

What to Expect from Collaboration
in Natural Resource Management:
A Research Synthesis for Practitioners



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Ecological Restoration Institute

The Ecological Restoration Institute at Northern Arizona University is a pioneer in researching, implementing, and monitoring ecological restoration of southwestern ponderosa pine forests. These forests have been significantly altered over the last century, with decreased ecological and recreational values, near-elimination of natural low-intensity fire regimes, and greatly increased risk of large-scale fires. The ERI is working with public agencies and other partners to restore these forests to a more ecologically healthy condition and trajectory—in the process helping to significantly reduce the threat of catastrophic wildfire and its effects on human, animal, and plant communities.

Cover photo: Collaborative meetings take place in all sorts of settings, like this gathering at the Parks-Bellefont Fire Department between Flagstaff and Williams, Arizona.



**NORTHERN
ARIZONA
UNIVERSITY**

Ecological Restoration Institute

PO Box 15017
Flagstaff, AZ 86011-5017
928-523-7182
www.eri.nau.edu

Publication date: February 2008

Authors: Ann Moote and Kimberly Lowe
Editor: Dave Egan
Cover Photo: Hiram “Doc” Smith

Series Editor: Dave Egan

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Introduction

Collaborative approaches to natural resource management have become increasingly popular since the 1980s in the United States, to the point where the federal government now mandates them for some federal activities and federally funded projects. For example, through the Healthy Forests Restoration Act and appropriations for the National Fire Plan, Congress has directed that federal land management agencies should make the states and local governments “full partners” in collaborative resource management, and work closely with citizens and governments at all levels.ⁱ In August 2004, President Bush released an Executive Order calling for “cooperative conservation, with an emphasis on appropriate inclusion of local participation in federal decisionmaking, ... [including] collaborative activity among federal, state, local, and tribal governments, private for-profit and nonprofit institutions, other nongovernmental entities and individuals.”ⁱⁱ

Collaboration in governance is certainly not a new phenomenon. Town halls, government commissions and advisory councils, and public meetings are mainstays of American governance. The requirement that resource management be conducted through a collaborative process is fairly new, however, and there is considerable confusion about how it is being defined and how it should be implemented. Requests for definitions of, and guidelines for, “good” collaboration are becoming more frequent.

In order to address the need for more clarity about the expected outcomes and characteristics of effective collaborative resource management, we reviewed the literature on collaboration, including theoretical, prescriptive, and empirical research literature. In the first part of this paper, we identify what collaboration is—and what it is not. We then turn to comparative empirical research on collaborative resource management to identify outcomes that are commonly reported (and, therefore, can reasonably be expected from) collaboration, and, lastly, to identify best practices and guidelines for effective collaborative resource management.

Methods

The literature on collaboration is rich and varied. There are several collections of “lessons learned” and prescriptions for how to do collaboration. These are usually grounded in considerable experience, but without the standards of formal research.ⁱⁱⁱ A more theoretical body of literature attempts to frame collaboration by describing its social, political and organizational underpinnings, and developing typologies that differentiate types of collaborative efforts.^{iv} The vast majority of both the popular literature and research on collaboration consists of single case studies. These studies offer important insights into collaborative group process but are not readily generalizable. They are important for developing definitions and descriptions of collaboration, but do not provide a defensible basis for defining expected outcomes or identifying variables likely to influence the success or failure of a collaborative effort.

To understand the positive and negative outcomes likely to result from collaboration and to identify factors that might be considered predictors of collaboration success or failure, we reviewed empirical research that compares and evaluates several collaborative efforts. Several of these studies focused on watershed groups or councils,^v while others examined collaborative forestry.^{vi} Some looked across a range of collaborative resource management efforts, some at international cases,^{vii} and still others did not look at cases *per se*, but interviewed individual community or agency leaders for their perspectives on collaboration.^{viii} We also considered research on collaboration in the social service sector^{ix} and previous research synthesis efforts.^x

From these, we selected the ten studies that compared at least five cases of collaboration, using systematic and accepted methods to test assumptions about collaborative resource management, and clearly based their findings on their research data. We coded these ten studies to identify costs, benefits, and factors that the researchers found influenced success or failure of collaborative efforts. We reviewed the other comparative studies to further elucidate these factors.

