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**Watershed Institutions and Collaborative Environmental Management: Linking Self-Governance to Existing Governmental Institutions (A Research Proposal)**

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## **Abstract**

A rich body of theoretical and empirical knowledge has been building about common pool resource management. From the work of Olson and Hardin providing models of collective action, we have moved to empirically-grounded theories from Ostrom and others. Much of this emphasis has been on the question of self-governance, and on the local scale. But increasingly scholarship aims to develop understanding of larger scale issues, including those with many resource users whose livelihood may not depend significantly on the resource in question. Moreover, self-governance by an isolated community is often less prevalent than is interconnected, multi-jurisdictional decision making for managing common pool resources.

In the proposed research I am interested in the interface between stakeholders and government officials with jurisdiction over common pool resource management. In particular, my focus is on watershed management, which typically crosses multiple jurisdictional boundaries and involves a wide range of stakeholders with varying levels of concern about the resource. Drawing on recent research about how governmental actors and institutions affect collaborative environmental management, and how collaborative actions lead to policy change, I propose a two-phase research program to build theory and inform practice. Phase I will be a case survey analysis of prior collaborative watershed management studies, and CEM studies more generally, to develop patterns of relationships. Phase II will involve primary data collection to test these patterns.

## **Introduction**

Throughout the 20<sup>th</sup> century in the U.S., watershed management largely emphasized federal government dollars, expertise, and control. Major emphasis was placed on modifying rivers for navigability, reducing flooding, extending irrigation for agriculture, generating hydroelectricity, and reducing sewage discharge. Today, important problems remain that are not as amenable to federal management. Declining salmon runs in the Pacific Northwest, hypoxia in the Gulf of Mexico, and contaminated aquifers in many regions, are just a few of the many water issues resulting from the independent actions of millions of decision makers. In particular, the rise of non-point source pollution as a primary contributor to water quality degradation has led some to conclude that federally controlled efforts are not sufficient to solve problems (John 1994).

In response, watershed groups have emerged across the country. By 1999 at least 1500 locally-based watershed management initiatives were said to exist in the United States (Lant 1999). Kenney (1999) counted as many as 400 watershed initiatives in the western U.S. alone, most of which emerged in the 1990s. These initiatives are characterized as having broad and open participation from both the public and private sector, informal structure, collaborative process, and action orientation (Kenney 1999). Local citizens and stakeholders are expected to play prominent roles in these initiatives. At the same time, their focus on topographic (watershed) boundaries typically necessitates the inclusion of multiple political jurisdictions, which can pose substantial management challenges (Blomquist and Schlager 1999).

Although they are locally-oriented, many watershed groups have tapped into federal funding through the U.S. EPA's Section 319 grant program. Under this program, established by the Clean Water Act Amendments of 1987, federal grant money is available to local watershed organizations to develop management plans for their watersheds. Emphasis is placed on collaborative, community-based management approach that uses a watershed scale (Davenport et al. 1996). State governments have contributed as well, providing watershed groups with

resources such as funding, technical assistance, and personnel (Collins et al. 1998, Steelman and Carmin 2002, Schott and Koontz 2002). Across the country, many millions of dollars have been spent on watershed management initiatives since 2000 (Koontz and Bowman forthcoming).

The growing popularity of collaborative watershed initiatives, and the public and private resources devoted to such efforts, suggests a need to understand how they function and interact with government. This paper describes a research proposal to generate such understanding. The research will be grounded in three bodies of literature: collaborative watershed management, common-pool resources, and collaborative environmental management.

## **Literature Review**

### *Collaborative Watershed Management*

With the growth of watershed partnerships, both in number and funding, scholars have begun to ask questions about the effectiveness of this approach to managing water. In a study of watershed partnerships in California and Washington, Leach et al. (2002) find that success in reaching agreements, implementing restoration projects, conducting educational efforts, and monitoring stream quality are positively correlated with group age. They argue that these groups typically need four to six years to attain a substantial number of successes in these areas.

In a review of the watershed partnership literature, Leach and Pelkey (2001) found that, across 37 studies examined, the most commonly cited keys to successful management were, in order: funding, effective leadership, committed partnership members with interpersonal trust, focused scope of activities, broad membership, low levels of conflict, agency staff support, well-defined decision rules, technical information, and consensus decision-making. Moreover, the authors found support for several variables from the Institutional Analysis and Development (IAD) framework as important contributors to success, including monitoring, well-defined

decision rules, technical information, leadership by local stakeholders, recognition by external authorities of the users' right to self-organize, ambitious in scope, and focused on specific, tangible issues.

