Collaboration and Institutional Endurance in U.S. Water Policy

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Collaborative institutions, which involve the collective decision-making by multiple political agencies, communities, and stakeholders, are becoming increasingly important for addressing policy dilemmas that are not bound within a single jurisdiction. This is especially true in the environmental arena (Wondolleck and Yaffee 2000; Karkkainen 2002; Koontz et al. 2004; Lubell 2004; McKinney and Harmon 2004; Brick et al. 2001; Sabel et al. 2000). In the water management field, for instance, Sabatier, Weible, and Ficker (2005) have argued that the growth of collaborative efforts among small watersheds is so widespread that it has become a new paradigm of management. A considerable body of policy research, particularly on watershed management, has begun to examine the factors that support the emergence of collaborative environmental governance (Lubell et al. 2002; Blomquist 1992; Ostrom 1990). Understanding what factors affect the performance of collaborative institutions has also become an emerging theme in this scholarship (Sabatier, Leach, Lubell, and Pelkey 2005; Leach, Pelkey, and Sabatier 2002; Conley and Moote 2003; Innes and Booher 1999). Empirically and methodologically however, what is often missing from research on collaborative institutions is a clearer picture of what factors support the endurance of collaborative institutions over time.[1]

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Institutional endurance, at a basic level, can be defined as the capacity of an institutional arrangement to persist over time. Here we are concerned not with the endurance of institutions broadly conceived, but rather with the endurance of collaborative institutions and those mechanisms that keep collaborative actors at the table and working together. We suggest that many of the factors that bring actors together in the first place are also those that keep them together. Yet, as a wide body of literature on institutions and collaboration suggests, the role of learning and adaptation over time also plays a critical role in this process. To help illuminate how this theory can be supported, this paper introduces examples from four large-scale collaborative watershed management programs in the U.S., including efforts along the Columbia River and Sacramento-San Joaquin Rivers, and in the Chesapeake Bay and Florida Everglades. In concluding, we discuss the role of endurance in assessing the performance of collaborative watershed management institutions.

The Impetus for Collaboration

Before examining the factors that support the endurance of collaborative institutions, it is instructive to look at the factors that support the emergence of collective action—as many of those same factors would likely play a role in keeping actors engaged in collaborative processes. A number of the factors that support the emergence of collaboration have been well-documented by scholars of common-pool resource institutions (e.g., forestry, fisheries, water management) and studies of local watershed management partnerships in the U.S. These factors include trust and reciprocity (Ostrom 1998), common preferences for resource use, shared knowledge about the resource system (Ostrom 1990; Taylor and Singleton 1993; Libecap 1994), and experience working together directly (Ostrom 1990; Taylor and Singleton 1993). Schneider et al. (2003), in examining collaborative governance networks around estuaries, also found that repeated interactions foster collective action on policy communities even in the presence of conflicting values and beliefs (Schneider et al. 2003, 152).

Such research highlights the importance of human and social capital in facilitating collaborative partnerships in managing water resources (Lubell et al. 2002). Beyond the social and human factors, financial capital is a condition that underlies the development of cooperative watershed partnerships in the U.S. (Lubell et al. 2002). Additionally, support for collaboration can be enhanced in situations where problems are relatively severe (Lubell et al. 2002), yet where improvements are still feasible (Ostrom 1990; 2001). This literature is supported by more general theories of collective action (Olson 1965), social capital (Putnam 1993), and institutional change (North 1990).

In comparing the formation of four large-scale collaborative watershed management efforts in the U.S. (the Chesapeake Bay Program, the Northwest Power Planning Council's Fish and Wildlife Program for the Columbia River, the California-Bay Delta Program, and the Comprehensive Everglades Restoration Program), we found support for much of the theoretical and empirical literature on the drivers of collaboration for common-pool resource management and local watershed partnerships (Heikkila and Gerlak 2005). As these cases are large in scale and scope, they present certain challenges to collaboration that do not exist in more homogeneous or small-scale settings. Thus, we highlighted some of the factors that are essential in settings where the transaction costs of collaborating might be high. Notably, leadership (or policy entrepreneurs), evidence and widespread concurrence about the salience of problems facing each region, experience working together, and external institutional triggers were key factors supporting the emergence of collaborative resource institutions. These findings demonstrated the value of integrating insights from theories of common-pool resource management, policy change and learning, and social capital in explaining

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the emergence of collaboration (Heikkila and Gerlak 2005).