Defining Collaboration

Collaboration is a process by which multiple stakeholders work together to solve a common problem or achieve a common goal. It involves sharing information and perceptions to encourage innovation and mutual learning, and is often viewed as an opportunity to improve planning and decisionmaking by finding ways to work beyond gridlock and inefficiency. Although collaborative resource management efforts are highly variable, diversity of participation and group process are their defining characteristics.

Frequently, collaboration is confused with more traditional public participation processes. Collaboration is not just a means of informing the public or gathering feedback; a process is generally not considered collaborative unless stakeholders representing diverse interests participate directly in the development and review of proposed actions.^{xi} Some proponents further suggest that collaboration is achieved only through shared responsibility, shared decisionmaking, or shared authority.^{xii}

In practice, the extent to which participants in a collaborative process engage in government planning and decisionmaking activities is open to debate. More than one study has shown that agency employees consider collaborative planning to be primarily an advisory function (i.e., the collaborative group makes recommendations to the agency and the agency retains full decisionmaking authority), while external groups want their role to be expanded beyond simply sharing information or advising to shared decisionmaking.^{xiii} To fully engage in shared decisionmaking, most agencies would have to change their planning, management, and decisionmaking procedures, if not law. Nonetheless, there is a common expectation that collaboration means government will be more open and willing to engage in ongoing dialogue about their plans and procedures.

Figure 1 illustrates different types and levels of public participation.^{xiv} Activities that would commonly be considered collaborative fall in the “high” and “highest” levels of participation, where groups are involved in planning and assessment, and provide informed recommendations or actually make final policy or management decisions. On the continuum of public participation activities, collaboration is found in the form of town halls, government advisory councils, partnerships, and watershed councils. Activities such as traditional public hearings, open houses, and public comment periods, which typically do not involve multi-stakeholder dialogue, are not collaborative.

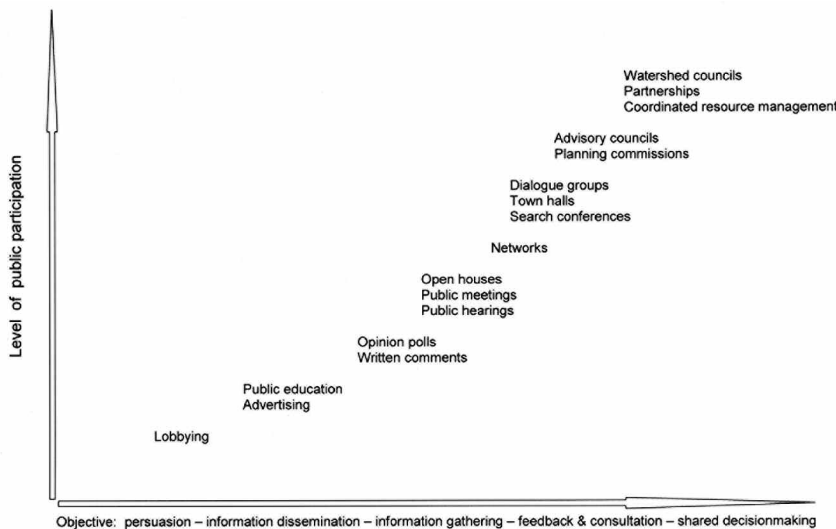


Figure 1. Collaboration on the ladder of public participation. Activities that would commonly be considered collaborative have high levels of participation and encourage information exchange and learning among participants. These include most networks, dialogue groups, advisory councils, partnerships, and watershed councils.

Collaborative Groups: Their Forms and Functions

It is difficult to describe and classify collaborative processes because they vary widely in their scope, participants, goals, and activities. Collaborative resource management may focus on geographic areas ranging from hundreds to millions of acres of land and water. The region of concern may include only one or several governmental jurisdictions. There may be fewer than ten or more than hundred active participants, who may include any combination of government agencies, nonprofit/interest groups, and others (including individual concerned citizens). Some collaborative groups exist solely for information exchange, communication, and mutual education. Others engage in project planning and review, and some take on project and program monitoring. Still others engage in project implementation, sharing resources to get a job done.

