categories. In this study, leaders are central to their partnerships and

dictate the rhythms of their groups, which relate to member engagement levels. The types of tasks among case study groups show significant diversity and define the leadership, resource, and process inputs necessary to accomplish goal-oriented tasks. Results suggest that resources derive mainly from social capital and that both social capital and resource levels exhibit significant input disproportionality. Process and resources need to remain flexible and adapt to changes over time, and temporal change was observed among all of these inputs, ranging from task types to leaders and resources to processes. These changes in processes and resources forced groups to exhibit adaptive response temporal changes, and inability to flexibly adapt led to termination of two of the partnerships studied.

Diversity

As noted in nationwide studies of partnerships, collaborative conservation is diverse (Coughlin *et al.* 1999; Berkes 2007). This study looked at grassroots, voluntary long-term proactive partnerships in southwestern Virginia that are focused on private land conservation by means of educational, economic, and implementation support. Groups ranged from for-profit forestry cooperatives to non-profit Landcare groups to informal educational associations. They ranged in age from 6 to 15 years; some have gone defunct before accomplishing their goals, while others continue implementing their goals.

Results suggest that much of the diversity resulted from the various *Task Types* and available *Resources* that were observed. Partnerships sought unique inputs in order to successfully accomplish their particular goals. Some needed high financial inputs, others high skill. Some groups are centrally run and cohesive, while others seek more diversity

and decentralized processes. Some leaders sacrificed immense time commitments to their groups, while other leaders developed less active partnerships that required less time commitment. Some groups had trouble finding complementary outside resources and so decided to hire skilled staff, while others have developed robust working relationships with complementary professionals that minimize the need for group staffing. Each partnership had to tailor itself uniquely to its context and the demands of its goal-oriented tasks.

Flexibility

All of the groups studied demonstrate *Temporal Change*. Leaders move on; new members join a group; stakeholder needs change; and funding sources dry up. Accessing and processing necessary *Resources* requires flexibility because their sources and volumes change over time. Successful groups demonstrated high levels of flexibility to adapt to changing internal and external conditions. Examples include changes in outreach methods, internal *Processes*, meeting locations, meeting frequency, and levels of volunteer help. All of these groups lack strategic plans, which has allowed for maximum flexibility but sometimes damaged their ability to re-assess needs as conditions decline.

The successful partnerships studied were highly flexible, while the 2 defunct groups ultimately made choices that limited their flexibility. This flexibility appears to be very important in developing a committed member base. Groups able to engage interested volunteers were more successful at developing new leadership than groups either too inactive to engage volunteers or unable to offer tasks appropriate for volunteers. Groups need to find ways of involving interested members if they want to grow future *Leaders* and their *Resources* base.

Leadership

Leadership was observed to be important to group success by providing a stable core for each group and determining group rhythm. Leaders of these groups remained in office for 5 to 15 years. This stability allowed them to add continuity to their groups and develop working relationships with members and complementary outsiders. Early on, before partnerships established track records and built their member bases, group credibility and networking derived from the contacts and legitimacy of group leaders. Most leaders chose to invest large amounts of time and make significant sacrifices for their partnerships. The energy and activity of these leaders dictated the rhythm of their partnerships. Energetic, charismatic leaders were generally more effective at growing new leadership than groups with low activity levels.

Social Capital

Case study collaborative conservation partnerships utilized 3 different types of *Resources* to operate: funding, labor, and expertise. All of these resources derived mainly from social capital. Funding was found from grants, membership fees, and product sales. Groups had to prove their legitimacy and build a customer base to make significant sales. Membership fees required community networking to build a member base, and grants were often sought with the help of local grant writers and tailored to local funds. Most of these partnerships had limited funding to pay for labor or expertise, so labor was either offered by volunteers or small staffs. Typically, staff members worked long, flexible schedules. Staff commitment derived from group legitimacy and goals rather than pay or working conditions. Expertise was sought from members, staff, and outside professionals

willing to help pro-bono. These results suggest that collaborative conservation partnerships must build social capital in order to successfully attract necessary resources.

Social Capital was built among the partnerships that were studied by enrolling credible members, finding boundary spanners, and developing successful track-records. Because these partnerships often operate within a dichotomous embedded context and were typically initiated by newer residents rather than entrenched families, most groups had to identify and enlist community members with this more deeply rooted form of legitimacy. Some groups have been able to attract credible boundary spanners with their conservation goals, but one group ultimately accessed both cultures by building a robust track record of success and quality. Accessing both social circles allowed these partnerships to move beyond their initial social networks and memberships, which often overlap between groups. Boundary spanners were also sought to access outside funding or expertise, which required demonstrating legitimacy for the group in order to enhance the commitment of outside experts that can help.

Disproportionality

Partnership inputs showed high levels of disproportionality in their *Resources* and *Social Capital*. A few core members were typically responsible for most of the day-to-day labor, and the remaining members spend very little time on group activities. Similarly, just a few individuals provided the majority of boundary spanning and high-skill task accomplishment. As recommended by Wenger, McDermott, and Snyder (2002), it is important to make roles for a large number of peripheral members and different roles for dedicated individuals.

Conclusions

While this research supports the notion that no single answer exists for questions of collaborative partnership functionality, it also demonstrates that documenting the variety of methods employed by different partnerships offers insight into the array of potential solutions available. As one key informant in this study said:

One of the most useful things [a university research team] did is they interviewed 6 other land trusts around the nation that were sort of similar to us... One of the questions they asked is, 'how do you grow your membership?' and one of the land trusts said, 'Well, there's not one thing, and our membership keeps growing.' And that's sort of what you do. There's not one answer.

Results indicate that appropriately structured and managed collaborative conservation partnerships can potentially influence a diverse array of conservation initiatives. The 6 groups studied have each made contributions to local timber management, conservation easement implementation, local and organic food production, and landowner education. The partnerships that effectively tailored themselves to meet task needs within their unique contexts have found success, while partnerships unable to satisfy their context-specific needs have ultimately folded.

4 key characteristics appear to transcend individual contexts and tasks. All of the partnerships studied demonstrate disproportionality of resources, go through temporal changes, need flexibility, and rely on social capital to attract resources. While future research is necessary to prove the universality of these 4 features, results indicate that these traits may be precursors to successful collaborative conservation partnerships.

Limitations and Future Research

The cross-disciplinary nature of this study helps bring diverse fields toward unified theories and connect laboratory studies with in-situ research. Understanding and

utilizing small group, organizational alliance, and behavioral theories show promise for increasing the success rates of collaborative conservation partnerships in the U.S..

The attributes studied were not meant to be a comprehensive list of all aspects ever studied or potentially important in group, partnership, alliance, or collaborative studies. Such a review is beyond the scope of any individual paper. Instead, this grouping was intended to be a succinct overview of key themes found across disciplines. Further, because of the interconnected nature of group attributes, most of the categories listed could be sorted into other overlapping categories. For example, temporal change exists within every other category as members turn-over, processes adapt, and available resources expand; and social capital may be considered a resource rather than a precursor to resource access. These factors simply serve as a starting point for continued analysis of in-situ collaborative conservation groups. Future research may be directed toward developing other, equally valid frameworks that lead to different insights into collaborative conservation partnership functionality.

Future studies are needed to build on the results in this paper. Because of the nature of this study, results only showed correlation and not causation. Further work should test the directions of influence between attributes and the universality of the above-mentioned shared characteristics. Similarly, success was judged qualitatively based on group continuity and leader perceptions of goal-accomplishment. Future studies are needed to develop objective measures of collaborative conservation partnership success.

