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A Framework for Assessing Collaborative Capacity in Community-Based Public Forest Management

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Abstract Community-based collaborative groups involved in public natural resource management are assuming greater roles in planning, project implementation, and monitoring. This entails the capacity of collaborative groups to develop and sustain new organizational structures, processes, and strategies, yet there is a lack of understanding what constitutes collaborative capacity. In this paper, we present a framework for assessing collaborative capacities associated with community-based public forest management in the US. The framework is inductively derived from case study research and observations of 30 federal forest-related collaborative efforts. Categories were cross-referenced with literature on collaboration across a variety of contexts. The framework focuses on six arenas of collaborative action: (1) organizing, (2) learning, (3) deciding, (4) acting, (5) evaluating, and (6) legitimizing. Within each arena are capacities expressed through three levels of social agency: individuals, the collaborative group itself, and participating or external organizations. The framework provides a language and set of organizing principles for understanding and assessing collaborative capacity in the context of community-based public forest management. The framework allows groups to assess what capacities they already have and what more is needed. It also provides a way for organizations supporting collaboratives to target investments in building and sustaining

their collaborative capacities. The framework can be used by researchers as a set of independent variables against which to measure collaborative outcomes across a large population of collaborative efforts.

Keywords Collaboration · Collaborative capacity · Community-based natural resource management · Public lands · National forests · USDA Forest Service

Introduction

Increasingly, agency managers and local stakeholders are utilizing collaborative approaches to address public resource management challenges, in part to address shortcomings in existing legal-regulatory and bureaucratic frameworks governing the sustainability of ecological and social systems associated with public resources (Weber 2003). A fruitful context for collaboration experimentation in public resource management is federally-managed forest lands in the US. Studies have investigated the utilization of collaborative approaches nationally (Selin and others 1997) and across a range of collaborative national forest management contexts, such as forest planning (Burns and Cheng 2005; Cheng and Mattor 2010; Farnum and Kruger 2008; Richard and Burns 1998), wildfire risk mitigation and recovery (Daniels and Walker 1996; Fleeger and Becker 2008), broad-based ecosystem management (Brick and others 2001; Weber 2003; Wondolleck and Yaffee 2000), and community-based stewardship (Cheng and Fernandez-Gimenez 2006; Moote and Becker 2003; Sturtevant and Lange 2003; Wilson 2006).

One basic insight that can be gleaned from the literature is that government agencies turn to collaboration to secure agreement on agency-initiated and -implemented proposals.

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However, many federal forest-reliant communities¹ have been driven to create and manage their own collaborative approaches due to economic distress caused in large part to the downturn in the timber programs of the USDA Forest Service (USFS) and USDI Bureau of Land Management (BLM)—driven by court injunctions to protect biological diversity and other ecological values—and the restructuring of the forest products industry (Baker and Kusel 2003; Gray and others 2001). In addition to being reactive, communities are expressing their own values for ecologically resilient forests by promoting forest restoration activities (Gray and others 2001). Community-based collaborative groups are also proliferating in response to threats to life, property, and community infrastructure from wildfires (Jakes and others 2011).

Such groups are addressing local ecological, economic and social issues in ways that federal agencies cannot through its traditional planning and decision-making processes (Wilson 2003). We have observed over the past two decades a growing number of community-based collaboratives organizing to address inter-connected socio-economic and ecological goals. Key organizing activities of these groups include, but are not limited to: sustaining broad-based participation by a broad spectrum of social groups, interests and organizations; integrating multiple forms of knowledge and information to define problems and potential options; combining human, financial, and technical assets in new ways; and developing new organizational structures.

Federal policies have also promoted the role of communities as partners in and beneficiaries of national forest stewardship and mandated the use of collaboration (Cheng 2006). Prominent statutory examples include, the Collaborative Forest Restoration Act of 2000, the Healthy Forest Restoration Act of 2003, congressional authorization of end-results stewardship contracting, and the Federal Landscape Restoration Act of 2009 (P.L. 111-11, Title IV), administered by the USFS as the Collaborative Forest Landscape Restoration Program (CFLRP). Executive branch policies include the National Fire Plan and proposed revisions to the USFS administrative rule directing national forest planning.

Implied in this expanded approach to public forest collaboration is the capacity of local, community-based collaborative groups to organize, coordinate, and manage people, resources, and tasks to achieve desired outcomes

¹ “National forest-reliant” communities is taken to mean communities in geographically-close proximity to national forest lands that are directly impacted physically, environmentally, socially, and economically by national forest management activities. This encompasses many types of communities, from traditional resource commodity use communities to ski resort and other recreation gateway communities to residential developments in the so-called wildland-urban interface.

over time. Yet, a common refrain we hear from collaboration leaders and participants concerns the vagueness of what constitutes collaborative capacity. Past research has produced important knowledge about the structures, processes, and attributes of collaborative resource management bodies. However, research on collaborative capacity in public forest contexts continues to lag behind practice and policy. Agranoff and McGuire (1998) contend that capacity tends to be evident through informal activities and not discernable by looking at formal structures and rules. The time is ripe to clarify and develop analytical methods for understanding and assessing what is meant by collaborative capacity, and how to build it, to achieve community and federal forest policy goals. As community-based collaboration in national forest management has evolved, there is a need for the literature to keep pace.

To this end, this paper presents a framework for understanding and assessing collaborative capacities associated with community-based collaborative public forest management. The centerpiece of the framework is six arenas of collaborative action, each comprised of a set of capacities: organizing, learning, deciding, acting, evaluating, and legitimizing. There are two purposes to which the framework can be applied. First, the framework can be used by collaboration participants to operationalize, assess, and monitor the capacities needed to make their collaborative perform according to expectations. It can help participants understand what capacities are already available and what more are needed. Additionally, participating and supporting organizations can target investments to build or enhance capacities critical to a collaborative’s performance. Second, the framework can inform scholarly research by identifying independent variables to test against collaborative outcomes. This is a particularly important but under-researched frontier of scholarship in community-based collaboration in public forest management (Koontz and Thomas 2006; Thomas and Koontz 2011).