Table 1 describes the goals, structures, and procedures typical to different kinds of processes that are considered collaborative, including networks, dialogue groups, advisory groups, partnerships, and watershed councils. While these types of collaboration are presented separately, they are perhaps best viewed as examples along a continuum that generally ranges from less formal to more formal. The categories are not mutually exclusive. For instance, a collaborative group could have a shared vision and common purpose but function more as a network than a partnership. Some people consider only partnerships and councils to be true collaboratives because they are the most open and give participants responsibility for setting their own goals and actions, while advisory councils and dialogue groups are often presented with a predetermined task and procedure. Others consider co-management—a formal process of sharing decisionmaking and management authority between government and local resource users—to be a form of collaboration.^{xv} However, most co-management in the United States limits participation to those with legal authority over the resource and does not represent a broad range of interests, so we do not include it here.

Table 1. Forms and functions of collaborative groups.^{xvi}

Type	Purpose and goals
Networks	A loosely defined group of individuals and/or organizations with overlapping interests or responsibilities that engages in intermittent, informal communication over extended periods of time. Their goal is information exchange and resource sharing, not conflict resolution or shared decisionmaking. Participation is voluntary and often ad hoc, and there are no formal rules of operation.
Dialogue groups (e.g., <i>town hall, search conference, community visioning</i>)	Individuals with diverse interests participating in single events or ongoing gatherings to share ideas and create a vision for future action. Participants share information and ideas, explore issues, and attempt to identify common values, but do not attempt to reach agreement or make decisions. Participation may be open or by invitation only. Meetings are semi-formal and facilitated.
Advisory groups (e.g., <i>advisory council, planning committee</i>)	Regular, facilitated meetings of individuals who are usually invited or appointed based on their expertise. Participants often represent specific interests or agencies rather than their individual perspectives. The group works together to develop guidelines or plans for others, analyze trends, review plans or proposals and make recommendations, but has no decisionmaking authority.
Partnerships and Councils (e.g., <i>watershed council, coordinated resource management group</i>)	Participants with diverse interests working together, both formally and informally, to achieve a common purpose. Typical group activities include developing and advancing a shared vision, mission, and goals; collectively identifying issues, gathering information, and learning about the issues of concern; generating options and developing recommended actions; engaging in joint projects; and monitoring and evaluating activities. Participation is open to any interested group or individual, but membership may be formally defined. The group makes decisions through a formal, defined process. It will typically develop a budget and seek funding independent of its members, who may represent organizations or stakeholder groups, or participate as individuals independent of their other affiliations.

What to Expect from Collaboration

Just as forms of collaboration vary widely, so too do expectations of collaborative resource management. While there are many desired and presumed outcomes of collaboration, those listed in Table 2 are commonly reported in the empirical research of multiple cases.

Table 2. Costs and benefits of collaborative resource management.

	Born and Genskow 2000	Coughlin and others 1989	Kennedy and others 2000	Leach and others 2002 Sabatier and others	Lubell 2004c	Huntington and Sommerstrom 2000	Schuett and others 2000, Schuett and Doppelt and others 2002	Imperial and Hennessey 2000	Williams and Ellefson 1987
Increased capacity for collaboration									
Increased trust, reduced conflict	X	X		X	X	X	X		
Better communication, new networks	X	X		X		X	X		
New institutions, better ways of doing business	X	X					X	X	
Mutual learning									
Information sharing, mutual learning	X	X		X	X	X	X	X	
Public education	X	X				X			
More democratic									
More representative, more public participation	X	X				X			
More transparent, fairer	X							X	
More effective outcomes									
Otherwise unattainable projects implemented	X	X		X		X	X	X	
More innovative, more informed, better science	X	X			X			X	
Stakeholders support implementation	X	X							
More efficient, saved time		X					X		
Undesirable outcomes									
Low-quality outcomes, focus on easier problems						X	X		
Inequitable, unrepresentative				X	X	X			
Expensive; harms the economy				X			X		
High transaction costs									
Time consuming	X				X				
Outcomes unpredictable				X				X	

Benefits of Collaboration

Many of the benefits of collaborative resource management are social, not ecological. In fact, the most commonly reported benefit of collaboration is that it builds social capital, thereby improving participants' capacity for future collaboration. Collaborative efforts have been found to reduce conflict, build trust among participants, and create new networks and institutions for information sharing and undertaking collective projects. These professional and interpersonal networks can increase participants' capacity for innovation and their collective flexibility to adapt to changing conditions.^{xvii}

Collaboration is commonly found to foster information exchange and mutual learning as well, leading to a better understanding of issues and constraints. In addition to encouraging learning among participants, a number of collaborative efforts operate as information clearinghouses and engage in public education to improve understanding of the local ecology, jurisdictional interdependencies, and management problems.