Sustaining Collaboration: The Roles of Learning and Adaptation

How would the factors that support the emergence of collaboration also lead to the endurance of collaborative institutions, and what factors might be different in explaining endurance? Here we revisit some of the findings briefly mentioned above from our four cases and identify those variables that are also useful in explaining endurance. The benefit in using the four large-scale collaborative watershed programs we have studied to assess endurance of collaboration is that they have been in existence for varying lengths of time (two for more than 20 years and two for just over five years) and have all experienced changes in the organization and level of collaboration over time. Moreover, the two older institutions show continued perseverance today, whereas the two newer institutions both have faced recent challenges to their existence (Gerlak and Heikkila 2006). Recognizing that these institutions may not be representative of all types of collaborative watershed management (especially smaller-scale or local institutions), we also point to findings from other empirical and theoretical research on collaboration that would lend more generalizability to these factors.

In our comparison of these four large-scale watershed management efforts, just as leadership helped sparked the emergence of new collaborative institutions, it also plays a critical role in sustaining the momentum and continued support from various actors for these institutions. For example, in the oldest of the four cases in our study, the Columbia basin's Northwest Power and Conservation Council, former Washington Governor Dan Evans was seen as instrumental in keeping actors at the table to develop a fish and wildlife plan for the Council (Lee 1993). He helped raise awareness about fish hatchery issues that were critical to tribes and successfully negotiated a water budget with the Army Corps of Engineers and utilities that would increase spring flows from dams to facilitate juvenile fish runs (Lee 1993). In the case of the Chesapeake Bay Program, federal actors reportedly have been vital in providing leadership for continued collaboration over the program's 23-year time span—not leadership in the "directive" top-down sense, but rather leadership that encourages state and local stakeholders to work together with a common purpose (Batiuk 2005). In both of the newer collaborative cases, the Everglades and the Bay-Delta, federal leadership demonstrated by Secretary of the Interior Bruce Babbitt in the 1990s was instrumental in the collaborative efforts there. However, today, federal withdrawal in terms of both resources and participation in these regions has created a large vacuum which the states are struggling to fill (Gerlak and Heikkila 2006). Thus, the absence of leadership may conversely threaten an institution's endurance. Scholars who have studied collaborative institutions across the environmental arena also have recognized the importance of core leaders in the success of collaborative management institutions, or the ability to keep diverse actors at the table and focused on shared problems (DeWitt 2004; Wondolleck and Yaffee 2000). Leadership can be particularly important in complex or large-scale resource settings where it may be more difficult to establish or maintain trust among actors with conflicting political interests (Raymond 2006).

The support and motivation of key leaders is certainly not the only factor that would keep collaborative institutions running. In studying the emergence of our four cases we noted that external institutional triggers, like the regulatory hammers of the Clean Water and Endangered Species Acts, provided critical incentives for actors to work together to address shared problems, particularly in the more modern cases of the Florida Everglades and California's Bay-Delta. External triggers may also play a role in the endurance of these collaborative institutions. For example, lawsuits over endangered species led the Northwest Power Planning Council to change the way it uses collaboration and updates its plans for managing Columbia River salmon in the early 1990s to pay more heed to input from fish and wildlife management agencies and other stakeholders (Heikkila and Gerlak 2005; Northwest Power Planning Council 2003). In the newer programs, the scientific process, driven by federal regulations, has become an important part of deciding the programs' respective missions. For example, in the more recent restoration efforts in the Everglades and Bay-Delta, the environmental impact process mandated by the National Environmental Policy Act (NEPA) has produced scientific analyses that have helped forge much of the collaborative institutional structure of these programs as they developed (Heikkila and Gerlak 2005, 604; U.S. Army Corps of Engineers and the South Florida Water Management District 1999; CALFED Bay-Delta Program 2000).

Whereas external institutional triggers like endangered species listings can remind actors of the costs of not working together, their experiences working together can help identify the potential benefits of collaboration. Thus, past experience with cooperation, which can promote the growth of trust and social capital as well as the development of leadership, has been considered one of the drivers of collective action (Ostrom 1990). In each of our four cases, evidence of prior cooperation, albeit piecemeal and incremental, was present prior to the inception of the programs. We also see that the organizational structures devised by these institutions provide a way to formalize these patterns of cooperation, which arguably supports the endurance of collaboration. Each of the four institutions, for example, has created organizational structures such as advisory committees and boards for citizens and scientists, which can facilitate collaboration. What may be critical in keeping actors at the table through these forums is that they provide opportunities for both procedural and representative legitimacy, so participants view the collaborative process as open and fair (Trachtenberg and Focht 2005). There are certainly differences across the four cases in how these structures work and they have evolved in each setting over time. In the case of the Columbia basin, for example, the program created science advisory bodies that have been integral in assessing the Council's subsequent plans. Based on scientific reviews of its plans in the 1990s, the program turned its focus in 2000 to sub-basin plans, trying to link water management and salmon recovery efforts throughout the entire basin. These sub-basin plans have also involved extensive citizen input and collaborative decision-making at a broader level than under prior plans.