The collaborative capacity framework was formulated inductively by drawing on case study data and participation in community-based collaborative processes over the past 20 years, and conceptualizations of community or collaborative capacity from a range of literature on community-based resource management, collaborative public management, community development, and community-based approaches to social, health, and educational services.

Conceptualizing Collaborative Capacity: Definitions and Core Concepts from the Literature

As a starting point, Beckley and others (2008) and Chaskin (2001) provide definitional and conceptual foundations for

collaborative capacity based on their work in community development. Beckley and others (2008) define community capacity as “the collective ability of a group to combine various forms of capital within institutional and relational contexts to produce desired results or outcomes” (p. 60). Chaskin (2001) elaborates on the various forms of capital in his definition: “the interaction of human capital, organizational resources, and social capital existing within a given community that can be leveraged to solve collective problems and improve or maintain the well-being of a given community” (p. 295).

This emphasis on collective capacity and the various means to execute it is central to collaborative capacity because it provides the context, assets, agents, and means for collaborative capacity to be exhibited. Both definitions break community capacity down into four primary components. The first comprises human, economic, natural, and social assets or capitals possessed or accessible by the community. Human capital includes the knowledge, specialized skills, job experiences, and health of individuals within or accessible by a community. Education and income levels, poverty rates, residential stability, and demographic conditions and trends (e.g., age, gender, race) are additional human capital attributes. Public organizational budgets, individual and household savings, not-for-profit cash flow and operating funds, business cash flow and operating funds, and availability and diversity of employment opportunities compose economic capital. Also included in economic capital are technologies, equipment, and physical infrastructure possessed or accessible by the community. Natural capital encompasses the condition and productivity of land, air, water, biological resources (i.e., forests, fisheries, agricultural plants and animals, wildlife, grasslands), and raw mineral resources. Natural capital also entails scenic beauty and recreation opportunities from which amenity values can be drawn. Social capital is the set of “norms and networks that facilitate collective action” (Beckley and others 2008, p. 63). These include prior history of conflict or cooperation, interpersonal trust relationships, patterns of social interactions among community members, private organizations and public bureaucracies, and structures and cultural rules that enable and govern collective behavior.

The second component is the factors that enable a community to, or prevent a community from, mobilizing and applying assets towards a set of goals. Chaskin (2001) refers to these as conditioning influences. In the context of public forest management, these include environmental, social, economic, and legal, political, and bureaucratic factors. Catalyzing events, such as a crisis or an opportunity window, can prompt a community to mobilize and apply assets, such as a wildfire event, a sudden economic downturn, new funding mechanisms, or changes in leadership.

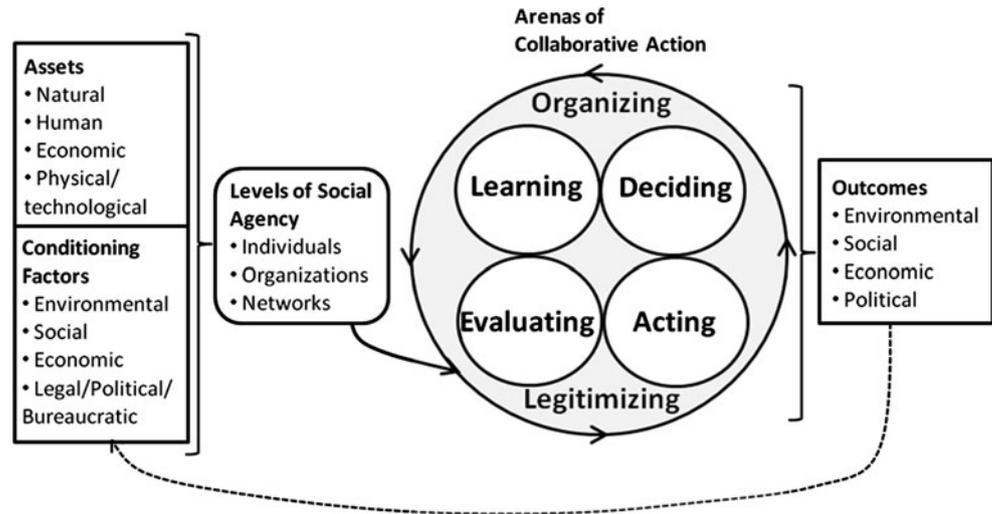
The third component is the process of ‘leveraging’ and ‘combining’ the assets within institutional and relational contexts. Beckley and others (2008) focus on macro contexts, or ‘spheres of social relations’, such as markets, bureaucracies, civic associations, and communal relations, such groups bound by birth, ethnicity, or geography; Chaskin (2001) defines more specific functional contexts relating to community development, such as planning, production of goods and services, and information dissemination activities. It is important to note, then, that assets or capitals in and of themselves do not constitute community capacity; they must be mobilized and applied through the agency of individuals, organizations, and networks (Chaskin 2001). ‘Agency’ in this context is the ability and authority of an individual or group to affect change.

The fourth component encompasses the outcomes of community capacity. The obvious outcomes in public forest management are improvements in desired biophysical conditions. For communities, family-wage jobs and community well-being are additionally important outcomes. Weber and others (2005) refer to collaborative capacity itself as an essential outcome—the capacity of individuals and organizations to overcome differences and work to address mutual goals. In the context of endangered species management, three types of problem-solving capacities are identified: vertical, horizontal, and vertical-horizontal linkages. Vertical problem-solving capacities are measured by compliance with, and community support of, statutory goals. This speaks to the legitimacy of top-down authorities. Horizontal capacities are indicated by the degree and scope of social capital and trust relationships, and community-wide institutions that are aligned with vertical capacities. Horizontal capacities allow community members to exercise cooperative behaviors and activities. Vertical-horizontal linkages refer to the levels of trust, good-faith bargaining, utility of other parallel efforts, and availability and application on human and financial resources for the collaborative cause. The vertical-horizontal linkages are vital to bottom-up legitimacy and accountability between the collaborative group and vertical institutions, such as bureaucracies and executive and legislative oversight bodies.