### *Common-Pool Resources*

As new organizational forms emerge for watershed management, new communities of stakeholders collaborate, and power shifts away from government control, scholars and practitioners are searching to understand the implications of these initiatives and how to design them to generate desired outcomes. One potentially rich source of guidance comes from scholarship in common pool resource (CPR) management.

Hardin's oft-cited 1968 article "The Tragedy of the Commons" sparked widespread interest in collective action problems and CPR management. Following a set of assumptions about self-interest, communication, and resource ownership, Hardin modeled a case where strategic actors' rational decisions led to collective ruin. A few years earlier, Mancur Olson's (1965) insightful analysis of interest group formation had pointed to similar problems associated with individuals acting collectively, even when they shared interests. Both of these seminal works suggested a pessimistic view of the likelihood that individuals could manage their own affairs effectively. Hardin's argument, in particular, that an outside central authority was needed to impose sanctions on individual strategic behavior led to calls for greater government control over resource management (Ophuls 1973, Heilbroner 1974, Carruthers and Stoner 1981). At the same time, accounts of failed central government schemes to promote effective natural resource use were legion. Economists and other scholars argued that successful natural resource management would require free market mechanisms (Smith 1981, Baden and Stroup 1981).

In the 1980s, Elinor Ostrom began tackling the puzzle of self-governance across a wide range of common pool resources. She sought to understand how institutions affect the behavior

of individuals engaged in common pool resource use, and subsequent outcomes of such resource systems. To do so, she conducted a meta-analysis of CPR cases. By design, her data included studies of small-scale common pool resources with users who depended heavily on the resource for their livelihood and whose actions did not cause externalities for those outside the system. In such cases, she argued, resource users had a large stake in sustainable resource use, thus CPR management decisions were likely to be salient and thoughtful.

Like Hardin's herder example, Ostrom focused on small-scale, isolated systems. But unlike Hardin's case, Ostrom allowed for the possibility of collective problem-solving and self-organization to address CPR challenges. In fact, Ostrom's "design principles" for successful CPR management center on the community of resource users having primary decision-making authority over the resource. Since this community is highly dependent on sustainable use of the resource, there is ample incentive for affected users to spend the time and effort necessary to create and maintain institutions for successful CPR management, and groups sometimes are able to do so.

Ostrom's work provided substantial insight into regularities of human action for small-scale CPRs whose sustainability was salient to the community of resource users. Since her book was published in 1990, numerous scholars have extended Ostrom's ideas to larger, more complex CPRs such as ocean fisheries, forest ecosystems, and global climate. The 2000 meeting of the International Association for the Study of Common Property featured a wide range of papers captured in the edited volume by Dolsak and Ostrom (2003). This book includes empirical and theoretical results from studies of complex, large-scale CPRs embedded in economic, political, and legal environments. As shown in Table 1, several theoretical links are suggested.

Table 1: Theoretical Links from CPR Literature

1. Resources of smaller size, with stable and well-delineated boundaries, relatively small negative externalities, ease in monitoring stock and flows, moderate level of use, and well understood (by the users) dynamics are more amenable to being successfully managed
2. Users who trust each other and engage in repeated interactions over time tend to more successfully manage CPRs.
3. Rules that are devised by resource users and whose compliance is easy to monitor contribute to successful CPR management.
4. For CPR systems whose stocks and flows are hard to measure, whose dynamics depend on many factors, or whose use patterns quickly change, procedures for learning and revising rules are important for successful management.
5. For CPR systems that exhibit high complexity or extensive negative externalities, institutions at multiple levels that are connected can facilitate successful management.
6. External funders may provide valuable resources and lend legitimacy to user communities, but these resources may interfere with CPR management if the local community is not allowed to change the rules or if the funder imposes rules that do not correspond to the community's social customs, norms, and values.
7. External governmental entities that lack the resources necessary to enforce rules may transfer CPR governance to local communities. If this leads to reduced resources available to the communities, it may hurt CPR management.