The directed efforts that these collaborative programs have taken to organize information sharing through advisory bodies are tied to another factor that proved critical in the emergence of these programs. As our prior research indicates, the availability of data and information on the existence of resource problems was instrumental in supporting their formation. The popular press, Congress, and government agencies all documented species decline and water-quality issues in the Chesapeake Bay, along the Columbia River, in California's Bay-Delta, and in the Florida Everglades prior to the inception of collaborative programs, despite uncertainty about the relative causes or solutions to these problems (Heikkila and Gerlak 2005, 596). Science and information, in supporting

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continued concurrence on the nature of problems in these regions, appears to play a critical role in supporting the endurance of these institutions as well. Through the use of scientific panels and committees, which produce and communicate new scientific and technical understandings about the issues these organizations face, these collaborative institutions reiterate the salience of, and identify alternative approaches to, the problems that they face. Arguably, if actors felt that the problems in these regions were diminishing in importance or even resolved there would likely be less of an incentive to continue to come to the table.

Science and information not only supports awareness and concurrence on problems, it also provides opportunities for learning and adaptation, which can foster institutional endurance. The importance of "learning" and the capacity to adapt to new information is not new to the resource management literature. Scholars of adaptive management, in fact, have argued for a number of years that in complex physical settings it is critical to establish mechanisms for resource managers to learn (ideally through the scientific method of hypothesis testing) about what types of management strategies work best (Holling 1978; Walters 1986; Fazey et al. 2005). Much of the thinking about adaptive management has built upon the concept of the "learning organization" advanced by organization theorists like Donald Schön (1973) and Peter Senge (1990). According to Schön: "We must become able not only to transform our institutions, in response to changing situations and requirements; we must invent and develop institutions which are 'learning systems', that is to say, systems capable of bringing about their own continuing transformation" (Schön 1973, 28). Policy scholars have similarly investigated learning organizations in the public sector. They emphasize how learning organizations differ from other organizations by their ability to problem solve and to promote "continuous learning" (Brown and Brudney 2003). This research gave way to the idea of "double-loop" learning, which occurs when an error is detected and corrected in ways that involve the modification of an organization's underlying norms, policies, and objectives (Argyris and Schön 1974, 2–3). This idea has been central to the concept of adaptive management (Lee 1993, 148–9; Parson and Clark 1995).

In all four cases, adaptive management practices have been recognized to varying degrees over time and across regions. What is common among the regions is that they all include scientific panels and independent scientific review, which serve to promote learning. Along the Columbia River, the Northwest Power and Conservation Council engages in broad-based programmatic review, emphasizing the concept of adaptive management. The Council makes an explicit attempt to update their plans and program goals according to what they learn from the monitoring and scientific assessments of the basin (Lee 1993). The Council's use of its Independent Scientific Advisory Board to review the program's plans and the state of knowledge of fish and wildlife management in the basin supports this process. The Chesapeake Bay Program also embraces an adaptive management approach (Costanza and Greer 1995; Batiuk 2005). Here the program's Scientific and Technical Advisory Committee and the various sub-committees for implementation provide data to support the program's use of measurable environmental goals in planning and decision-making. With each annual *State of the Bay Report*, program officials adapt the goals to reflect the realities and complexities identified through monitoring. The two newer programs have also attempted to institutionalize an adaptive management approach and a structure for continued scientific input into decision-making to help identify and clarify appropriate solutions. CALFED's Science Program, established by the 2000 Record of Decision, serves to assist state agencies by developing the science necessary to support their work. An Independent Science Board with world-renowned scientists provides external peer review on various program elements. In the Florida Everglades, the REstoration COordination and VERification Team (RECOVER), an interdisciplinary, interagency team designed to develop tools to evaluate, monitor, and improve restoration, is charged with applying scientific and technical information to ensure the success of the Everglades restoration program. A newly formed National Academies of Science Independent Scientific Review Panel provides an annual review of progress toward achieving restoration goals there. Of course, there are concerns that "true" adaptive management is not really occurring on the ground (Johnson 1999; Gunderson 1999; Walters 1997; Doremus 2001). Some argue that adaptive management along the Columbia River and in the Everglades, for example, more often accurately resembles "adaptive assessment" with efforts to monitor the proposed inventories rather than full-fledged experimental designs (Roe and Van Eeten 2002, 513).