Collaborative resource management frequently results in decisions or projects that are expected to improve resource conditions, including new plans, new policies, and on-the-ground projects. For example, collaborative processes have been found to use better science, address more issues, and be more innovative than traditional planning processes. In some cases, collaboration has allowed for planning and projects that would not otherwise be possible, such as those that extend across management jurisdictions. Collaboration has made stakeholders more likely to support decisions and project implementation and, in some cases, collaborative processes have actually been more efficient than traditional resource management planning and decisionmaking processes. Collaboration has also been found to be more democratic than traditional bureaucratic decisionmaking processes when it increases public participation, solicits input from a broader representation of stakeholders, makes decisions more transparent, or empowers the public.

Costs of Collaboration

Some of the normative literature on collaboration in resource management warns of potentially negative results of collaboration, including the likelihood of lowest common denominator decisions, increased conflict, and unbalanced representation.^{xviii} However, most of the empirical research we examined does not substantiate these claims, suggesting that they are rarely a problem. One study of 70 watershed groups in Washington and California, for example, found results contrary to all three of these fears: collaborative efforts had the most positive effect on the issues participants considered most serious, conflict was positively related to outcomes, and commodity and environmental interests were equally well represented.^{xix}

Nor has the fear that collaboration will undermine government authority been borne out. For instance, in a study of collaborative planning in 200 cities, Agranoff and McGuire (2003, p. 1410) found, "while there was a great deal of collaboration and sharing, the city government was at the core of local decisions" and retained ultimate decisionmaking authority. On the other hand, participants in collaboration efforts sometimes report that they believe results are inequitable or the process is unrepresentative.^{xx}

While many collaborative resource management efforts have resulted in tangible products that are expected to improve resource conditions,^{xxi} collaboration also has very real costs in terms of participants' time and energy, which frequently results in frustration and burnout among collaborative group participants.^{xxii} These costs, which sociologists refer to as transaction costs, reflect the challenges inherent to building and maintaining communication among several different organizations, individuals and interests, and the unpredictability of collaborative process. Other costs of collaboration occasionally reported include a tendency to focus on the easiest problems first,^{xxiii} increased conflict,^{xxiv} and increased economic costs.^{xxv}

Factors Influencing Success or Failure

Factors that influence success and failure within collaborative efforts are often reciprocal, that is, if the factor is present, it tends to promote success; if not, failure is more likely the outcome. Our analysis of the more rigorous, multi-case empirical research found five broad variables to be highly associated with success or failure of collaborative resource management: 1) adequate resources (particularly funding), 2) a common purpose, 3) recognized authority, 4) capacity for collaboration, and 5) a fair and effective process (Table 3). All of the empirical research literature we examined found that each of these variables influenced the success or failure of collaborative efforts. As discussed below, however, in practice these variables take many different forms.

Adequate Resources

Adequate, consistent funding to support operations, usually including paid staff, is almost always linked to successful collaboration. Some research points not only to adequate funding, but to *government* funding as essential to successful collaboration.^{xxvi} In addition to money and staffing, adequate time is a critical ingredient. At least three research studies found that collaborative groups rarely achieve measurable outcomes during their first three years and suggest that it is unrealistic to expect measurable outcomes any sooner.^{xxvii} Several others cite time and participants' patience as factors influencing success.^{xxviii}

Table 3. Factors associated with success or failure in collaborative resource management.