Collaborative Capacity in Community-Based Public Forest Management: Six Arenas of Collaborative Action

In the context of community-based collaborative public forest management, the four primary components of community capacity are organized into a relational framework (Fig. 1). Available assets and conditioning factors

Fig. 1 Framework for understanding and assessing collaborative capacities associated with community-based public forest management



constitute the conditions in which a collaborative group has to operate. The assets are leveraged and combined by individuals, organizations, and networks through six arenas of collaborative action, each of which is comprised of a set of collaborative capacities: organizing, learning, deciding, acting, evaluating, and legitimizing. From these arenas are collaborative outcomes.

The central focus of the framework is on the six arenas of collaborative action and associated capacities; it is to these arenas that we focus our discussion. Our understanding of these capacities is derived from two methodologies. The first are case studies on, and ongoing interactions with, community-based, collaborative national forest-related initiatives, some dating to 1992. Over this time, we have collected interview, questionnaire, participant-observation, and written document data on the emergence, development and transformation of over 30 case studies across four federal forest-related collaboration domains: national forest planning, community wildfire protection planning, collaborative landscape restoration, and community-based forestry initiatives. Table 1 provides a greater level of detail of the cases by these attributes.

We identified and categorized collaborative capacity attributes using an iterative, inductive process for identifying, combining, and refining capacity types from the data following the constant comparison methods specified in Strauss and Corbin (2008). The process began with an ‘open coding’ list of key words or phrases indicating a set of skills, knowledge, or assets associated with collaboration. This list was refined by combining open codes where similarities or overlaps exist, and eliminating redundancies.

The second methodology is an inductive categorization of collaborative capacities from literature on natural resource collaboration and community-based coalitions. We identified and reviewed published materials assessing collaborative functioning and performance encompassing

various resource management contexts, including national forests (Burns and Cheng 2005; Cheng and Mattor 2010; Daniels and Walker 1996; Farnum and Kruger 2008; Moote and Becker 2003; Richard and Burns 1998; Sturtevant and Lange 2003; Wilson 2006), community wildfire mitigation (Fleeger and Becker 2008), community-based forestry (Baker and Kusel 2003; Cheng and Fernandez-Gimenez 2006; Gray and others 2001; Kusel and Adler 2003), watershed and river basin management (Abers 2007; Imperial 2005), adaptive co-management and governance, (Armitage 2005; Folke and others 2005; Nelson and others 2007), and ecosystem management writ large (Koontz and others 2006; Weber 2003; Wondolleck and Yaffee 2000). Collaborative capacity is more explicitly addressed in literature from broader public sectors. Topics include collaborative public governance and management (Agranoff 2006; Ansell and Gash 2008; Bryson, Crosby, and Stone 2006; Goldsmith and Eggers 2004), community coalitions (Foster-Fishman and others 2001; Wolff 2001), and community health education, prevention, and provision coalitions (Granner and Sharpe 2004; Laverack 2005; Zakocs and Edwards 2006).

Following the case study analysis, an inventory list of collaborative skills, knowledge and assets from the literature was developed. The list was compared and contrasted with the list from the case study coding, resulting in an additional refinement of the collaborative capacity list. As a final step, we grouped the capacities according to the functional contexts associated with collaboration—what we term “arenas of collaborative action” in which participants attempt to function as a collaborative body and collectively achieve desired outcomes. The groupings were initially formulated by looking to two types of collaborative process models. One set demarcate process phases (Daniels and Walker 2001; Selin and Chavez 1995) which generally overlap with general models of planning:

Table 1 Descriptions, key conditioning factors, and goals and outcomes of case studies

Case Study Description	Key conditioning factors	Goals and Outcomes
Cross-case analyses of social capacity associated with collaboration in 13 community wildfire protection planning cases in eight states, sponsored by the Joint Fire Science Program; supplemented by continued observations of CWPP development and implementation.	Incidence of large, intense wildfires since 2000 raised awareness among policy-makers, land managers and communities of scope and scale of problems, spurring federal policy changes, (including the passage of the Healthy Forest Restoration Act of 2003) and greater financial and technical assistance to state and local governments, and communities and neighborhoods.	Reducing hazardous forest fuels and mitigated risk and effects of large, intense wildfires on community lives, properties, and critical infrastructure (i.e., electricity power lines, natural gas, water supplies). Additionally, communities that are able to maintain lower hazardous fuels over time and more prepared during wildfire events.
Participatory research program with 6 community-based forestry initiatives taking part in the Ford Foundation's Community-Based Forestry Demonstration Program	Gradual and sudden socio-economic transformations caused by legal and policy changes, shifting global timber investments and markets, and changes in local community demographics and social values.	Restoring and maintaining ecosystem functioning through the development and application of local community resident and forest worker capacities, especially traditionally under-served and marginalized populations
Case studies and cross-case analyses of collaboration in six national forest planning projects, sponsored by Cooperative Forestry program of State & Private Forestry, USFS	Revisions to USFS national forest planning administrative rule, increasing demands by public stakeholders for more robust collaborative processes, and USFS leadership supporting collaborative planning approaches	Building local stewardship skills and resources so community leaders, stakeholder groups and residents can effectively participate in national forest plan development, implementation, monitoring and adaptive management.
Ongoing participation and observation of five collaborative landscape-scale forest restoration and forest health initiatives in the Western US	Catalyzed by unusually large and intense wildfires since 2000, emerging science of ecological restoration supporting restoration needs, and recognition among diverse sets of stakeholders of restoration as common cause.	Restoring ecological functioning and processes at large landscape scales (200,000-800,000 ha) to increase ecological resilience to wildfires, drought, and long-term climate-induced changes using local contractors and benefiting local industries.
Ongoing participation and observation, and empirical literature associated with three long-standing community-based collaborations associated with federal public lands	Gradual and sudden socio-economic transformations caused by legal and policy changes, shifting global timber investments and markets, and changes in local community demographics and social values.	Restoring and maintaining ecosystem functioning through the development and application of local community resident and forest worker capacities, with emphasis on geographic and economic connectivity between private and public lands.

situation assessment, goal-setting, developing options, analyzing consequences, selecting the preferred option, implementing, monitoring, and evaluating outcomes. A second set of models classify the attributes of collaboration (Ansell and Gash 2008; Bryson, Crosby, and Stone 2006; Thomson and Perry 2006; Wondolleck and Yaffee 2000). Common attributes include: (a) structuring, governing and administering the group; (b) securing participants' commitment; (c) managing conflict; (d) forging agreements; (e) developing norms of trust and reciprocity; and (f) attaining outcomes.