Even if adaptive management *per se* does not occur according to the formal design of managing resources through scientific experimentation, that does not necessarily restrict organizational and policy learning. Scholars in the environmental field have begun to note that collaborative and community-based institutions have tremendous capacity for solving complex environmental problems through "adaptive governance" (Scholz and Stiftel 2005; Brunner and Steelman 2005; Dietz, Ostrom, and Stern 2003). Scholz and Stiftel (2005, 5) define adaptive governance as: "*institutions capable of generating long-term, sustainable policy solutions to wicked problems through coordinated efforts involving previously independent systems of users, knowledge, authorities, and organized interests*" (emphasis in the original). Brunner and Steelman (2005, 19) recognize that adaptive governance involves "the adaptation of policy decisions to experience on the ground as real people interact with each other and the soils, waters, plants, and animals in specific contexts." Administrative law scholar Jody Freeman's model of collaborative governance is also characterized by institutional adaptation and requires joint problem-solving, broad participation, provisional solutions, sharing of regulatory responsibility across the public-private divide, as well as flexible, engaged agencies (Freeman 1997). Her more recent work, which highlights collaborative efforts in California's Bay-Delta, also incorporates the need for "governance structures in which form follows function" (Freeman and Farber 2005).

In practice, our four cases demonstrate that adaptive "governance" occurs more than adaptive management *per se*. In all four cases, the interests of stakeholders and participants, and the information they share, is equally as important as scientific information in the policy adaptation process. In essence, pure scientific experimentation does not occur because the political interests of actors still come into play in the learning process. Yet, learning and change is structured in these programs within settings where science and information has a prominent and formal role, as evidenced by their committee structures and monitoring programs (Gerlak and Heikkila 2006). This process fits with Sabatier and Jenkins-Smith's (1993) notion that policy learning is facilitated by informed debate. They note that members of different policy coalitions with different beliefs can learn from the technical research and debates in policy communities, which can then impact policy outcomes. In a

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similar vein, research from the international environmental realm finds that the most common processes by which learning occurs involves the transmission of information to the institution from outside sources, such as the scientific community (Haas 2000, 567). According to Haas: "In order for an institution to be able to engage in this process it must be able to have timely access to relatively impartial information, be able to effectively process the information internally, and be capable of converting such new ideas into new activities." What can facilitate this type of learning and adaptation are those structures that allow for open sharing of knowledge and ideas as well as "leaders" that support a culture of learning (Fazey et al. 2005)—factors which we have recognized as playing a role in the endurance of our four cases.

One of the key reasons why adaptation is central to the endurance of collaborative resource management institutions is due to the degree of uncertainty surrounding the physical setting of ecosystems and the effects of management choices on them (Johnson 1999, 6–7; Gunderson 1999, 6; Dietz, Ostrom, and Stern 2003). Addressing this uncertainty ultimately requires institutional flexibility or adaptation, such as changes to institutional structure and decision-making, program goals, procedures for stakeholder engagement, and program accountability and independent review. For example, pressure for greater stakeholder involvement and independent scientific review in restoration of the Everglades prompted institutional change there (Gerlak and Heikkila 2006). Dissatisfaction with slow progress in California's Bay-Delta has resulted in significant program review recently and will likely lead to significant institutional change in that region (CALFED Bay-Delta Program 2006). Again, these types of changes reflect a form of adaptive "governance," which keeps these institutions intact even if their rules and structures change over time.

In sum, establishing the organizational capacity for learning—which involves pursuing a range of information sources about the problem, formalized decision-making structures that can interpret and process information, and a commitment on the part of decision-makers to adapt policies and management choices—plays a role in the endurance of these institutions. While our focus has been on the nature of learning, due to its prominence across a range of literatures and clear evidence from the cases, we do not want to discount other likely factors supporting endurance. Certainly, the ability of decision-makers to acquire the necessary financial resources (in light of diminishing federal funding and increased competition between restoration projects) to keep these processes running is a necessary factor for institutional endurance. As research on other collaborative processes has noted, external support for these processes (particularly, political and financial) can also be critical in sustaining collaborative institutions (DeWitt 2004; Wondolleck and Yaffee 2000).