	Born and Genskow 2000	Coughlin and others 1999	Kennedy and others 2000	Leach and others 200, Sabatier	Lubell 2004c	Huntington and Sommerstrorr	Schuett and others 2000,	Doppelt and others 2002	Imperial and Hennessey 2000	Williams and Ellefson 1997
Adequate resources										
Time	X	X		X		X	X			X
Funding	X		X	X	X	X	X	X	X	X
Staff	X	X	X			X	X	X	X	X
Common purpose, achievable goals										
Common problem or objective						X	X			X
Salient issue	X		X				X	X		
Clear, agreed-upon goals; common vision		X	X			X	X	X	X	X
Appropriate scope, achievable goals	X	X	X	X	X	X	X		X	
Recognized authority										
Broad representation, involve all stakeholders	X	X	X	X	X	X	X	X	X	X
Active government support	X		X		X		X	X	X	X
Legal authority			X		X	X				X
Capacity for collaboration										
Social capital	X	X			X	X	X	X	X	X
Willingness to work together, flexibility	X	X	X	X		X	X	X	X	X
Leadership	X	X	X		X	X	X		X	X
Trust		X		X		X	X	X		X
Mutual respect	X					X	X			X
Fair & effective process										
Open, transparent, equitable		X			X	X	X	X	X	X
Best available information	X	X		X	X	X	X		X	
Monitoring and evaluation					X	X		X	X	
Accountability						X		X	X	
Clear organizational structure	X	X			X		X	X	X	X
Deliberative		X	X		X	X	X	X	X	X
Action-oriented, tangible results			X	X	X	X	X	X	X	X

Common Purpose

Another key to success is having a common problem or need. Some researchers have found that the urgency of that purpose or need is also important; that is, a mandate, crisis, or other incentive for people to collaborate increases the likelihood of success.^{xxxix} An important, but often overlooked, aspect of this factor is that all stakeholders share the same expectations of the collaborative effort, which may be reflected in a common vision and clear, agreed-upon goals. Research also shows that collaborative efforts are most likely to succeed when their goals are manageable: relatively small-scale and technically feasible. Tackling overly complex projects or projects with too large a scope can result in failure.^{xxx}

Recognized Authority

Collaborative resource management is most credible when it involves the right people, including those with the authority or power to implement or undermine the group's effort. Although not often mentioned in the theoretical literature, empirical research shows that active support from government agencies and political leaders is often a critical factor in the success of a collaborative venture. Failure to involve key interests or power brokers is sometimes reported as a reason for group failure,^{xxxi} as are lack of government support and lack of legal authority or a mandate. For instance, one study comparing 23 cases of collaborative resource management found "The case studies demonstrated that to move beyond a purely advocacy and education role, government laws and policies had to be conducive to integration....The cases also revealed that legislation and policies can constrain or prevent integration through a focus on single issues and objectives."^{xxxii} Born and Genskow (2000, p. 50) suggest "measures of formal governmental support...include the degree to which [collaborative] efforts...are formally recognized and given standing by governmental units; and whether they formally adopt or incorporate [the collaborative group's] actions and plans into their own activities, thus fostering implementation."

Every research study we coded mentioned the importance of broad representation, or involving all stakeholders in collaboration, as a means of guaranteeing the legitimacy of the effort. In Australian cases where elected officials had "excluded certain groups, weighted committees in favor of certain political affiliations, and even rejected individuals nominated by organizations as their representative...many participants specifically cited this as undermining their credibility."^{xxxiii} In a contrasting example of alleged exclusion, Magerum (1999) reports that "in several cases in the United States, stakeholder group recommendations were challenged on the ground that the selection of the stakeholder group biased the outcome. Participants were able to overcome this challenge by demonstrating a clearly defined process, which was open membership to any interested party."^{xxxiv} In other cases, community involvement or community support has been important to success.^{xxxv} For example, a study of 69 watershed groups in Ohio found that "groups with a broader array of participants tend to excel in watershed plan creation, identifying/prioritizing issues, and group development and maintenance."^{xxxvi}

Although some literature on collaboration emphasizes the importance of local leadership, this is not a definitive finding. In their study of 70 watershed partnerships, Sabatier and others (2002, p. 38) found "local leadership is associated with fewer agreements, less monitoring, and stakeholders who perceive less progress on improving watershed conditions....Success in terms of reaching agreements and implementing projects depends on active participation by state and federal agencies." This finding likely reflects the reality that state and federal agencies, not local authorities, manage most natural resources.

Capacity for Collaboration

Collaboration is not effective in all situations. Frequently, its success depends on social structures and individuals (social capacity) that facilitate this form of planning and decisionmaking. Deep-seated ideological differences, interests pitted against each other, or dissimilarities in fundamental values are all associated with failed collaborative efforts.^{xxxvii} On the other hand, several factors have been correlated with effective collaborative efforts: a history of collaboration among different interests in the community, resource management and regulatory agencies that coordinate their research and management efforts, an established communication network including formal channels of communication, and personal connections among the interested parties.^{xxxviii} Individual participants' attitudes and behaviors, such as commitment to the collaborative process, a willingness to work together, willingness to compromise, and flexibility were almost always found to influence success or failure.