References

Abrams, D, M A Hogg, S Hinkle, and S Otten. 2005. "The social identity perspective on small groups." In *Theories of small groups: Interdisciplinary perspectives*, edited

- by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Agustin R Mercado, Jr, Dennis P Garrity, and Delia Catacutan. 1999. Technical and institutional innovations to conservation farming and agroforestry: Components of sustainable watershed management. In *Upland NGO Assistance Committee Lakbay-Aral*. Claveria Research Site, MOSCAT Campus, Claveria, Misamis Oriental, Philippines.
- Akrivou, Kleio, Richard E Boyatzis, and Poppy McLeod. 2006. "The evolving group: Towards a prescriptive theory of intentional group development." *Journal of Management Development* no. 25 (7):689-706.
- Alwin, Duane F, and Jon A Kronsnick. 1991. "The reliability of survey attitude measurement." *Sociological Methods Research* no. 20 (1):139-181.
- Anderson, Nathaniel M. 2003. Enhancing the growth and economic viability of landowner cooperatives to improve sustainable forest management in the United States. College Park: Maryland.
- Appalachian Regional Commission. 2010. Socioeconomic overview of Appalachia 2010. Washington, DC: Appalachian Regional Commission.
- . 2011. County economic status in Appalachia, Fiscal year 2012. In *Research, Maps, and Data*, edited by Appalachian Regional Commission. Washington, DC.
- Araujo, Luis, and Carlos Brito. 1998. "Agency and constitutional ordering in networks: A case study of the port wine industry." *International Studies of Management & Organization* no. 27 (4):22-46.
- Arrow, H, K B Henry, M S Poole, S Wheelan, and R Moreland. 2005. "Traces, trajectories, and timing: A temporal perspective on groups." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Arrow, Holly. 1997. "Stability, bistability, and instability in small group influence patterns." *Journal of Personality and Social Psychology* no. 72 (1):75-85.
- Arrow, Holly, Marshall Scott Poole, Kelly Bouas Henry, Susan Wheelan, and Richard Moreland. 2004. "Time, change, and development: The temporal perspective on groups." *Small Group Research* no. 35 (1):73-105.
- Ashton, Sarah F. 2006. *A study of cooperative ventures addressing the needs of forest landowners in southern Appalachia*, Forestry, Virginia Tech, Blacksburg, VA.
- Bagley, Scott. 2010. *Forestry Cooperatives*. United States: Forestry and Natural Resource Webinar Portal. Powerpoint Presentation.
- Bailey, D, and K M Koney. 2000. *Strategic alliances among health and human services organizations: From affiliations to consolidations*. London: Sage Publications.
- Bales, Robert F., and Fred L. Strodbeck. 1951. "Phases in group problem-solving." *The Journal of Abnormal and Social Psychology* no. 46 (4):485-495. doi: 10.1037/h0059886.
- Báles, Robert F., Fred L. Strodbeck, Theodore M. Mills, and Mary E. Roseborough. 1951. "Channels of Communication in Small Groups." *American Sociological Review* no. 16 (4):461-468.
- Barten, Paul K, David Damery, Paul Catanzaro, Jennifer Fish, Susan Campbell, Adrian Fabos, and Lincoln Fish. 2001. "Massachusetts Family Forests: Birth of a landowner cooperative." *Journal of Forestry* no. 99 (March):-2330.

- Baw Baw Shire Council. *Landcare*. AusSoft Solutions 2011 [cited April 27, 2011].
- Bazzoli, Gloria J., Rita Harmata, and Cheeling Chan. 1998. "Community-based trauma systems in the United States: an examination of structural development." *Social Science & Medicine* no. 46 (9):1137-1149.
- Bennis, W G, and H A Shepard. 1978. "A theory of group development." In *Group Development, 2nd ed.*, edited by L P Bradford, 13-35. La Jolla, CA: University Associates.
- Berkes, Fikret. 2007. "Community-based conservation in a globalized world." *Proceedings of the National Academy of Sciences* no. 104 (39):15188-15193.
- Bettencourt, B A. 1996. "Grassroots organizing: Recurrent themes and research approaches." *Journal of Social Issues* no. 52 (1):207-220.
- Black, Alan W, and Ian Reeve. 1993. "Participation in Landcare groups: The relative importance of attitudinal and situational factors." *Journal of Environmental Management* no. 39:51-71.
- Blinn, C R, P J Jakes, and M Sakai. 2007. "Forest landowner cooperatives in the United States: A local focus for engaging landowners." *Journal of Forestry* no. 105 (5):245-251.
- Bodin, Orjan, Beatrice Crona, and Henrik Ernstson. 2006. "Social networks in natural resource management: What is there to learn from a structural perspective?" *Ecology and Society* no. 11 (2):r2 (online).
- Borgatti, Stephen P, and Rob Cross. 2003. "A relational view of information seeking and learning in social networks." *Management Science* no. 49 (4):432-445.
- Borgatti, Stephen P., and Pacey C. Foster. 2003. "The Network Paradigm in Organizational Research: A Review and Typology." *Journal of Management* no. 29 (6):991-1013.
- Bradford, L P. 1978. "Group formation and development." In *Group Development, 2nd ed.*, edited by L P Bradford, 4-12. La Jolla, CA: University Associates.
- Bradshaw, Ben. 2003. "Questioning the credibility and capacity of community-based resource management." *The Canadian Geographer* no. 47 (2):137-150.
- Brass, Daniel J., Joseph Galaskiewicz, henrich R. Greve, and Wenpin Tsai. 2004. "Taking stock of networks and organizations: A multilevel perspective." *Academy of Management Journal* no. 47 (6):795-817.
- Broussard, Shorna R, and Kenli A Schaaf. 2004. "A private lands perspective on collaboration." *Journal of Community Based Collaborative Research* (Spring):2004.
- Brown, Margaret, and denise Vewsell. 2010. "Using a market segmentation approach to better target agricultural extension programs-- Aligning learner needs with learning programs." *Journal of Extension* no. 48 (5).
- Burchell, Brendan, and Catherine Marsh. 1992. "The effect of questionnaire length on survey response." *Quality and Quantity* no. 26 (3):233-244.
- Burke, P J. 2003. "Interaction in small groups." In *Handbook of social psychology*, edited by J Delamater, 363-387. New York: Kluwer Academic/Plenum Publishers.
- Butler, B J, and E C Leatherberry. 2004. "America's family forest owners." *Journal of Forestry* no. 107 (7):4-9.

- Butler, B J, M Tyrell, G Feinberg, S VanManen, L Wiseman, and S Wallinger. 2007. "Understanding and reseraching family forest owners: Lessons from social marketing research." *Journal of Forestry* no. 105 (7):348-357.
- Butler, Brett J. 2009. Who owns Virginia's forests? Blacksburg, VA: Virginia Tech.
- Butler, Brett J, Earl C Leatherberry, and Michael S Williams. 2005. Design, implementation, and analysis methods for the National Woodland Owner Survey. In *General Technical Report*. Newton Square, PA: United States Department of Agriculture Forest Service Northeastern Research Station.
- Butler, Brett J., Patrick D. Miles, and Mark H. Hansen. 2011. National Woodland Owner Survey Tabler web-application version 1.0. U.S. Department of Agriculture, Forest Service, Northern Research Station.
- Butler, Brett J., Patrick D. Miles, and Mark H. Hansen. *National Woodland Owner Survey Tabler web-application version 1.0*. U.S. Department of Agriculture, Forest Service, Northern Research Station 2009 [cited Wed Nov 18. Available from <http://fiatools.fs.fed.us/NWOS/tablemaker.jsp>.
- Byron, Ian, and Allan Curtis. 2002. "Maintaining volunteer commitment to local watershed initiatives." *Environmental Management* no. 30 (1):59-67.
- Carley, Kathleen. 1991. "A theory of group stability." *American Sociological Review* no. 56 (3):331-354.
- Chang, Artemis, Prashant Bordia, and Julie Duck. 2003. "Punctuated equilibrium and linear progression: Toward a new understanding of group development." *Academy of Management Journal* no. 46 (1):106-117.
- Cheng, Antony S, and Katherine M Mattor. 2010. "Place-based planning as a platform for social learning: Insights from a national forest landscape assessment process in Western Colorado." *Society and Natural Resources* no. 23:385-400.
- Christoffersen, N, D Harker, M W Lyman, and B Wyckoff. 2008. The status of community-based forestry in the United States: A report to the U.S. Endowment for Forestry and Communities. Silver Spring, MD: Community Forest Consortium.
- Clarke, Jeanette. 1991. "Participatory technology development in agroforestry: Methods from a pilot project in Zimbabwe." *Agroforestry Systems* no. 155:217-228.
- Colliver, R, D Lucas, and S Moore. 2008. Agent, partner or activist: The role of community Landcare in creating sustainable rural landscapes. In *Community Development and Ecology Conference*. Deakin University, Melbourne.
- Conley, Alexander, and Margaret A Moot. 2003. "Evaluating collaborative natural resource management." *Society and Natural Resources* no. 16:371-386.
- Coughlin, Christine W, Merrick L Hoben, Dirk W Manskopf, and Shannon W Quesada. 1999. *A systematic assessment of collaborative resource management partnerships*, School of Natural Resources, University of Michigan, Ann Arbor, MI.
- Cramb, R A. 2005. "The role of social capital in the promotion of conservation farming: The case of 'landcare' in the Southern Philippines." *Land Degradation and Development* no. 17 (1):23-30.
- Cremer, David De, and Daan van Knippenberg. 2002. "How do leaders promote cooperation? The effects of charisma and procedural fairness." *Journal of Applied Psychology* no. 87 (5):858-866.