These theoretical links recognize the multiple-scale, diverse, complex nature of many important CPR systems today. Several of these items (especially the first three) center on users as the primary decision-makers over management. But in the U.S., management authority over many CPRs, including watersheds, is not vested primarily in those who use the resource. Instead,

government regulatory authority at the federal, state, or local level may play a dominant role in establishing rules affecting the CPR. In contrast, resource users may have substantially less authority, and their ability to change rules may be indirect, through communicating with government officials who set the rules. Furthermore, shifting from “users” who directly use a CPR to “stakeholders” with an interest in the CPR (even without directly using it) further complicates questions about who should and does have a say in management. For example, a CPR may be used intensively by some but less intensively by others, perhaps living far away and not engaged in regular communication with other users. Thus the stakeholder community may not constitute a social community in the sense of frequent interactions or shared geographic space. In such cases, governmental actors might take a central role in coordinating input from a diverse array of stakeholders and in ultimately making decisions about managing the resource. Such an arrangement represents not user self-governance, but rather mediated governance through government officials who are not resource users.

I am interested primarily in the interface between stakeholders and government officials with jurisdiction over common pool resource management. In particular, my focus is on watershed management, which typically crosses multiple jurisdictional boundaries and involves a wide range of stakeholders with varying levels of concern about the resource.

### *Collaborative Environmental Management*

An area of inquiry that emphasizes the interface between stakeholders and government officials for resource decisions is collaborative environmental management (CEM). Following the evolution of citizen roles in government policy-making, CEM emerged in the 1990s as a popular approach to address environmental issues. Citizens pressed for expanded roles in environmental planning and implementation, seeking to generate greater understanding of complex environmental and human interactions. Rather than merely providing public input for



government officials to consider when making their decisions, CEM calls for shared authority and decision-making among government and private stakeholders.

CEM represents a substantial shift in government roles. Rather than the traditional roles of regulator, expert, or manager, government personnel are asked to become contributors to a shared community of interests. In fact, CEM efforts are often described as “bottom-up” or “grassroots” endeavors, suggesting the predominant role of citizens. However, CEM does not mean that governments withdraw from the scene. Except in rare cases, government retains primary authority over decision-making. Moreover, government personnel participate in deliberation with citizens, and governmental institutions and personnel provide the incentives and constraints that can powerfully shape collaborative efforts (Koontz, et al. 2004). Thus the increased stakeholder involvement inherent in CEM occurs within the context of governmental institutions and actors.

#### How Government Actors and Institutions Affect CEM

Prior research has sought to explain government roles in collaborative environmental management efforts. This research encompasses not only watersheds, but other resources such as forests, farmland, and species habitat. A recent theoretical framework suggests that government as actors and government as institutions both can affect collaborative efforts, through three primary sets of variables: issue definition (biophysical scale and issue framing), resources (human, technical, and financial), and structure and decision processes (group structure and decision-making processes), which in turn affect collaborative outcomes (Koontz, et al. 2004). These sets of variables are similar to the IAD framework, which emphasizes physical attributes, community attributes, and rules-in-use as affecting actions and patterns of interaction, which ultimately affect outcomes (Ostrom, et al.1994). Moreover, these sets include many of the

variables that Leach and Pelkey (2001) found to be key factors affecting watershed partnership success.

In addition to the CEM theoretical framework provided by Koontz, et al (2004), their comparative case analysis suggests several testable hypotheses about how government actors and institutions affect CEM processes and outcomes (see Table 2).

Table 2: Testable Hypotheses from Koontz, et al. (2004)

1. Government resources given to encourage collaboration impact not just resource levels, but also issue definition and group structure and decision-making processes.
2. Collaboration works in conjunction with existing governmental institutions, rather than as an alternative to these institutions.
3. CEM efforts led by governmental actors tend to have greater resources than do those led by non-governmental actors. At the same time, government-led efforts restrict the use of resources more than do CEM efforts led by non-governmental actors. This leads to more concrete, but also narrower and less creative, outcomes.
4. Shared government-citizen decision making in a CEM effort fosters trust, network-building, and participatory democracy.

#### How CEM Affects Government Policy

It is important to note the feedback loops involved in CEM. In addition to examining how governments affect CEM processes and outcomes, we can also examine how CEM process and outcomes affect government policy. Recent research on collaborative efforts explores how such efforts affect policy making by government officials. In one study, recommendations by collaborative farmland preservation groups led to visible policy changes in counties where the

farmland preservation issue was ripe for policy change (Koontz 2002). In other words, a local context of rapid development, growing citizen and elected official concern, and current land use plans promoted the adoption of collaborative planning recommendations into policy.