In defining the arenas of collaborative action, we sought to identify labels that were parsimonious yet descriptive of processes and attributes that define how a collaborative body functions. Additionally, we identified the levels of agency through which assets are mobilized and applied within each arena based on the case study data (Table 2). Below, we delve into greater detail for each arena by describing the defining attributes, associated capacities

mobilized and applied by level of agency, and examples from the cases.

Organizing

Collaborative bodies in the public forestry issue domain not formally designated under the Federal Advisory Committee Act are self-organizing and self-governing. Across the case studies, the collaborative body and process were developed and administered by individuals exhibiting leadership and systems thinking skills, and who have extensive social networks within their respective communities. System thinking is the cognitive facility to understand the interconnections and feedback loops of a system. In this case, these include the connections and feedback loops between the federal forest lands health and community vitality. Because these individuals typically possess prestige and authority within various local social groups or organizations, such as serving as school board president,

Table 2 Collaborative capacities by collaborative action arena and level of agency

Collaborative Capacities		Level of Social Agency	
	Individual	Collaborative Group	Home/External Organizations
Organizing	Leadership committed to group success	Ability to recruiting and retain right participants	Authority and resources for representatives to participate
	Systems thinking ability	Systems for regular communications internally and externally	Technology & technical expertise
	Social networks	Knowledge of effective organizational design	Logistics assistance
Learning		Conflict management competencies	Procedures beneficial to collaborative outcomes
	Leadership committed to learning	Grant-writing, project management, & writing skills	
	Systems thinking ability	Human and financial resources to carry out tasks	
	Communication competencies—active listening and effective speaking and writing skills	Learning facilitators	Data, information, geo. Information systems assistance
Deciding	Communication and negotiation skills	Access to external expertise & knowledge	Subject matter specialists
	Authority to decide on behalf of constituency or organization	Access to data and information; skills and resources to compile and synthesize information	
	Standing and persuasion within constituency or organization	Report organization and writing skills	
		Physical, financial, and human resources to carry out learning tasks	
		Knowledge of decision space	Authority to representatives to make decisions on behalf of organization
Acting		Ground rules governing behavior, interactions, and decision-making	Technical expertise and assistance
		Strategic planning experience/competency	
		Report organization and writing skills	
		Physical, financial, and human resources to carry out planning & decision-making tasks	
	Knowledge of how to operationalize desired goals/activities	Acquire and coordinate adequate human, technical, & financial resources	Ability to exert authority over work plans, personnel, & budgets to contribute to implementation of group goals in short time frame
	Knowledge of what constitutes operational feasibility	Ability to develop and follow-through with intermediate outcomes, e.g., pilot, demo	Assigning operations-oriented technical expertise to operationalize group goals
Knowledge of contracting mechanisms appropriate for tasks	Organizational structure and personnel that ensure assets are applied to activities	Contract, administration, and accountability mechanisms to ensure work gets done correctly	
	Knowledge, skills & resources for effective advocacy		

Table 2 continued

Collaborative Capacities		Level of Social Agency		
	Individual	Collaborative Group	Home/External Organizations	
Evaluating	Champion or group of champions advocating for monitoring & evaluation Expert knowledge and/or experience in both ecological and socio-economic monitoring	Ability to sustain the organizational structure, time and space for monitoring and evaluation Access to expertise, data and information through social networks Data storage, analysis, and interpretation resources and competencies Report organization and writing skills Sufficient human, financial and technical resources to conduct monitoring	Field crews, subject matter experts Data, information, remotely-sensed imagery, and GIS technology Recruiting and organizing volunteers Training in measurement techniques	
Legitimizing	Social networks encompassing community leaders and other collaborative groups Social networks encompassing individuals at higher authority levels 'Standing' within one's peer group or organization Persuasion skills	Human, financial, and technical resources to develop and disseminate communication materials Knowledge, skills, and resources for advocacy in state and federal policy venues	Explicit leadership support for organizational representatives' participation Explicit political and financial support for collaborative group functioning and activities	

watershed association, local elected official, or homeowner association board member, they had social networks they could leverage to recruit and retain additional key people.

Leadership across our cases was found to be essential in determining the fate of a collaborative. Community, organizational, and agency leaders built support and allocated resources for the collaborative; agency and non-governmental organizational leaders also assigned staff for the collaborative's benefit. We also found that lack of agency leadership can set back collaborative progress, consistent with one of the key barriers to collaborative forestry identified in Moote and Becker (2003). The extent to which individuals participating on behalf of an organization received authority and resources from the home organization were more varied. Several collaborative groups intentionally recruited the participation of executives within their organizations so that they were authorized to speak on behalf of the organization and commit organizational resources to carry out group activities and decision. Especially important are local elected officials and staff (Fleeger and Becker 2008; Koontz and others 2004; Richard and Burns 1999), who oftentimes can use financial and technical resources to support federal land management. The ability of representatives from large, bureaucratic organizations to speak and act on behalf of their organization depended greatly on their standing and authority within the organization. Some individuals were able to persuade their peers, leaders, and/or governing boards that the collaborative group was a worthwhile endeavor, while others faced constant tension. A clear example of this is fully described in Sturtevant and Lange's (2003) assessment of the Applegate Partnership in southwestern Oregon.