- Cremer, David De, Tom R Tyler, and Nathalie den Ouden. 2005. "Managing cooperation via procedural fairness: the mediating influence of self-other merging." *Journal of Economic Psychology* no. 26:393-406.
- Crewson, Phil. 2011. *Applied statistics handbook*. AcaStat Software, Inc 1999 [cited April 27, 2011 2011]. Available from <http://www.acastat.com/index.htm>.
- Curtis, Allan. 1998. "Agency-community partnership in Landcare: Lessons for state-sponsored citizen resource management." *Environmental Management* no. 22 (4):563-574.
- . 2000. "Landcare: Approaching the limits of voluntary action." *Australian Journal of Environmental Management* no. 7 (1):19-27.
- Curtis, Allan, and Terry De Lacy. 1996. "Landcare in Australia: Does it make a difference?" *Journal of Environmental Management* no. 46:119-137.
- Curtis, Allan, and Michael Lockwood. 2000. "Landcare and catchment management in Australia: Lessons for state-sponsored community participation." *Society and Natural Resources* no. 13 (1):61-73.
- Curtis, Allan, and Marike Van Nouhuys. 1999. "Landcare participation in Australia: The volunteer perspective." *Sustainable Development* no. 7:98-111.
- Curtis, Allan, Marike Van Nouhuys, Wayne Robinson, and Jacinta Mackay. 2000. "Exploring Landcare effectiveness using organisational theory." *Australian Geographer* no. 31 (3):349-366.
- Curtis, Allan, Bruce Shindler, and Angela Wright. 2007. "Sustaining local watershed initiatives: Lessons from Landcare and watershed councils." *Journal of the American Water Resources Association* no. 38 (5):1207-1216.
- Dailey, Robert C. 1977. "The effects of cohesiveness and collaboration on work groups: A theoretical model." *Group and Organization Studies* no. 2:461-469.
- Danks, Cecilia, and Yvonne Everett. 1996/97. Rural development forestry network. In *Rural Development Forestry Network Paper 20a*. London, UK: Overseas Development Institute.
- Danks, Cecilia. 1996/1997. "Developing institutions for community forestry in northern California." In *Network Paper 20a*, edited by Rural Development Forestry Network. Overseas Development Institute.
- Davis, Miriam, and J Mark Fly. 2010. "Do you hear what I hear: Better understanding how forest management is conceptualized and practiced by private forest landowners." *Journal of Forestry* no. October/November:321-328.
- Diederer, Paul, Hans van Meijl, Arjan Wolters, and Katarzyna Bijak. 2003. "Innovation adopters in agriculture: Innovators, early adopters and laggards." *Cahiers d'economie de sociologie rurales* no. 67:29-50.
- Dillman, Don A. 2001. *Mail and internet surveys: the tailored design method*. 2nd Ed. ed. New York: Wiley.
- Dolisca, Frito, Joshua M McDaniel, Dennis A Shannon, and Curtis M Jolly. 2009. "A multilevel analysis of the determinants of forest conservation behavior among farmers in Haiti." *Society and Natural Resources* no. 22 (5):433-447.
- Downing, Adam K, and James K Finley. 2005. "Private forest landowners: What they want in an educational program." *Journal of Extension* no. 43 (1).
- Doz, Yves L. 1996. "The evolution of cooperation in strategic alliances: Initial conditions or learning processes." *Strategic Management Journal* no. 17:55-83.

- Egan, A, and S Jones. 1993. "Do landowner practices reflect beliefs." *Journal of Forestry* no. 91 (10):39-45.
- Egan, Andrew F, and A E Luloff. 2000. "The exurbanization of America's forests: Research in rural social science." *Journal of Forestry* no. 98 (3):26-30.
- Everett, Y. 1996/1997. Building community capacity for a sustained non-timber forest products industry in the Trinity Bioregion: Lessons drawn from international models. In *Network Paper 20a*, edited by Rural Development Forestry Network: Overseas Development Institute.
- Fajvan, Mary Ann, Shawn T Grushecky, and Curt C Hassler. 1998. "The effects of harvesting practices on West Virginia's wood supply." *Journal of Forestry* no. 96 (5):33-39(7).
- Finholt, T, L Sproull, and S Keisler. 1990. "Communication and performance in ad hoc task groups." In *Intellectual teamwork: Social and technological foundations of cooperative work*, edited by J Galegher, R E Kraut and C Egidio, 291-325. Hillsdale, NJ: Lawrence Erlbaum Assoc.
- Finley, Andrew O, and David B Kittredge. 2006. "Thoreau, Muir, and Jane Doe: Different types of private forest owners need different kinds of forest management." *Northern Journal of Applied Forestry* no. 23 (1).
- Fisher, R J. 1995. Collaborative Management of forests for conservation and development. In *Issues in Forest Conservation*. Bellegarde, France: International Union for the Conservation of Nature and Natural Resources and World Wide Wildlife Fund for Nature.
- Flint, Courtney G, A E Luloff, and James C Finley. 2008. "Where is "community" in community-based forestry?" *Society & Natural Resources* no. 21 (6):526-537.
- Forbes, Peter, and Danyelle O'Hara. 2008. Building a new movement: Land conservation and community. Fayston, VT: Center for Whole Communities.
- Gabarro, J J. 1990. "The development of working relationships." In *Intellectual Teamwork: Social and Technological Foundations of Cooperative Work*, edited by J Galegher, R E Kraut and C Egidio, 79-110. Hillsdale, NJ: Lawrence Erlbaum Assoc.
- Galaskiewicz, J. 1985. "Interorganizational relations." *Annual Review of Sociology* no. 11:281-304.
- Galaskiewicz, Joseph. 2007. "Has a Network Theory of Organizational Behaviour Lived Up to its Promises?" *Management & Organization Review* no. 3:1-18. doi: 10.1111/j.1740-8784.2007.00057.x.
- Gates, Stephen. 1993. Strategic alliances: guidelines for successful management. In *The Conference Board Report: The Conference Board Inc*.
- Gersick, C J G. 1988. "Time and transition in work teams: Toward a new model of group development." *Academy of Management Journal* no. 31 (1):9-41.
- . 1989. "Marking time: Predictable transitions in task groups." *The Academy of Management Journal* no. 32 (2):274-309.
- Gersick, Connie J. G. 1991. "Revolutionary Change Theories: A Multilevel Exploration of the Punctuated Equilibrium Paradigm." *The Academy of Management Review* no. 16 (1):10-36.

- Gill, Nicholas, Peter Klepeis, and Laurie Chisholm. 2010. "Stewardship among lifestyle oriented rural landowners." *Journal of Environmental Planning and Management* no. 53 (3):317-334.
- Gladstein, Deborah L. 1984. "Groups in Context: A Model of Task Group Effectiveness." *Administrative Science Quarterly* no. 29 (4):499-517.
- Granovetter, M S. 1973. "The strength of weak ties." *American Journal of Sociology* no. 78 (6):1360-1380.
- Granovetter, Mark. 1985. "Economic Action and Social Structure: The Problem of Embeddedness." *The American Journal of Sociology* no. 91 (3):481-510.
- Gray, Barbara. 1989. *Collaborating: Finding common ground for multiparty problems*. San Francisco, CA: Jossey-Bass Inc.
- . 1990. "Building interorganizational alliances: Planned change in a global environment." *Research in Organizational Change and Development* no. 4:101-140.
- Gulati, R. 2004. "Alliances and networks." In *Strategic alliances: Theory and evidence*, edited by J J Reuer, 378-416. New York: Oxford University Press.
- Gulati, Ranjay, and Martin Gargiulo. 1999. "Where Do Interorganizational Networks Come From?" *The American Journal of Sociology* no. 104 (5):1439-1493.
- Heberlein, Thomas A, and Robert Baumgartner. 1978. "Factors affecting response rates to mailed questionnaires: A quantitative analysis of the published literature." *American Sociological Review* no. 43 (4):447-462.
- Hines-Ward, Gretchen, Eric Jokela, Lynn Starr, Hubert Hinote, Kevin L O'Hara, and Peter Womble. 1993. "Cooperative models: Educating landowners, managers, and the public." *Journal of Forestry* no. 91 (10):28-30.
- Hobbs, Stephen D, A Scott Reed, and Beverly B Hobbs. 1993. "Technology transfer: Putting research into practice." *Journal of Forestry* no. 91 (10):12-14.
- Hollingshead, A B, G M Wittenbaum, P B Paulus, R Y Hirokawa, D G Ancona, R S Peterson, K A Jehn, and K Yoon. 2005. "A look at groups from the functional perspective." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Hull, Bruce, David Robertson, and Gregory J Buhyoff. 2004. "Boutique" forestry - New forest practices in urbanizing landscapes." *Journal of Forestry* no. 102 (1):14-19.
- Hull, R Bruce, and Sarah Ashton. 2008. "Forest cooperatives revisited." *Journal of Forestry* no. 98 (3):100-105.
- Human, Sherrie E, and Keith G Provan. 2000. "Legitimacy building in the evolution of small firm multilateral networks: A comparative study of success and demise." *Administrative Science Quarterly* no. 45:327-365.
- Jakes, Pamela. 2006. *Forestry cooperatives: What today's resource professionals need to know*. Saint Paul, MN: USDA Forest Service.
- Janes, Joseph. 1999. "Survey construction." *Library Hi Tech* no. 17 (3):321-325.
- Jarillo, J. Carlos. 1988. "On Strategic Networks." *Strategic Management Journal* no. 9 (1):31-41.
- Jepson, Christopher, David A Asch, John C Hershey, and Peter A Ubel. 2005. "In a mailed physician survey, questionnaire length had a threshold effect on response rate." *Journal of Clinical Epidemiology* no. 58 (1):103-105.