Final Thoughts: Endurance and Performance of Collaborative Institutions

As our analysis of the literature and the cases suggest, the concept of institutional endurance of collaborative institutions is intricately tied to the concept of performance or "success." Much of the literature on collaborative institutions in fact does not distinguish between endurance and success. We argue, however, that these concepts should remain empirically distinct for institutional scholars and policymakers. While endurance, in and of itself, may be an indicator of institutional success, performance, in terms of improving ecological conditions, is another issue altogether. As one prominent institutional scholar points out, we may see many institutions endure, even if they "are not optimally suited to a given environment" (Shepsle 1989, 144).

There is some empirical evidence to suggest that endurance in some instances may be linked with ecological success, but this linkage may be due to the learning component previously discussed. For example, a number of studies of common-pool resource management institutions suggest that underlying conditions that support the endurance of the collaborative institutions–particularly learning and adaptation–are characteristics of "robust" resource management institutions, or those that are successful in managing the commons (Dietz, Ostrom, and Stern 2003; Ostrom 1990). Empirical studies of organizations in the private sector also confirm that organizations that adapt quickly and have mechanisms for learning are likely to perform well (Brown and Eisenhardt 1997; Eisenhardt and Tabrizi 1995). Thus, it is not unreasonable to expect that those collaborative institutions that have developed explicit organizational mechanisms to identify and adapt to changing conditions might also be successful in managing resources. Again, however, the key variable here though is not endurance *per se*; rather it is adaptation or learning.

Still, we argue that even among institutions that are effective learners or adapters, there are no guarantees that such adaptation will equate to success. From a methodological and empirical standpoint, scholars should be careful to clearly distinguish between institutional adaptation (or endurance) and institutional performance (in terms of ecological improvements). The Chesapeake Bay Program is an interesting case in point. While this institutional arrangement has proven to be quite enduring in terms of its capacity to keep collaboration going and arguably adaptive to changing knowledge and circumstances, some critics have found the results of this program to be less than stellar. Ernst (2003) has argued that the health of the Chesapeake Bay (e.g., water quality and species abundance) has shown relatively minimal improvement over the past 20 years. Ernst attributes this to political disputes and entrenched economic interests in the Bay.

The challenge then to scholars and policy analysts is to try to find ways to assess endurance and ecological performance separately. An obvious problem that scholars face is the counterfactual in assessing ecological performance: What would the conditions of the watersheds in our four cases be without the programs? It is nearly impossible to say. Even with pre- and post-program data, the physical and institutional complexity of these watersheds, which span multiple jurisdictions and support a range of interdependent communities and industries, means that the number of potential causal variables (political/institutional, socioeconomic, and physical) that can shape ecological outcomes would be enormous. Some recent scholarship on collaborative watershed management has tackled the performance question by looking at partnership outputs and outcomes, including level of agreement reached, extent of restoration projects' implementation of agreements, and the participants' perceptions of the institution's effects on environmental and social conditions in the watershed (Leach and Sabatier 2005, 237). Imperial (2004, 18) relied on several measures as well, including effectiveness, output, efficiency, productivity, service quality, and citizen satisfaction measures to assess network performance in watershed settings.

Focusing on outcomes and outputs in measuring performance is certainly consistent with the performance management and program evaluation literature, which emphasizes identifying program goals and then measuring how outputs and outcomes measure up. We may never be fully capable of determining the cause-effect relationship between the

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actions of collaborative institutions and ecological outcomes because of the numerous confounding variables or lack of a counter-factual; but we should be able to assess whether stated goals have been met. Of course, if goals are meaningless, watered-down, or ill-suited to the context, measuring performance based on goals presents obvious limitations as well. Ultimately then, a multi-pronged approach to assessing performance—one that looks at goals, historic trends in ecosystem health, perceptions of participants of effectiveness, and institutional endurance and adaptation—must be taken together when drawing conclusions about performance. Endurance then is one piece of the puzzle, not a proxy for performance. What we have shown, though, is that understanding factors that support endurance may also bring us closer to better understanding performance.

Note

1. Even beyond the resource management field, scholars of collaborative governance recognize that the bulk of scholarship has focused on describing the structure and functions of collaboration and that the literature is still deficient in understanding issues such as: "How does the collaborative process begin, continue, and end?" (Agranoff and McGuire 2003, 177).

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