A fundamental imperative of a collaborative body is the ability to organize and sustain itself as a group. This includes the skills, knowledge, and assets to: activate and sustain participation of the right people; devise structures, rules, and strategies for how the group interacts, deliberates, manages conflict, and makes decisions; and maintain a system for regular communication within the group and outreach outside of the group (see further Sturtevant and others 2005; Wondolleck and Yaffee 2000). The strength and extent of the group's social networks to recruit and maintain participants were critical across the cases. Having access to Internet technologies to craft internal and external communications and outreach contributes the group's collaborative capacity. Many groups solicited grant funds or monetary contributions from participating organizations to hire a professional coordinator and staff to help with the design of group structure and rules, mediate between conflicting viewpoints, and devise regular communication and outreach strategies. Not only does a skilled facilitator ensure that all voices are heard and conflicts are managed appropriately, we found that facilitators also maintained

regular communications among participants between meetings to ensure that expectations are being met and assignments are completed. Several cases did have a third-party facilitator, but others self-facilitated.

Paid staff contributed to grant-writing, project management, and writing. In some cases, groups received assistance from participants' home organizations or from organizations whose primary purpose is to assist community-based conservation across a broad region. These include established entities such as cooperative extension, Resource Conservation and Development (RC&Ds) organizations, or community development corporations. We also noted the emergence of non-governmental for-profit and non-profit organizations filling these roles. These capacities become self-reinforcing; success in attracting resources allows a collaborative to continue developing the capacity to attract, absorb, and manage additional resources. In turn, funding organizations are more likely to invest in groups with these capacities already in place.

Collaboratives with formalized structures and work groups tended to be more adept than more informal groups at attracting and absorbing resources, managing projects, maintaining a group website and internet listserv, and, in some cases, managing contracts with local businesses to conduct field work. Becoming incorporated allowed many collaborative bodies to gain recognition with outside entities, pool funds, and administer a coherent program of work. Incorporation became a means to solidifying horizontal and vertical linkages with the goal of institutionalizing the collaborative group and process. Horizontal linkages are the mechanisms by which participants and their home organizations mutually agree to support the collaborative body and process. Memoranda of Understanding were common across the cases. Vertical linkages are the mechanisms by which the collaborative body seeks durable arrangements with higher levels of hierarchical organizations and bureaucracies, and with formal governance institutions (e.g., legislatures and executive branches of government).

Organizations contributed to organizing capacities by authorizing organizational members to participate and by contributing financial and technological resources. Across the cases, government agencies and non-profit organizations contributed subject matter specialists, data, field trip transportation, and geographic information systems technologies to collaborative groups. Bureaucratic procedures, while oftentimes implicated as barriers (Moote and Becker 2003), also facilitated collaborative goals. For example, the USFS' stewardship contracting rules provides greater procedural flexibility than traditional timber sale contracting for collaborative participation in designing and implementing projects. The USFS State & Private Forestry branch has more procedural flexibility than the National Forest Systems to administer funds to assist community-based stewardship, such as the

Economic Action Programs (Sustainable Northwest and National Network of Forest Practitioners 2005).

Learning

One of the defining attributes of public forest collaboration is an emphasis on learning so that all stakeholders have shared understandings of the situation and potential improvements (Daniels and Walker 2001; Folke and others 2005; Wondolleck and Yaffee 2000). Collaborative learning is based on the capacity of individuals, groups, and organizations to create and manage the conditions that foster conscious collective self-reflection and learning through interactions in a group setting embedded in a particular biophysical and socio-cultural context (Fernandez-Gimenez and others 2008). In each of our cases, there were individuals who assumed leadership roles, had the ability to think systemically, and effectively communicated to foster group learning. All participants needed some level of interpersonal "communication competencies" (Daniels and Walker 2001), including, but not limited to: active listening skills to understand what is important to others in the group and the aptitude to clearly communicate one's own values and knowledge about the situation. Across the cases, we found that participants needed to possess the willingness to shift their points of view to better align with new information and shared learning.

Developing and managing a continuous collaborative learning environment requires a certain level of capacity within the group as a whole, with contributions from home and external organizations. In every group, there were individuals with content knowledge of the issues who contributed to shared learning. Skilled group leaders and/or facilitators can draw out knowledge held by collaborative participants and identify knowledge gaps in a safe, non-threatening environment. To enhance knowledge and fill knowledge gaps, many case study groups relied on their collective social networks and leadership capacities to access expertise, knowledge, information, and technology.

Some groups could afford paid staff to develop and implement learning tasks, ensure regular communication, compile existing data and gather new data, write reports, and communicate results to different audiences. Technical writing skills were an essential learning capacity for many groups that created their own ecological and/or socio-economic assessments. This established collaborative ownership over knowledge and data, and demonstrated to external audiences their commitment to using currently available science and information. Absent paid staff, collaboratives formed working groups or technical subcommittees that allowed the group to access, develop, and integrate multiple forms of information and knowledge, including observational and experiential knowledge.

Collaborative groups across our cases received contributions from government agencies and private for-profit and non-profit organizations in the form of data, geographic information systems (GIS) capabilities, and other knowledge resources. Academic and government research institutions provide expertise through their outreach and engagement programs or through individual initiative. The ability to attract and access knowledge, information, and technological resources depended on the strength of the group's horizontal and vertical linkages.

Deciding

Collaborative groups are confronted with myriad decisions about its functioning, goals, and activities. Across our cases, we observed that individuals needed good communication, negotiation, and self-facilitation skills when interacting with other participants, especially concerning hot-button issues. Individuals also needed the authority to make decisions on behalf of their home organizations, and often must be good at negotiating with their peers, leaders, and overseers to be entrusted with this authority (Ansell and Gash 2008). This was often problematic for the USFS; even if a forest supervisor was a key participant, s/he may have been constrained by administrative or budget direction from higher-up authorities. Individuals with high social standing in their communities and home organizations provided critical deciding capacities; they were able to speak authoritatively on behalf of their constituencies.