- Katz, N, H Arrow, and N Contractor. 2005. "The network perspective on small groups: Theory and research." In *Theories of small groups: Interdisciplinary perspectives*, edited by Marshall Scott Poole and Andrea B Hollingshead. Thousand Oaks, CA: Sage Publications.
- Kellert, Stephen R, Jai N Mehta, Syrna A Ebbin, and Laly L Lichtenfeld. 2000. "Community natural resource management: Promise, rhetoric, and reality." *Society and Natural Resources* no. 13 (8):705-715.
- Kelso, Anna, and Michael Jacobson. 2011. "Community assessment of agroforestry opportunities in GaMothiba, South Africa " *Agroforestry Systems* no. 82 (in press).
- Kendra, A, and R B Hull. 2005. "Motivations and behaviors of new forest owners in Virginia." *Forest Science* no. 51 (2):142-154.
- Kittredge, D B. 2005. "The cooperation of private forest owners on scales larger than one individual property: International examples and potential application in the United States." *Forest Policy and Economics* no. 7:671-688.
- Kluender, R A, and T L Walkingstick. 2000. "Rethinking how nonindustrial landowners view their lands." *Southern Journal of Applied Forestry* no. 24 (3):150-158.
- Koehler, Brandi, and Tomas Koontz. 2008. "Citizen Participation in Collaborative Watershed Partnerships." *Environmental Management* no. 41 (2):143-154. doi: 10.1007/s00267-007-9040-z.
- Lacoursiere, R B. 1980. *The life cycle of groups: Group developmental stage theory*. New York: Human Sciences Press.
- Lauber, T Bruce, Daniel J Decker, and Barbara A Knuth. 2008. "Social networks and community-based natural resource management." *Environmental Management* no. 42 (677-687).
- Leach, William D, and Neil W Pelkey. 2001. "Making watershed partnerships work: A review of the empirical literature." *Journal of Water Resources Planning and Management* no. 127 (6):378-385.
- Lofstrom, S M. 1999. *Strategic alliance success: Bringing individuals' networks, knowledge and actions into the equation*, Graduate School, University of Minnesota, St. Paul.
- Lowry, Richard. 1998. *Concepts and applications of inferential statistics*. Poughkeepsie, NY: Online: <http://faculty.vassar.edu/lowry/webtext.html>.
- Magill, Daniel J, David W McGill, and Rory F Fraser. 2004. "Refining outreach to woodland owners in West Virginia-- Preferred topics and assistance methods." *Journal of Extension* no. 42 (4).
- Majumdar, I, L Teeter, and B Butler. 2008. "Characterizing family forest owners: A cluster analysis approach." *Forest Science* no. 54 (2):176-184.
- Majumdar, I, L D Teeter, and B J Butler. 2009. "Using extant data to determine management direction in family forests." *Society and Natural Resources* no. 22:867-883.
- Marks, Michelle A., John E. Mathieu, and Stephen J. Zaccaro. 2001. "A Temporally Based Framework and Taxonomy of Team Processes." *The Academy of Management Review* no. 26 (3):356-376.
- McGrath, Joseph E. 1984. *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall, Inc.

- . 1990. "Time matters in groups." In *Intellectual teamwork: Social and technological foundations of cooperative work*, edited by J Galegher, R E Kraut and C Egido. Hillsdale, NJ: Laurence Erlbaum Association.
- . 1991. "Time, interaction, and performance (TIP): A theory of groups." *Small Group Research* no. 22 (2):147-174.
- McGrath, Joseph E, Holly Arrow, and Jennifer L Berdahl. 2000. "The study of groups: Past, present, and future." *Personality and Social Psychology Review* no. 4 (1):95-105.
- McGrath, Joseph E. 1997. "Small group research, that once and future field: An interpretation of the past with an eye to the future." *Group Dynamics: Theory, Research, and Practice* no. 1 (1):7-27. doi: 10.1037/1089-2699.1.1.7.
- McLaughlin, Diane K, Daniel t Lichter, and Stephen A Matthews. 1999. Demographic diversity and economic change in Appalachia.
- McPherson, J Miller, Pamela A Popielarz, and Sonja Drobnic. 1992. "Social networks and organizational dynamics." *American Sociological Review* no. 57 (April):153-170.
- Mennecke, B E, J A Hoffer, and B E Wynne. 1992. "The implications of group development and history for group support system theory and practice." *Small Group Research* no. 23 (4):524-572.
- Miles, S J, and G Mangold. 2002. "The impact of team leader performance on team member satisfaction: the subordinate's perspective." *Team Performance Management* no. 8 (5/6):113-121.
- Moles, Jerry. 2011. New River LandCare. Paper read at New River Symposium, May 20, 2011, at Concord University, Athens, WV.
- Moore, Elizabeth A., and Tomas M. Koontz. 2003. "Research Note A Typology of Collaborative Watershed Groups: Citizen-Based, Agency-Based, and Mixed Partnerships." *Society & Natural Resources: An International Journal* no. 16 (5):451 - 460.
- Morton, Lois Wright. 2008. "The role of civic structure in achieving performance-based watershed management." *Society and Natural Resources* no. 21 (9):751-766.
- Munsell, John F, Rene H Germain, Eddie Bevilacqua, and Rudy M Schuster. 2006. "Voluntary best management practice implementation by nonindustrial private forestland owners in New York City's water supply system." *Northern Journal of Applied Forestry* no. 23 (2):133-140.
- Munsell, John F, Rene H Germain, Valerie A Luzadis, and Eddie Bevilacau. 2009. "Owner intentions, previous harvests, and future timber yield on fifty working nonindustrial private forestlands in New York state." *Northern Journal of Applied Forestry* no. 26 (2):45-51.
- Munsell, John F, Rene H Germain, and Ian A Munn. 2008. "A tale of two forests: Case study comparisons of sustained yield management on Mississippi and New York nonindustrial private forestland." *Journal of Forestry* no. 106 (8):431-439.
- Nadeau, E G, E Howard, and K Edberg. 2005. Taking care of family forests: Lessons for Minnesota. Vital Forests/Vital Communities Initiative of the Blandin Foundation.
- Nadeau, E G, Isaac Nadeau, M E Myers, J Padgham, P Guillery, and K Fernholz. 2002. Balancing ecology and economics: A start-up guide for forest owner cooperation. edited by University of Wisconsin Center for Cooperatives. Madison, WI.