Mutual respect, embracing diversity, and an understanding of others' cultures are also important success factors. In several cases, trust has been reported to be an important factor for successful collaboration. On the other hand, some research suggests that while honesty and accountability (doing what one said one would do) are important predictors of success, building trust and interpersonal relationships are not.^{xxxix} In these cases, the characteristic influencing success is not trust but accountability: "The emphasis is not just on building trust but rather on establishing predictability and reducing vulnerability."^{xl} If the primary concerns of the group are to reduce resource management redundancy and achieve tangible environmental benefits, participants may well consider trust-building exercises a waste of time.^{xli}

Leadership has proven to be highly correlated with success. For collaborative resource management, determinants of "good" leadership include individuals with recognized authority; good communication, facilitation, and problem-solving skills; and the ability to inspire commitment and action from others.^{xlii} However, finding people with these skills can be a challenge because most leaders have traditional hierarchical leadership and qualities, such as competitiveness and the ability to take unilateral action, which can actually undermine a collaborative effort.^{xliii}

Perhaps because federal and state agencies play a central role in resource management, agency behavior or "organizational culture" is frequently singled out as a reason why collaborative efforts fail. Agency participants are sometimes said to be non-responsive, overly bureaucratic, and excessively reliant on rules and procedures.^{xliv} In a survey of USDA Forest Service personnel and their partners from outside the agency, Carr and others (1998) found that both groups viewed the organizational culture of the agency as the most significant obstacle to successful collaboration.

At least two factors make it difficult for agency personnel to collaborate. First, they have been trained as "technical experts" with the expectation that they will make decisions on the basis of objective data and science, not values. Secondly, the obligations created by the collaborative effort may be onerous enough that agency staff would either have to neglect other commitments or even completely revise their planning, decisionmaking, and project implementation procedures to fully meet the expectations of their fellow collaborators. For these reasons, perhaps, some research has concluded that if upper management is not committed to collaboration, collaborative efforts are more likely to fail.^{xlv}

Fair and Effective Process

Public participation research has shown that procedural justice--the perceived fairness of the decisionmaking process--positively affects people's reactions to agency decisions. To most people a "fair" process 1) is open and inclusive, 2) provides equal opportunities for meaningful input, and 3) is rational and transparent.^{xlvi} An "open and inclusive" process is one that encourages participation from all interested parties and strives to involve all stakeholders without being dominated by any particular stakeholder group. Participants want to know that their views and ideas are considered in the decisionmaking process. They want equal access to decisionmakers and opportunities for meaningful input, such as participation in the identification of problems and potential projects, and the development and analysis of alternatives.^{xlvii} Thirdly, people want rational, fact-based decisions and want to know how those decisions were made, even if they don't contribute to making them.^{xlviii} Sometimes, basing work on "sound science" or "the best available information" is important for the credibility of the process. Monitoring and evaluation also can be important because they offer a way for the group to determine whether it is making progress toward its goals and encourage adaptive management.

Collaboration research similarly shows that equitable and accountable processes--with incentives for cooperative behavior and consequences for uncooperative behavior--are more likely to produce desired outcomes.^{xlix} Some level of formality, which may be spelled out in a charter or memorandum of agreement, helps clarify roles and manage power differentials among partners and can be important for accountability. Margerum (2001) has identified six strategies collaborative groups used to encourage commitment to the group's project and plan: 1) legislative (changes in power and jurisdiction), 2) contractual (joint written agreement--politically, morally, and sometimes legally binding), 3) facilitational (shared knowledge of agreement reached in a facilitated process), 4) interorganizational coordination (formalized process of information sharing and joint decisionmaking), 5) financial (funds placed in

common pool), and 6) interpersonal (mutual trust and understanding). As this range of strategies suggests, the appropriate level of formality is a function of the collaborative group's goals and interpersonal dynamics. Some collaborative activities can be accomplished by simply assigning discrete tasks to different organizations, while those that require the partners to work together closely are more likely to need roles to clarify roles and responsibilities.