At the group level, shared knowledge of the decision space is a vital deciding capacity. Decision space is the set of decisions that the collaborative can influence. The space is typically bounded by laws and administrative rules; we also found that even within legal and administrative boundaries, groups define topics that are off-limits for the time being, such as cutting large, old trees during a restoration treatment. An essential group asset is a set of agreed-upon ground rules that define the procedures by which the group decides. Ground rules are intended to create a safe space within which individuals representing different values, interests, perspectives, and knowledge can speak freely, be heard, and deliberate options. Ground rules can have an effect only if participants possess the interpersonal communication skills and courage to self-enforce. Groups with sufficient funds initially hire a third-party facilitator or coordinator to help define ground rules and manage group decision-making. The group also has to have access to physical spaces that can accommodate full participation. This was especially challenging for collaborative groups encompassing large geographic areas, such as multiple counties or multiple national forests.

Fundamental to deciding capacity is the competency to conduct strategic planning—setting goals and measurable

objectives, defining priorities and alternative courses of action, allocating tasks and responsibilities, and setting timeframes for accomplishment. Every collaborative group in our case studies carried out some form of strategic planning. We found that the group drew upon the prior knowledge and experience of participants in different planning contexts to craft and adaptively manage the collaborative's planning process. The group also needs to have an individual or group of individuals with the ability to coordinate, develop, revise, and finalize a physical document. Sufficient time, interpersonal communication skills, and writing skills are key assets. We found a broad range of planning capacities across the case studies. Some of the cases used an executive or steering committee to carry out planning tasks, while others relied on a coordinator to facilitate the planning process and write drafts of the planning document. Some groups able to pool funds from member contributions were able to financially support planning; in other groups, planning relied on voluntary contributions of time and energy.

Organizations enhanced deciding capacities by clearly authorizing representatives to make decisions on behalf of the organization, and contribute technical expertise and assistance. Organizations also contributed by providing assurances from organizational leaders at higher authority levels that the decisions of the collaborative body will be supported. In this latter instance, securing this capacity was problematic for many collaboratives. Especially for the USFS, but also for large, bureaucratic non-governmental organizations, leadership at higher levels of the organization sometimes had different priorities that commanded their attention and resources, or simply did not agree with the collaborative's goals and strategies. Additionally, there is the fundamental matter of government officials having the legal capacity to share decision-making authority with voluntary, self-organizing groups concerning public forests. Doing so would be construed as an abdication of statutory authority (Coggins 1999). The ability of agency officials to clearly articulate the boundaries of the decision space is critical.

Acting

The capacity to act circumscribes the collaborative's abilities perform tasks that work towards achieving collaborative goals. Many collaborative groups developed their own capacity to take action in concert with the USFS. In four of the national forest planning cases, collaborative efforts were spun off to focus a subset of issues covered in forest planning, such as forest restoration, co-managing recreation infrastructure, or coordinating hazardous fuels treatments across jurisdictional boundaries. A key individual-level capacity is translating goals and priorities into

operationally-feasible actions. This requires knowledge of what constitutes feasibility, such as the biophysical constraints, technological and human resource needs, and the financial costs of implementing projects. All collaborative groups in our cases involved subject-matter specialists and on-the-ground practitioners to assist with this knowledge transfer. A subset of acting capacity is the knowledge of contracting mechanisms. Especially in the case of the USFS, contracting is arcane and involves specialized knowledge about legal, regulatory, and administrative contracting aspects.

At the group level, collaboratives must have the ability to acquire and coordinate human, technical, and financial resources to take part in project implementation and secure intermediate outcomes (Ansell and Gash 2008; Wondolleck and Yaffee 2000). This entails assigning and monitoring roles, tasks, deadlines, and reporting back to the group (Goldsmith and Eggers 2004). Securing intermediate outcomes—such as a pilot or demonstration project—keeps participants engaged and demonstrates success of the collaborative group to external organizations and the public at large. Subcommittees or work groups, or, for more well-funded groups, hired staff carried out acting capacities for many collaboratives. Several of the more formalized, structured collaboratives created a separate implementation body to attract and pool resources, coordinate activities among participating organizations, and assemble, train, and hire local workforce to assist with implementation and generate local economic and social benefits. Examples include the Uncompahgre Partnership in western Colorado, Wallowa Resources in northeast Oregon, and the Watershed Research and Training Center in northern California. Staff from these bodies coordinated with agency staff and private contractors to manage projects.

Beyond the implementation activities internal to the collaborative, the group must also have the ability to affect institutional and policy changes needed to facilitate implementation (Ansell and Gash 2008; Granner and Sharpe 2004; Wolff 2001). It is often necessary for a collaborative group to travel to regional offices or even Washington, DC to promote institutional and policy changes, thereby requiring travel funds, logistical coordination, and the knowledge of whom to speak with. Many case study groups have invested in this kind of acting capacity or join networks which enable it.

Contributions of resources from participating and supporting organizations are critical to a collaborative's capacity to act. Individuals in authority positions in both governmental and non-governmental organizations must be able apply that authority to integrate collaborative goals into organizational work plans and allocate sufficient human, technical, and financial resources to carry out activities supporting those goals in a timely manner. We

found that locally-based organizations, such as local governments, local businesses, and community- or regionally-based non-governmental organizations are more nimble than state and federal agencies in this regard, but also have smaller resource bases from which to draw. Nonetheless, these monetary and in-kind contributions are important to leverage resources from national-level organizations. Resources include seed funds and individuals with specialized skills and knowledge. One challenge facing the USFS in particular was the time lag between a collaborative's agreement and integrating the agreement into its schedule of proposed actions and work plans due to internal agency work planning procedures. Circumventing internal operating procedures was disruptive to program staff and required line officers' persuasion skills to align internal agency personnel, budgets, and action plans with the collaborative's action plans.