- Nadeau, E G, and P Pingrey. 2001. What's new in forest owner cooperation? In *The Timberline*: Wisconsin Department of Natural Resources, Division of Forestry.
- Neilson, E H. 1978. "Applying a group development model to managing a class." In *Group Development, 2nd ed.*, edited by L P Bradford, 117-131. La Jolla, CA: University Publishers.
- Neuman, W Lawrence. 2006. *Social Research Methods: Qualitative and Quantitative Approaches*. Edited by Jeff Lasser. New York: Pearson Education, Inc.
- Niederkofler, Martin. 1991. "The evolution of strategic alliances: Opportunities for managerial influence." *Journal of Business Venturing* no. 6:237-257.
- Nowak, Pete, Sarah Bowen, and Perry E Cabot. 2006. "Disproportionality as a framework for linking social and biophysical systems." *Society and Natural Resources* no. 19:153-173.
- Perkins, D D, B B Brown, and R B Taylor. 1996. "The ecology of empowerment: Predicting participation in community organizations." *Journal of Social Issues* no. 52 (1):85-110.
- Poole, Marshall Scott. 1981. "Decision development in small groups I: A comparison of two models." *Communication Monographs* no. 48 (1):1.
- . 1983a. "Decision development in small groups II: A study of multiple sequences in decision making." *Communication Monographs* no. 50:206-232.
- . 1983b. "Decision development in small groups III: A multiple sequence model of group decision development." *Communication Monographs* no. 50:321-341.
- Prager, K. 2010. "Local and regional partnerships in natural resource management: The challenge of bridging institutional levels." *Environmental Management* no. 46 (5):711-724.
- Prell, Christina, Klaus Hubacek, and Mark Reed. 2009. "Stakeholder analysis and social network analysis in natural resource management." *Society and Natural Resources* no. 22 (6):501-518.
- Provan, Keith G, Amy Fish, and Joerg Sydow. 2007. "Interorganizational networks at the network level: A review of the empirical literature on whole networks." *Journal of Management* no. 33 (3):479-516.
- Provan, Keith G, and Patrick Kenis. 2007. "Modes of network governance: Structure, management, and effectiveness." *Journal of Public Administration* no. 18:229-252.
- Provan, Keith G, and Juliann G Sebastian. 1998. "Networks within networks: Service link overlap, organizational cliques, and network effectiveness." *Academy of Management Journal* no. 41 (4):453-463.
- Provan, Keith G., and H. Brinton Milward. 1995. "A Preliminary Theory of Interorganizational Network Effectiveness: A Comparative Study of Four Community Mental Health Systems." *Administrative Science Quarterly* no. 40 (1):1-33.
- Raak, Arno van, and Aggie Paulus. 2001. "A sociological systems theory of interorganizational network development in health and social care." *Systems Research and Behavioral Science Systems Research* no. 18:207-224.
- Rasamoelina, Maminiaina S, James E Johnson, and R Bruce Hull. 2009. Demographic analysis of family forest owners in relation to educational program participation.

- In *2009 IUFRO 3.08 Small-Scale Forestry Symposium*, edited by Kate Piatek, Ben Spong, Steve Harrison and Dave McGill. Morgantown, WV (USA).
- Rickenbach, M. 2009. "Serving members and reaching others: The performance and social networks of a landowner cooperative." *Forest Policy and Economics* no. 11:593-599.
- Rickenbach, Mark G, Raymond P Guries, and Daniel L Schmoltdt. 2006. "Membership matters: Comparing members and non-members of NIPF owner organizations in southwest Wisconsin, USA." *Forest Policy and Economics* no. 8 (1):93-103.
- Rickenbach, Mark, Keimberly Zeuli, and Emily Sturgess-cleek. 2005. "Despite failure: The emergence of "new" forest owners in private forest policy in Wisconsin, USA." *Scandinavian Journal of Forest Reserach* no. 20 (6):503-513.
- Ring, Peter Smith, and Andrew H. Van De Ven. 1994. "Developmental processes of cooperative interorganizational relationships." *Academy of Management Review* no. 19 (1):90-118.
- Rogers, E M, and R J Burdge. 1972. *Social change in rural societies, 2nd ed.* New York: Appleton-Century-Crofts.
- Rogers, Everett M. 1976. "New product adoption and diffusion." *Journal of Consumer Research* no. 2 (4):290-301.
- Rogers, Everett M. 2003. *Diffusion of innovations.* 5th Edition ed. New York, NY: Free Press.
- Rond, Mark de. 2003. *Strategic alliances as social facts: Business, biotechnology, and intellectual history.* New York: Cambridge University Press.
- Sagor, Eli, Shorna Broussard, and Amanda Kueper. 2008. Woodland owner networks: Assessing outcomes from several models used in the Unites States (Part II) Methodological considerations and preliminary findings. Paper read at Evolving challenges and changing expectations for forestry extension and technology transfer: Meeting the needs of people and forests around the globe, at Mattawa and Ottawa, ON.
- Sagor, Eli S, Maureen H McDonough, and Shorna Broussard Allred. 2009. Woodland owner networks and peer-to-peer learning. In *2009 IUFRO 3.08 Small-Scale Forestry Symposium*, edited by Kate Piatek, Ben Spong, Steve Harrison and Dave McGill. Morgantown, WV (USA).
- Scott, John. 2000. *Social network analysis: A handbook.* Edited by 2nd Ed. Thousand Oaks, CA: Sage Publications.
- Selin, Steve, and Deborah Chavez. 1995. "Developing a collaborative model for environmental planning and management." *Environmental Managment* no. 19 (2):189-195.
- Smith, Michael D, and Richard S Krannich. 2000. "'Culture clash" revisited: Newcomer and longer-term residents' attitudes toward land use, development, and environmental issues in rural communities in the Rocky Mountain West." *Rural Sociology* no. 65 (3):396-421.
- Sobels, Jonathan, Allan Curtis, and Stewart Lockie. 2001. "The role of Landcare group networks in rural Australia: Exploring the contribution of social capital." *Journal of Rural Studies* no. 17:265-276.

- Soda, Giuseppe, Alessandro Usai, and Akbar Zaheer. 2004. "Network memory: The influence of past and current networks on performance." *Academy of Management Journal* no. 47 (6):893-906.
- Sperry, Charlie. 1997. *Community development groups: A solution to conflict in Western Montana*, Resource Conservation, University of Montana, Missoula.
- Steinhilber, S. 2008. *Strategic alliances: Three ways to make them work*. Boston, MA: Harvard Business Press.
- Stricker, D. 2008. "BrightStat.com: Free statistics online." *Computer methods and programs in biomedicine* no. 92 (135-143).
- Surendo, G C, MSayed Mehmood, and John Schelhas. 2009. "Segmenting landowners based on their information-seeking behavior: A look at landowner education on the red oak borer." *Journal of Forestry* no. 107 (6):313-319.
- Sydow, Jorg. 2004. "Network development by means of network evaluation? Explorative insights from a case in the financial services industry." *Human Relations* no. 57 (2):201-220.
- The HTC Group. 2004. *Appalachia: Turning assets into opportunities*. Asheville, NC: Appalachian Regional Commission.
- Totterdell, Peter, David Holman, and Amy Hukin. 2008. "Social networks: Measuring and examining individual differences in propensity to connect with others." *Social Networks* no. 30:283-296.
- Tuckman, B W. 1965. "Developmental sequence in small groups." *Psychological Bulletin* no. 65 (6):384-399.
- Tuckman, B W, and M A C Jensen. 1977. "Stage of small group development revisited." *Group and Organization Studies* no. 2 (4):419-427.
- Turner, Monica G, Scott M Pearson, Paul Bolstad, and David N Wear. 2003. "Effects of land-cover change on spatial pattern of forest communities in the Southern Appalachian Mountains (USA)." *Landscape Ecology* no. 18:449-464.
- Tyler, T. R., and S. L. Blader. 2003. "The group engagement model: procedural justice, social identity, and cooperative behavior." *Personality and Social Psychology Review* no. 7 (4):349-361.
- USDA Forest Service. 2008. *Forest Inventory and Analysis: Forest Inventory Data Online*. USDA Forest Service.
- Venkatraman, N., and Lee Chi-Hyon. 2004. "Preferential linkage and network evolution: A conceptual model and empirical test in the U.S. video game sector." *Academy of Management Journal* no. 47 (6):876-892.
- Virginia Department of Game and Inland Fisheries. 2011. *Virginia's watersheds: USGS hydrologic unit river systems*. In *Virginia Watersheds*. Richmond, VA.
- Wagner, Cheryl L, and Maria E Fernandez-Gimez. 2008. "Does community-based collaborative resource management increase social capital?" *Society and Natural Resources* no. 21:324-344.
- Weber, Edward P. 2000. "A new vanguard for the environment: Grass-roots ecosystem management as a new environmental movement." *Society and Natural Resources* no. 13:237-259.
- Weinreich, N K. 1999. *Hands-on social marketing*. London: Sage Publications.
- Wenger, Etienne, Richard McDermott, and William M Snyder. 2002. *Cultivating communities of practice*. Boston, MA: Harvard Business School Press.