Much of the normative literature on collaboration emphasizes the importance of spending time coming to understand others' concerns and viewpoints, and the empirical research does suggest that processes emphasizing information exchange, dialogue, and mutual learning are highly correlated with success. Yet research also suggests that collaborative efforts should not spend all their time in dialogue without moving forward on actions and outcomes; collaborative groups that develop an implementation or management plan and on-the-ground projects are more successful than groups that do not.

Realistic Expectations

Attempting to define indicators of success for collaborative efforts is an inherently challenging task. After a review of 450 collaborative groups, Coughlin and others (1999, p. 21-1) concluded, "Collaborative partnerships are immensely variable.... The sheer numbers of groups arising, in addition to their multiple decisionmaking processes and organizational structures, make it impossible to neatly fit groups into divisible boxes. As such, drafting prescriptive advice that applies to all seems absurd and not useful." Webler and Tuler (2001, p. 37) similarly state, "It is inappropriate to expect that criteria will be universally held.... Different participants chose to emphasize different normative aspects of the process." Yet, in a time of mandated collaboration, there is a real need for a common understanding of what collaboration is, what we can expect from it, and when it is likely to work.

Our review of the comparative empirical research identifies outcomes that can be realistically expected from collaboration. These include reduced conflict and a greater capacity for joint problem-solving, better information exchange and collective learning, and more innovative and effective outcomes. Because the process is often perceived to provide more opportunities for substantive input, outcomes are sometimes more readily accepted and implemented. On the other hand, reaching these decisions and outcomes takes considerable effort and time--usually on the order of years. And in some cases, the process is perceived to be undemocratic and results are perceived to be ineffective or undesirable.

Five broad factors are highly correlated with successful collaboration. These are 1) adequate resources, 2) commonly held and achievable goals, 3) recognized authority, 4) stakeholders' ability and willingness to work together, and 5) a fair and effective process. The specific form that each of these factors takes will necessarily vary with the nature of the collaborative effort: its participant makeup, context, scope, and issues being addressed. In other words, a fair and effective process in one instance may look quite different in structure than an equally fair and effective process in another situation.

Given the diversity of collaborative efforts, we likely will never be able to identify a recipe for "good collaboration" or specific indicators of success that will apply to all collaborative groups. However, the five broad factors identified here are highly correlated with successful collaboration and can be used in both the design and evaluation of collaborative resource management efforts.

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Endnotes

- i Public Law 108-148.
- ii Bush 2004.
- iii See for example, Anderson and Baum 1988, BLM and Sonoran Institute 2000, Dukes and Firehock 2001, Ingles and others 1999, Oregon 2000.
- iv See for example, Bryan 2004, Cestero 1999, Cigler 1999, Gray 1989, Hummel and Freet 1999, London 1995, Mandell 1999, Moore and Koontz 2003, Plummer and Fitzgibbon 2004, Selin and Chavez 1995, SPIDR 1997.
- v Born and Genskow 2000, Kenney and others 2000, Leach and others 2002, Sabatier and others 2002, Huntington and Sommerstrom 2000, Imperial and Hennessey 2000, Lubell 2004a.
- vi Carr and others 1998, Doppelt and others 2002, Selin and others 2000, Williams and Ellefson 1997.
- vii Curtis and others 2002, Coughlin and others 1999, Margerum 1999 and 2001, Kellert and others 2000, Pitkin and Doerksen 2000, Wondolleck and Yaffee 2000,
- viii Belden and others 2001, Carr and others 1998.
- ix Agranoff and McGuire 1999, Chrislip and Larson 1994, Cigler 1999, Johnson and others 2003, Takahashi and Smutny 2001.
- x Mattesich and others 2000, Smith and Gilden 2003.
- xi Gray 1989, Koontz and Moore-Johnson 2004, Oregon 2000, London 1995, Sherlock and others 2004, Beierle 2002.
- xii Ingles and others 1999, Hummel and Freet 1999, Mattesich and others 2001, BLM and Sonoran Institute n.d., Bryan 2004.
- xiii Carr and others 1998, Moote and Becker 2003, Sherlock and others 2004.
- xiv Modeled after Arnstein's 1969 ladder of public participation.
- xv Plummer and Fitzgibbon 2004, Olsson and others 2004.
- xvi This table draws upon the works of Bergstrom and others 1996, Cigler 1999, Cestero and others 1999, Dukes and Firehock 2001, Gray 1989, Hummel and Freet 1999, Ingles and others 1999, London 1995, Mandell 1999, Selin and Chavez 1995, and SPIDR 1997.
- xvii Agranoff and McGuire 1999, Lubell 2004b, Wondolleck and Yaffee 2000.
- xviii Kenney 2000, Dukes and Firehock 2001, BLM and Sonoran Institute 2000.
- xix Sabatier and others 2002.
- xx Leach and others 2002, Lubell 2004b, Huntington and Sommerstrom 2000.
- xxi Coughlin and others 1999, Belden and others 2001, Kenney and others 2000, Leach and others 2002, Imperial and Hennessey 2000, Leach 2004, Born and Genskow 2000, Curtis and others 2002, Kellert and others 2000, Koontz and Moore-Johnson 2004.
- xxii Born and Genskow 2000, Carr and others 1998, Lubell 2004b, Imperial and Hennessey 2000, Margerum 1999, Manning 1998, Kellert and others 2000, Curtis and others 2002, Cestero 1999, Cigler 1999.
- xxiii Doppelt and others 2002, Huntington and Sommerstrom 2000.
- xxiv Sabatier and others 2002, Lubell 2004b, Kellert and others 2000.
- xxv Leach and others 2002, Schuett and others 2001.
- xxvi Curtis and Lockwood 2000, Curtis and others 2002, Born and Genskow 2000.
- xxvii Born and Genskow 2000, Leach and others 2002, Sabatier and others 2002, White and others 1994.