Evaluating

Possessing the skills, knowledge, and resources to collaboratively monitor outcomes, evaluate effectiveness, and adapt changes to future activities constitute evaluating capacity. Our examination surfaced several capacities associated with developing and implementing evaluating activities, although the preponderance of activities was found among more formalized groups organized around multiple goals at large landscape scales as opposed to those groups with a narrow set of goals, such as mitigating wildfire risk to communities. We found that monitoring occurred in the cases when there was a champion or small group of champions within the collaborative who advocated for monitoring by employing effective persuasion skills. In such cases, collaborative groups generally had participants that possessed substantial scientific expertise and technical training and experience about what and how to measure especially ecological outcomes, but less so for economic and social outcomes.

A necessary set of group-level evaluating capacities is the organizational structure, time, and space for monitoring and evaluation. Subcommittees or work groups in many of the cases served as a portal for knowledge, technologies, and coordination of resources and logistics. Such work groups leveraged their social and professional networks to access information and in-kind technical assistance within their home organizations and from external organizations. A small number of collaboratives with sufficient financial resources were able to hire staff with specialized scientific training to assist in protocol development, and writing monitoring plans and reports. Groups that engaged in multi-party monitoring used their work groups and/or staff to organize and coordinate people, equipment, transportation, food and drink, and project sites. We found, however,

that sustaining the necessary funds, expertise, and personnel for multi-party monitoring remains an ongoing challenge.

While evaluation activities are generally associated with ecological, economic, and social outcomes, we found across our cases evidence of monitoring and evaluating the collaborative process itself. Most are informal, ad hoc and performed by a facilitator. Several groups conduct annual meetings or surveys of participants to take stock of accomplishments, determine where the group fell short on goals, and chart changes in direction. We found these evaluation activities to be important in keeping participants engaged and contributed to the transparency, credibility, and legitimacy of the collaborative. Additionally, evaluation activities were particularly important for building trust and credibility within and outside the collaborative. Many agency personnel, environmental groups, and community members continue to be skeptical of the ability of community-based collaborative approaches to achieve positive outcomes, and expect on-the ground confirmation that collaborative projects have ecological and economic benefits.

One evaluating capacity we did not find was the ability of a collaborative to store, manage, and analyze its own monitoring data. Rather, they were reliant on existing databases kept by government agencies or, in a small number of cases, by non-governmental organizations, such as The Nature Conservancy. Developing and managing a new database for a collaborative would be costly and require personnel with necessary skills and knowledge.

The evolving status of evaluating capacities among our case study groups meant that collaboratives relied heavily on contributions from participating and external organizations for additional capacity. The USFS supplied field crews, oftentimes supplemented by local high school students or community residents. Non-governmental conservation organizations used their networks to organize volunteers to assist in monitoring, such as the Society of American Foresters and local Audubon Society chapters. Universities and agencies provided training for collaboratives, volunteers, and field crews on sampling design, measurement techniques, and data recording, and contribute to quality control and assurance. In several cases, social science expertise was provided by universities or non-governmental organizations to assist with economic and social monitoring—expertise that is sparse compared to biophysical expertise within government resource management agencies. A common evaluating capacity gap is funding for monitoring. Government agencies and philanthropic foundations primarily emphasize implementation over monitoring. Where funding is available, it is for specific resources, such as water quality monitoring through Environmental Protection Agency grants.

Legitimizing

Community-based collaboratives are confronted with the need to establish and maintain their legitimacy vis-à-vis existing institutions and organizations, some of whom have questioned the legitimacy of such groups (McCloskey 1999). Legitimacy is broadly defined as the congruency between the affected population's expected performance for an organization and the organization's actual performance (Weber 2003). For community-based collaboratives involved in national forest management, establishing and sustaining legitimacy takes two forms.

The first is the ability to persuade a diverse set of institutions that a new set of relationships are needed between communities and public forests. Whereas this relationship was largely mediated by either government policies and agencies or private industry for a better part of the 20th century, community-based groups are asserting themselves as primary actors (Baker and Kusel 2003). In short, community-based collaboratives are attempting to set new societal expectations for involving community stakeholders in shaping public forest management decisions and recognizing the legitimacy of community knowledge and stewardship capacities to attain ecological and social goals. Second, community-based collaboratives must continually and transparently demonstrate that they are performing in a way that is accountable and producing public value (Ansell and Gash 2008; Bryson and others 2006). This not only entails showing positive environmental and socio-economic outcomes, but functioning in a way that obeys laws and regulations, includes a broad diversity of perspectives and interests, does not allow any one entity to dominate the process, employs consensus-based decision-making, and uses currently available science and evidence (Weber 2003; Wondolleck and Yaffee 2000). Environmental groups are especially concerned with these issues. Legitimacy for community-based collaboratives is evident when they are able to attract political and financial support to sustain their activities, and successfully advocate for institutional and policy changes to facilitate collaborative functioning and goals.

To these ends, we found that fostering horizontal and vertical linkages were essential legitimizing capacities across our cases. A common set of horizontal linkages uncovered in the case studies were community education and outreach efforts. Field trips, community presentations and science symposia, and education programs in local high schools, colleges, and universities were commonplace. Also common were peer-learning networks. Community wildfire mitigation collaboratives connected with similar efforts in neighboring communities and through the Firewise network to share successes and challenges, and promote their work to local and state agencies and officials.

A notable example of a regional peer-learning network is the Rural Voices for Conservation Coalition which organizes an annual policy meeting and sends delegations for a “Week in Washington” where coalition members meet with agency executives and congressional delegations. The National Forest Foundation sponsors peer-learning sessions among collaboratives they fund.

To build and sustain vertical linkages, individual participants and the collaborative as a whole must use their networks and have the resources to organize interactions and communications between the collaborative group and institutions and organizations at higher policy levels (Wondolleck and Yaffee 2000). In addition to interpersonal and persuasion skills, the group must have the human, technical, and financial resources to develop and regularly disseminate materials that highlight their accomplishments. Newsletters, regularly updated websites, and face-to-face meetings with policy-makers and key political actors were common across the cases. We found that even smaller collaboratives working on community wildfire protection planning provided oral reports to municipal and county government meetings, and solicited assistance from local government officials.