- Wheelan, S A. 1994. *Group processes: A developmental perspective*. Boston, MA: Allyn and Bacon.
- Wheelan, S A, B Davidson, and F Tilin. 2003. "Group development across time: Reality or illusion?" *Small Group Research* no. 34 (2):223-245.
- Whelan-Berry, K A, J R Gordon, and C R Hinings. 2003. "Strengthening organizational change processes: Recommendations and implications from a multilevel analysis." *Journal of Applied Behavioral Science* no. 39 (2):186-207.
- Wilson, Geoff A. 2004. "The Australian Landcare movement: Towards 'post-productivist' rural governance?" *Journal of Rural Studies* no. 20:461-484.
- Wolf, S A, and S Hufnagl-Eichiner. 2007. "External resources and development of forest landowner collaboratives." *Society and Natural Resources* no. 20:675-688.
- Woolcock, Michael, and Deepa Narayan. 2000. "Social Capital: Implications for Development Theory, Research, and Policy." *The World Bank Research Observer* no. 15 (2):225-249. doi: 10.1093/wbro/15.2.225.
- Worchel, S. 1994. "You can go home: Returning group research to the group context with an eye on developmental issues." *Small Group Research* no. 25 (2):205-223.
- Zaheer, Akbar, Bill McEvily, and Vincenzo Perrone. 1998. "Does Trust Matter? Exploring the Effects of Interorganizational and Interpersonal Trust on Performance." *Organization Science* no. 9 (2):141-159.
- Zajac, Edward J, and Cyrus P Olsen. 1993. "From transaction cost to transactional value analysis: implications for the study of interorganizational strategies." *Journal of Management Studies* no. 30 (1):131-145.
- Zaller, John, and Stanley Feldman. 1992. "A simple theory of the survey response: Answering questions versus revealing preferences." *American Journal of Political Science* no. 36 (3):579-616.

Chapter 5: Conclusions

The objective of this research was to inform the development of the FFN by describing the membership demographics of family forest-based collaborative conservation partnerships and finding qualitative indicators and patterns relating partnership characteristics and successes. The following conclusions will reiterate the findings presented in this thesis, discuss their implications for the FFN, and link conclusions with the broader field of collaborative conservation partnerships.

The collaborative conservation partnerships studied have potential as landowner education vehicles, as evidenced by high levels of member interest in education and innovativeness. Currently, members tend to be well-educated, higher-income, large-landholding individuals with a propensity to seek out technology transfer agents and an interest in multiple-use management objectives. Expanding to a broader member demographic will likely take time as collaborative conservation partnerships prove their legitimacy as stewardship outlets among the broader community.

Survey results suggest that a collaborative conservation partnership may be an efficient way to teach forest farming and point to 2 recommendations for the FFN to maximize participation rates. Members are likely most interested in the educational and environmental benefits of their involvement. FFN coordinators are therefore advised to emphasize the didactic results of their non-timber forest product trials and the conservation values of those results. Second, most members will likely learn about the FFN through word-of-mouth such as friends, neighbors, and participation in other civic groups. The FFN should seek out local opinion leaders with social networks to spread interest and awareness in the partnership.

FFN coordinators, along with collaborative conservation partnership leaders in general, should be aware of the implications of partnership characteristics. Coordinators should be aware that the volume of time they dedicate to the partnership will dictate the level of group activity. Low activity levels may inhibit member engagement and development of future partnership leaders, while high activity levels may ultimately over-tax partnership leaders. Space needs to be made available for highly active participants as well as peripheral members. Group processes are dynamic and must be able to capitalize on the interests, skills, and labor inputs of members within the constraints of forest farming implementation. Resources available will fluctuate with social capital and the ability to network with complementary outsiders, members, funders, and experts. The FFN needs to develop connections with diverse stakeholders, establish a successful track record, and develop ties with credible actors in order to expand membership and financial and professional resource assistance. Just a few members or outside contacts will be disproportionately valuable for their labor, financial, legitimacy, or expertise inputs. As external conditions such as funding or membership levels change, the FFN will need the capacity to adapt to or capitalize on those changes. Coordinators should be aware that the group is a dynamic entity and not a static organization.

Overall, qualitative and quantitative results indicate the collaborative conservation partnerships are in the early stages of adoption but have high potential to positively influence conservation practices, particularly through member education. Successful partnerships must adapt themselves to their ever-changing context-specific situations such as available financial, labor, and expertise resources.

Appendix A. Survey Instrument

Questions about your landowner network

Please respond to the following questions by checking your responses

1. Which of these landowner networks do/did you belong to? (Check all that apply)

- Appalachian Sustainable Development
- Blue Ridge Forest Cooperative
- The Forest Farming Network
- Tri-County Forestry and Wildlife Association
- LandCare
- Land Trust

2. Please list any other land stewardship organizations you are a part of. (Examples: Virginia Forestry Association, Virginia Forest Products Association, Tree Farmer, etc)

- No other organizations
- The following organizations: _____

3. What are your primary motivations for being a part of a landowner network? (Check all that apply)

- Economic (to earn more money)
- Educational (to learn and/or share ideas)
- Social (to interact with other like-minded people)
- Environmental (to help promote environmental stewardship)
- Other _____

4. How did you first learn about your landowner network(s)? (Examples: friend, bulletin board, newspaper, presentation from a network leader, etc)

I first learned about landowner networks from _____

Demographic Questions

Please respond to the following questions by checking your responses

5. What is your sex?

- Male
- Female

6. What is your household's annual income?

- Less than \$25,000
- \$25,000 to \$49,999
- \$50,000 to \$99,999
- \$100,000 to \$199,999
- \$200,000 or more

7. What is your age?

- Under 25 years
- 25 to 34 years
- 35 to 44 years
- 45 to 54 years
- 55 to 64 years
- 65 to 74 years
- 75 years and above

8. What is your race? (Check all that apply)

- White/Caucasian
- American Indian
- Asian
- African American
- Pacific Islander

9. What is the highest degree or level of school that you have completed? (Check only one)

- Less than 12th grade
- High school/GED
- Some college
- Associate/technical degree
- Bachelor's degree
- Graduate degree

Questions about your land

Please respond to the following questions by checking your responses

10. How many acres of land do you own in Virginia?

- I do not own land in Virginia. **YOU ARE DONE WITH THIS SURVEY. PLEASE RETURN TO VIRGINIA TECH IN THE SELF-ADDRESSED, STAMPED ENVELOPE**
- I own _____ acres of land in Virginia.

11. Is there a conservation easement on any of the land that you own in Virginia?

Conservation easements are legally binding agreements (sometimes the result of a payment to the owner) that restrict land from being used for certain, designated purposes, such as development.

- Yes, there is a conservation easement
- No, there is not a conservation easement
- No, there is not currently a conservation easement, but I plan to get one

12. How many acres of woodland do you own in Virginia? *Woodland is at least one acre in size and has at least ten (10) well-spaced trees per acre. Woodlands do not include orchards, nurseries, Christmas tree farms, or lawns.*

- I do not own woodland in Virginia. **YOU ARE DONE WITH THIS SURVEY. PLEASE RETURN TO VIRGINIA TECH IN THE SELF-ADDRESSED, STAMPED ENVELOPE**
- I own _____ acres of woodland in Virginia.

13. In what year did you first get woodland in Virginia?

- I first acquired woodland in Virginia in _____
- I don't remember

14. What is the primary reason that you own woodland in Virginia?

I own woodland primarily because _____

15. Please check ONE of the two following statements:

- My home (primary residence) is part of the same property as my woodland.
- My home (primary residence) is _____ miles from my nearest woodland.

16 a. Have trees been harvested or removed from any of your woodland in the last 10 years (since 2000)?

- Yes
- No

16 b. Why were trees harvested or removed? (Check all that apply)

- To achieve objectives in my management plan
- Trees were mature
- To generate money for an emergency (e.g. health-related emergency, etc)
- To generate a regular flow of income
- To obtain products for personal use (firewood, building materials, etc)
- To clear land for conversion to another use (e.g. road, building, pasture, etc)
- To minimize risk of wildfire
- To improve forest health
- Price was right
- To improve hunting opportunities
- To improve scenery and recreational opportunities
- To remove trees damaged by natural catastrophe
- To improve marketability of remaining trees

- To allow for creation of a new, young forest
- Other (please specify) _____

17. What sources of information have you ever used to get information for managing your forest land? (Check all that apply)

- Conservation organizations
- Virginia Department of Forestry
- Lawn and Garden Company
- Arborist
- Extension forester or other university employee
- Private consultant
- Forester from a forest products company
- Local government
- Logging contractor
- Other forest landowner
- Neighbors, friends, family
- Television/radio
- Magazine, newspaper, newsletter
- Internet/web
- Other: _____

18. Which of the following categories best describes you?

- I like to experiment with new ideas and be the first to try something new.
- I am willing to try new things but don't like to be the first.
- I usually wait until something is tried by others and found to be useful before I adopt it.
- I will adopt new things mainly when they are in common use.
- I prefer traditional ideas and products to new ones.

Thank you! Please return this completed form to the Virginia Tech College of Natural Resources in its self-addressed, stamped envelope.