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- xxx Belden and others 2001, Coughlin and others 1999, Leach and others 2002, Lubell 2004b, Huntington and Sommerstrom 2000.
- xxxi Born and Genskow 2000, Coughlin and others 1999, Mattessich and others 2001.
- xxxii Margerum 1999, pg.155.
- xxxiii Margerum 1999, pg. 157.
- xxxiv Margerum 1999, pg. 157.
- xxxv Born and Genskow 2000, Coughlin and others 1999, Huntington and Sommerstrom 2000, Schuett and others 2001, Schuett and Selin 2002.
- xxxvi Koontz and Moore-Johnson 2004 p.185.
- xxxvii Huntington and Sommerstrom 2000, Williams and Ellefson 1997, Belden and others 1999, Johnson and others 2002.
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- xxxix Mandell 1999, Takahashi and Smutny 2001, Webler and Tuler 2001, Webler and others 2003.
- xl Mandell 1999; p.13.
- xli Webler and others 2003, Sabatier and others 2002, London 1995.
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Ecological restoration is a practice that seeks to heal degraded ecosystems by reestablishing native species, structural characteristics, and ecological processes. The Society for Ecological Restoration International defines ecological restoration as “an intentional activity that initiates or accelerates the recovery of an ecosystem with respect to its health, integrity and sustainability...Restoration attempts to return an ecosystem to its historic trajectory” (Society for Ecological Restoration International Science & Policy Working Group 2004).

In the southwestern United States, most ponderosa pine forests have been degraded during the last 150 years. Many ponderosa pine areas are now dominated by dense thickets of small trees, and lack their once diverse understory of grasses, sedges, and forbs. Forests in this condition are highly susceptible to damaging, stand-replacing fires and increased insect and disease epidemics. Restoration of these forests centers on reintroducing frequent, low-intensity surface fires—often after thinning dense stands—and reestablishing productive understory plant communities.

The Ecological Restoration Institute at Northern Arizona University is a pioneer in researching, implementing, and monitoring ecological restoration of southwestern ponderosa pine forests. By allowing natural processes, such as fire, to resume self-sustaining patterns, we hope to reestablish healthy forests that provide ecosystem services, wildlife habitat, and recreational opportunities.

The ERI White Papers series provides overviews and policy recommendations derived from research and observations by the ERI and its partner organizations. While the ERI staff recognizes that every forest restoration is site specific, we feel that the information provided in the ERI White Papers may help decisionmakers elsewhere.

This publication would not have been possible without funding from the USDA Forest Service. The views and conclusions contained in this document are those of the authors and should not be interpreted as representing the opinions or policies of the United States Government. Mention of trade names or commercial products does not constitute their endorsement by the United States Government or the ERI.

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