One surprising capacity that surfaced from several of our cases is participants’ ‘standing’ within their respective peer groups. For many collaboration participants, from USFS personnel to conservation organization and resource user group representatives, the legitimacy of not only the collaborative is contested, but their participation in the collaborative. We found examples where participants found themselves needing to hold at bay their peers who questioned the collaborative’s motivations and activities. In such instances, it is the reputation and persuasion skills of those participants that created the space for the collaborative to operate. In turn, they faced pressure to negotiate and follow through with accountability measures.

Discussion

In this paper, we sought to provide more specificity to the concept of collaborative capacity associated with community-based public forest management. We drew on existing definitions and concepts of community and collaborative capacity across a variety of public management and community development arenas and combined them with an inductive analysis of our case study research on community-based collaborative public forest management. The resulting collaborative capacity framework is organized into assets and conditioning factors, six arenas of collaborative action, and outcomes. Our focus of examination was on the capacities associated with each of the six collaboration action arenas: organizing, learning, deciding, acting,

evaluating, and legitimizing. We presented specific capacity types and attributes and, using case examples, discussed the role of individuals, the collaborative as a whole, and participating and supporting organizations and networks in mobilizing and applying assets.

The framework is limited by several factors. It is informed by a relatively small number of cases that were selectively sampled and therefore not representative of the entire population of community-based collaborative public forest management groups. Indeed, the population has never been delineated. The contexts of the cases were also fairly narrow, focusing on national forest planning, community wildfire protection planning, collaborative landscape restoration, and community-based forestry initiatives. There are numerous other contexts within national forest management in particular and public resource management in general. However, upon reviewing empirical research on rangeland management (Paulson 1998; Wagner and Fernandez-Gimenez 2009) and watershed management (Imperial 2005; Leach and Pelkey 2001), we are reasonably confident that the collaborative capacity framework applies to these contexts as well.

Despite these limitations, the framework has utility as a starting point for operationalizing, assessing, and evaluating the relative effect of different collaborative capacities associated with public forest management. Two insights from the framework are worth conveying. First, it is likely that most, if not all, collaborative groups possess some level of capacities to effectively operate in all six arenas, but may not recognize them as such. The framework offers a language and organizing framework to elucidate what is meant by “collaborative capacity.” Second, collaborative capacities for all six arenas of collaboration action work in concert. Organizing and legitimizing are ongoing activities and lay the foundation for learning, deciding, acting, and evaluating. Learning contributes to deciding and acting, while evaluating contributes to learning. Many capacities impact all six arenas, such as leadership, authority from home organizations, staff, and communication skills. From our ongoing observations of several collaboratives, over time, these capacities become self-reinforcing and allow groups to expand the scope and scale of their activities.

A basic practical application of the framework is as a diagnostic framework for both emerging and established collaboratives. All organizations go through transitions, from the start-up phase of organizing and implementing pilot projects to sustaining and scaling-up their activities (Taylor and Cheng 2012). From our observations, groups generally proceed in an ad hoc, pragmatic manner, cobbling together capacities when they encountered the need. Indeed, Bonnell and Koontz (2007) found that collaborative groups spend an inordinate time on organizational issues, often to the neglect of other collaborative actions.

There is also a benefit to collaboratives to assess their existing available capacities, identify gaps, and strategically plan for how to acquire additional needed capacities to fulfill their functioning and performance. In this way, the framework offers a capacity roadmap for collaboratives.

The framework also has potential use by participating and supporting organizations to allocate resources to build and sustain collaborative capacity. In our ongoing interactions with community-based collaborative groups, resources tend to be available solely for implementation. Few funding opportunities exist for developing organizing, learning, planning and evaluating capacities, and yet these are essential building blocks towards implementation. The framework can also be useful for defining roles for so-called boundary-spanning or bridging organizations (Folke and others 2005) that seem to be emerging to support community-based collaboratives. These are generally community- or regionally-based governmental or non-governmental organizations with the common mission to translate and transfer science to practice, foster connections between ecological and socio-economic systems, and serve as a portal through which many agencies and organizations can pool funds, technologies, and people to apply to collaborative activities.

The framework also has the potential to advance research on community-based collaborative public forest management by defining capacity as an independent variable in determining collaborative functioning and outcomes. As noted in the introduction, much public forest collaboration research has emphasized collaborative structure, rules, facilitation, and processes as factors effecting collaborative behaviors and performance. Many authors identify the need for sufficient resources to make collaboration work, but are not specific in what functional context those resources are applied. By structuring specific capacities across six collaborative action arenas, it is possible to conduct large-N studies to determine the relative effect of specific capacities on collaborative performance (Conley and Moote 2003; Thomas and Koontz 2011). In doing so, practitioners and researchers alike may be able to better discern which capacities tend to have more effect for attaining certain outcomes compared to others.

As community-based collaboration in public forest management expands through grassroots initiatives and top-down policies, collaborative groups must be attentive to the capacities needed to meet their own goals as well top-down policy goals. There appears to be growing demand by agencies, communities, facilitators, non-governmental organizations, and supporting institutions and organizations to more fully understand what collaborative capacity means and how it applies to their efforts. Distinguishing and categorizing these capacities can contribute to more effective collaborative processes and outcomes.

In a broader sense, collaborative capacity can be thought of as key contributor to the adaptive capacity of social-ecological systems to remain resilient—the ability of a system to absorb disturbance and still retain its desired functions and structures (Walker and others 2006). Defined by Armitage (2005) adaptive capacity entails the “ability to experiment and foster innovative solutions in complex social and ecological circumstances” (p. 703). More specifically, adaptive capacity entails a collective commitment to learning, nurturing diversity, combining different kinds of knowledge, and creating opportunities for self-organization—activities core to public forest collaboration.

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