Appendix B. Semi-Structured Interview Prompts

What is your name

Describe your organization:

Its name

Its purpose

Its products/services

How long have you been with the group

What is your role in the group

Were you around when the group initially started up?

Network initiation

When did it start

What catalyzed network initiation

Who started it

Did you/they have prior networking experience?

What special knowledge/skills/resources did initial leaders have to work with?

What happened to these early leaders?

Membership base

How many members did you have initially?

Size of advisory board?

What motivated early leaders to join & work on the network?

What motivated early members to join?

Were there specific defining features of the early members? (ex. Owned land, friends, similar socioeconomic status, neighbors, etc)

How geographically spread-out was it?

What was your role?

Were you connected with members before starting the organization? (who, how much)

Were members connected with each other before the organization? (who, how much)

What was expected of members? (dues, meetings, individual tasks, etc?)

How much time did this require, number of interactions?

Communication

How did leaders communicate? (frequency of meetings, email, phone, etc)

How did leaders communicate with members?

How did you communicate with potential members?

Legitimacy

What did the broader community think of the group?

How did you initially gain legitimacy/credibility

(ex. Certification, key members/leaders, external affiliations, etc)

External influences

What key players outside of the organization helped fund the network?

What key players outside the organization helped motivate the network?

What key players outside the organization helped lead the network?

Conflicts

Were there early conflicts between members and/or leaders? (ex.

Developing goals or procedures, electing leaders, etc)

Explain

Organization

How did you decide on your formal organizational form?

What were the group's short-term goals?

What were the group's long-term goals?

What formal structures did you set up? (board of directors, bylaws, communication mediums, etc)

Did you choose to keep some aspects of the organization informal?

How long did it take to formalize the group?

How do you formally (or informally) assess your success?

OR

If you weren't around when it started up...

How did you first hear about the group?

Where did you find more follow-up information?

What motivated you to join?

What motivates your continued participation?

Walk me through how the group changed over time and what caused these changes

Changes in member-base or size

Changes in member expectations/roles/tasks

Changes in organization form/structure

Changes in leadership

Changes in how you communicate

Changes in how the larger community views the organization

Changes in who helps/funds the group from the outside (non-member)?

Changes in goals

Changes in organization activities/programs/services/products

Phases & Transitions

Do you remember any periods of intense conflict?

How are/were conflicts resolved?

Have the same issues come up over again?

Do you remember any periods of immense change/organizational overhaul?

Have there been long periods without any big changes or conflicts?

Current network

Membership base

- How many members are there?
- Size of governing board? Management?
- What motivates leaders to work on the network?
- What motivates members to join?
- Are there specific defining features of the early members? (ex. Own land, friends, similar socioeconomic status, neighbors, etc)
- How geographically spread-out is it?
- What is your current role?
- How do members hear about the organization? How do you recruit?
- What is expected of members? (dues, meetings, individual tasks, etc?)
- How much time does this require?

Communication

- How do leaders communicate with each other? (frequency of meetings, email, phone, etc)
- How do leaders communicate with members?
- How do members communicate with leaders?

Legitimacy

- What does the broader community think of the group?
- What key certifications/members/affiliations/actions have developed your credibility & legitimacy?

External influences

- What key players outside of the organization help fund you?
- What key players outside the organization help lead?

Conflicts

- Are there any current or ongoing conflicts within the group?
- Explain

Organization

- What are the group's short-term goals?
- What are the group's long-term goals?
- What formal structures are you set up? (board of directors, bylaws, communication mediums, overview assessments, etc)
- What informal structures are set up?
- What roles do different leaders/members play?
- How do you punish members who deviate from contracts/rules/norms?
- How are day-to-day activities carried out?

Success

- What has your group been particularly successful with?
- Where would you like to see improvement in your organization?
- How do you assess/quantify your successes?

Appendix C. Internal Review Board Approval Letter

MEMORANDUM

DATE: March 3, 2011

TO: John Munsell, Ritchie Vaughan, James Chamberlain, Robert B. Hull, Lisa Hightower, Scott Polewach

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires October 26, 2013)

PROTOCOL TITLE: Demographics and Evolution of Natural Resource Networks

IRB NUMBER: 10-270

Effective March 23, 2011, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the continuation request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 5, 6, 7**

Protocol Approval Date: **3/23/2011 (protocol's initial approval date: 3/23/2010)**

Protocol Expiration Date: **3/22/2012**

Continuing Review Due Date*: **3/8/2012**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federal regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released.

Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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Website: www.irb.vt.edu

Appendix D. Annotated List of Tables

Table 1. Major evolutionary model types and key attributes

Table 1. Major evolutionary model types and key attributes (Arrow 2005)			
Model Type	Description	Source of Continuity	Source of Change
Sequential Stage	5-stage hierarchical developmental path	Internal	Internal
Adaptive Response	Relationships and tasks develop at different rates with different breakpoints	External	External
Repeating Cycle	Ongoing cycles of (re-)organization, productivity, and metamorphosis	Neither	Neither
Robust Equilibrium	Members settle on a stable structure that is maintained in the face of changes	Internal	External
Punctuated Equilibrium	Long stagnant period followed by a quick transition to a new stagnant stage	External	Internal

Table 2. Descriptive statistics from all CCPM respondents, regardless of land ownership

Table 2. Descriptive statistics from all CCPM respondents, regardless of land ownership					
Characteristic	N	Response Category	Percent of Respondents	Mean	Mode
Primary motivations for collaborative conservation partnership membership*	67	Environmental	79%		
		Educational	79%		
		Economic	46%		
		Social	44%		
Initial information source about collaborative conservation partnership*	67	Word of mouth	46%		
		Presentation	25%		
		Other organization	16%		
		Advertisement	15%		
Belong to multiple conservation groups	68		60%		
Gender	66	Male	59%		
		Female	36%		
		Both (a couple)	5%		
Household Annual Income	61			\$55,000-\$99,000	\$55,000-\$99,000
Age^A	69			55-64	55-64
Race	66				White
Educational Attainment^A	70			Bachelor's Degree	Master's Degree
* Indicates responses were not mutually exclusive					
^A Some respondents listed separate answers for husband versus wife, so N exceed 68					

Table 3. Descriptive statistics about forestland-owning CCPM respondents

Table 3. Descriptive statistics about forestland-owning CCPM respondents		
Characteristic	N	Response
Acres forestland owned (mean)	48	95
Acres of forestland owned (median)	48	45
Years of land tenure (mean)	48	24
Years of land tenure (median)	48	20
Primary residence (percent)	48	75%
Primary ownership motivations (descending order)	48	Live there
		Appreciate the woods/aesthetics/privacy
		Recreation
Harvests (percent)	48	58%
Most common harvest objectives (percent of respondents who have conducted harvests)	26	Improve forest health (44%)
		Achieve objectives in management plan (44%)
		Obtain products for personal use (41%)
Primary information sources (percent)	39	Virginia Department of Forestry (87%)
		Conservation organizations (57%)
		Extension/university personnel (55%)
		Private consultant (49%)
Which category best describes you (percent)*	50	I like to experiment with new ideas and be the first to try something new (53%)
		I am willing to try new things but don't like to be the first (21%)
		I usually wait (26%)
* Some respondents gave different answers for husband versus wife		

Table 4. Yates corrected chi-square and standard residual values comparing CCPM respondent to NWOS respondent demographics

Table 4. Yates corrected chi-square and standard residual values comparing CCPM respondent to NWOS respondent demographics							
Question	Response	Expected Responses		Actual Responses		χ^2	e
		Percent	Value	Percent	Value		
What is your household's annual income?	<25,000	12%	7	7%	4		-1
	25,000-49,999	25%	14	16%	9		-1.33
	50,000-99,999	32%	18	45%	25		1.75
	100,000-199,999	19%	10	18%	10		-0.08
	>200,000	1%	1	5%	3		2.80 ^B
	No answer	11%	6	2%	1	12.82 ^A	-2.01 ^B
What is your age?	<35	1%	1	0%	0		
	35-44	4%	3	4%	2		
	45-54	29%	16	27%	15		
	55-64	32%	17	40%	22		
	65-74	15%	8	13%	7		
	75+	12%	7	13%	7		
	No answer	6%	4	0%	0	3.72	
What is the highest degree or level of school that you have completed?	<12th grade	19%	10	0%	0		-3.20 ^B
	High school/GED	16%	9	11%	6		-0.89
	Some college	15%	9	11%	6		-0.85
	Associate/technical degree	11%	6	7%	4		-0.91
	Bachelor's	15%	8	24%	13		1.61
	Graduate	20%	11	47%	26		4.62 ^B
	No answer	4%	2	0%	0	34.12 ^A	-1.48
What is your sex?	male	76%	42	60%	33		-1.33
	Female	15%	8	35%	19		3.69 ^B
	Both (a couple)	6%	3	5%	3		-0.16
	No answer	3%	2	0%	0	14.86 ^A	-1.33

^A indicates a significant results at the 0.05 level
^B indicates a major influence to statistically significant results
* indicates that answers were not mutually exclusive, so totals may not equal 100%

Table 5. Yates corrected chi-square and standard residual values comparing CCPM respondent to NWOS respondent forestland characteristics

Table 5. Yates corrected chi-square and standard residual values comparing CCPM respondent to NWOS respondent forestland characteristics								
Question	Response	Expected Responses		Actual Responses		χ^2	e	
		Percent	Value	Percent	Value			
How many acres of woodland do you own in Virginia?	1 to 9	56%	31	20%	11		-3.60 ^B	
	10 to 49	32%	18	29%	16		-0.42	
	50 to 99	6%	3	25%	14		6.12 ^B	
	100 to 499	5%	3	22%	12		5.60 ^B	
	500 to 999	0%	0	2%	1		2.33 ^B	
	1000 to 4999	0%	0	2%	1		2.33 ^B	
	>5000	0%	0	0%	0		0	
	No answer	0%	0	0%	0	76.47 ^A	0	
Is your primary residence on your woodland property?	Yes	73%	40	75%	41			
	No	23%	13	25%	14			
	No answer	4%	2	0%	0	1.5		
Do you have a conservation easement?	Yes	1%	1	31%	17		17.86 ^B	
	No	95%	52	69%	38		-1.94	
	No answer	4%	2	0%	0	304.15 ^A	-1.43	
Have trees been harvested or removed from any of your woodland in the last ten years?	Yes	51%	28	58%	32			
	No	47%	26	42%	23			
	No answer	2%	1	0%	0	0.55		
Why have you harvested or removed trees from your woodlands in the past ten years?*	Part of plan	11%	6	25%	14		3.35 ^B	
	Trees mature	27%	15	22%	12		-0.72	
	Money	12%	7	11%	6		-0.27	
	Personal Use	15%	8	25%	14		1.96	
	Clear Land	16%	9	18%	10		0.37	
	Right Price	2%	1	5%	3		1.4	
	Hunting	1%	0	9%	5		7.16 ^B	
	Improve Recreation	2%	1	9%	5		4.13 ^B	
	Natural Catastrophe	9%	5	11%	6		0.42	
	Improve Quality	15%	9	20%	11	68.96 ^A	0.86	
	What sources of information have you ever used to get information for managing your forest?*	VDOF	4%	2	75%	41		27.19 ^B
		Extension	1%	1	47%	26		34.41 ^B
Private consultant		4%	2	42%	23		14.62 ^B	
Industry		1%	0	11%	6		8.72 ^B	
Neighbor		1%	1	18%	10		12.78 ^B	
Logger		8%	4	7%	4		-0.12	
No answer		4%	2	15%	8	2282.9 ^A	3.72 ^B	

^A indicates a significant results at the 0.05 level
^B indicates a major influence to statistically significant results
* indicates that answers were not mutually exclusive, so totals may not equal 100%

Table 6. Attributes of collaborative groups and alliances that relate to successful outcomes

Table 6. Attributes of collaborative groups and alliances that relate to successful outcomes						
Study	Leadership	Task Type	Social Capital	Group Processes	Resources	Temporal Change
Abrams <i>et al</i> (2005)			1	1	1	1
Araujo and Brito (1998)					1	
Arrow <i>et al</i> (2005)		1				1
Bailey and Koney (2000)	1		1	1		
Bazzoli, Harmata, and Chan (1998)	1			1		
Berkes (2007)*			1	1	1	
Bettencourt (1996)	1		1	1		
Blinn, Jakes, and Sakai (2007)*	1		1	1	1	
Bodin, Crona, and Ernstson (2006)*			1			
Brass <i>et al</i> (2004)			1	1	1	
Burke(2003)	1			1		1
Byron and Curtis (2002)*				1	1	
Christofferson <i>et al</i> (2008)*					1	
Coughlin <i>et al</i> (1999)*	1		1	1	1	
Cremer and Knippenberg (2002)	1			1		
Cremer, Tyler, and Ouden (2005)	1			1		
Curtis (1998)			1		1	
Curtis <i>et al</i> (2000)*	1		1	1	1	
de Rond (2003)	1		1	1	1	
Gabarro (1990)	1					
Gates (1993)			1	1	1	
Gladstein (1984)	1			1	1	
Gray (1990)				1		
Gulati and Gargiulo (1999)			1			
Gulati (2004)						
Hollingshead <i>et al</i> (2005)	1	1	1	1	1	1
Kittredge (2005)*					1	
Koehler and Koontz (2008)*					1	
Lauber, Decker, and Knuth (2008)*			1		1	
Leach and Pelkey (2001)*	1		1	1	1	
Lofstrom (1999)			1	1		
McPherson, Popielarz, and Drobnic (1992)			1			1
Miles and Mangold (2002)	1			1		
Nadeau <i>et al</i> (2002)*	1			1	1	
Nadeau, Howard, and Edberg (2005)*				1	1	
Niederkofler (1991)			1			1
Perkins, Brown, and Taylor (1996)				1		
Provan and Milward (1995)			1			
Provan and Kenis (2007)	1	1	1	1		
Provan, Fish, and Sydow (2007)			1			1
Rickenbach (2009)*			1		1	
Rogers and Burdge (1972)	1			1		
Soda, Usai, and Zaheer (2004)		1	1		1	1
Sobels, Curtis, and Lockie (2001)			1	1	1	
Steinhilber (2008)	1			1		
Totterdell, Holman, and Hukin (2008)	1					
Wolf and Hufnagl-Eichiner (2007)*			1		1	
Zaheer, McEvily, and Perrone (1998)			1			
Total	20	4	27	28	24	8

* indicates study conducted specifically within the natural resources sector

Table 7. Aspects of partnerships studied based on Coughlin *et al.*'s (1999) framework

Table 7. Aspects of partnerships studied based on Coughlin <i>et al.</i> 's (1999) framework							
Criteria	Group						
	G1	G2	G3	G4	G5	G6	
Origins	Trigger	Proactive	Proactive	Proactive	Proactive	Proactive	
	Initiator	Non-profit	Individual	Individual	Individual	Individual	
Issues	Focus	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	
	Number of issues	1	1	1	Variable	2	
	Resources addressed	Private	Private	Private	Private	Private	
	Responsibility	Individuals	Individuals	Individuals	Individuals	Individuals	
	Scientific complexity	High	High	Moderate	Varying	Moderate	Low
	Visibility	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
Organization	Mission	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	Triple bottom line	
	Objectives	Action	Action	Action	Education + action	Education + action	Education
	Structure	Formal	Formal	Formal	Somewhat formal	Formal	Informal
	Formality of agency links	Informal	Informal	Informal	Informal	Somewhat formal	Informal
	Strength of agency links	Moderate	Weak	Weak	Moderate	Strong	Weak
	Funding sources	Public + private	Public + private	Private	Public + private	Public + private	Private
	Funding stability	Sporadic	Sporadic + fluctuating	Stable + fluctuating	Sporadic	Stable	Stable
	Authority	None	None	None	None	None	None
	Membership	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary	Voluntary
	Geographic scale	Multi-county	Multi-county	Multi-county	Multi-county	Multi-county	Multi-county
	Age (years)	11	6	13	6	10	11
	Duration	Long-term	Long-term	Long-term	Long-term	Long-term	Long-term
	Visibility	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate
	Processes	Decision rule	Consensus	Consensus	Top-down	Consensus	Consensus
Decision makers		Board	Board	CEO	Board	Board	Members
Facilitation		Unassisted	Unassisted	Unassisted	Unassisted	Unassisted + assisted	Unassisted
Transparency		Moderate	Low	Low	High	Moderate	High
Meeting frequency		Variable+ at least quarterly	Variable + at least quarterly	Variable + at least annually	Variable + at least monthly	Variable + at least monthly	Quarterly
Representation		Homogeneous	Homogeneous	Homogeneous	Homogeneous	Homogeneous	Homogeneous
Agency involvement		None	Low	None	Low	Moderate	None
Core member investment	High	High	High	Moderate	High	Low	
Outcomes	Scale	Local	Local	Local	Local	Local	Local
	Social impact	Positive	Debatable	Positive	Positive	Positive	Positive
	Products	Tangible	Tangible	Tangible	Tangible + intangible	Tangible + intangible	Intangible