In a study of one collaborative watershed partnership, Korfmacher (2000) argued that group characteristics that encouraged widespread participation without binding commitments led to policy changes, as local government officials took ideas from watershed discussions back to their government positions and subtly changed their way of thinking and doing their jobs.

More recent research about collaboration provides additional clues. In a study of collaboration in federal rule-making, Weber (1998) concludes that collaboration is more likely to impact policy when all stakeholders with an interest in the issue are included in the deliberations. Cases in Brunner, et al. (2002) suggest several factors that facilitate policy adoption, including threat of an unpopular alternative being enacted if the collaborative recommendation isn't, agency officials possessing skills and incentives to seek the common interest over their own interest, and including diverse interests into a consensus so that the proposal isn't blocked by disaffected parties.

A related field of study, citizen advisory committees, sheds some light on the factors likely to impact government policy. Advisory committees are groups established by government agencies, comprised of citizens who deliberate to develop recommendations for agency decisions about particular issues. In a review of citizen advisory committee studies, Lynn and Busenberg (1995) found that committee selection procedures were correlated with the responsiveness of public officials to the committee's recommendations. Lynn (1987) also found that the existence of prior networks surrounding an issue, which could be mobilized to pressure for recommendations, was an important factor in policy adoption. Nelson (1990) reported that professional facilitation, consensus-based process, and independent grant support were key factors associated with the degree to which the state legislature adopted committee recommendations.

Such studies suggest several testable hypothesis about the circumstances under which CEM efforts can affect government policy-making. A number of factors are expected to be positively correlated with policy adoption of CEM recommendations (see Table 3).

Table 3: Factors Likely to Foster Policy Adoption of CEM Recommendations

1. Visible pressure on the resource
2. High citizen and elected official concern about the issue
3. Current institutional arrangements or plans in which the recommendations can be placed
4. Widespread participation of all stakeholders with an interest in the issue
5. Threat of an unpopular alternative being enacted if the collaborative recommendation isn't
6. Agency officials have skills and incentives to seek the common interest rather than narrow self-interest
7. Committee selection procedures that are "open" rather than closed
8. Existence of prior networks surrounding an issue

### **Research Objectives**

The proposed research has two primary objectives:

- (1) To discover design principles for government roles in successful CEM initiatives for watersheds as well as other common-pool resources;
- (2) To explain how collaborative watershed initiatives, and CEM initiatives more generally, affect government policy

For objective (1), the framework from Koontz, et al. (2004) will guide sets of variables to include in the analysis. This will allow testing of the hypotheses listed in Table 2. Following this framework (and numerous prior studies), success will be measured by both environmental and social outcomes. In addition, variables suggested by the CPR literature (Table 1) will be examined.

For objective (2), analysis will focus on the factors listed in Table 3.

## **Research Methods**

### *Phase I: Analyzing Empirical Data from Previous Studies*

This research will proceed with collection of published studies relating to CEM, especially collaborative watershed efforts, using the case survey method. The researcher and assistants will read and code each case in a manner linked to the theoretical framework described in Koontz, et al. 2004, with inclusion of variables suggested by the CPR literature and CEM studies.

The case survey method is one of several methods of drawing on previous studies for empirical data. These methods include meta-analysis, review of research, as well as case survey. The meta-analysis, perhaps best known in psychological and medical studies, seeks to determine a summary causal effect for a given independent variable (the treatment or exposure) on a dependent variable. Meta-analysis is a method argued to be particularly strong in testing the generalizability of causal constructs across settings (Matt 2003, Cook 2000), but it is applicable only to previous studies that are quantitative in design (Lipsey and Wilson 2000).

A less formal strategy of working with prior studies is to develop a review that summarizes prior findings, without attempting to rigorously code them or using statistical

analysis. Such a review of research does not permit quantitative analysis, but it does enable inclusion of qualitative studies in seeking themes and patterns from prior research.

The case survey method involves coding existing studies into quantified variables and quantitatively analyzing the coded data. The analyst “asks” a standard set of questions to each case study and codes the responses systematically (Beierle and Cayford 2002). This method is well suited to research areas where the empirical literature is largely populated with case studies (Yin and Heald 1975) and when the unit of analysis is the organization (Larsson 1993). The case survey strategy has several key strengths: combining the generalizability of survey research with the in-depth contextual knowledge of case studies; replicability through transparent coding schemes and case study data; ability to test patterns across a variety of study characteristics such as research design, publication status, and study age; and illumination of complex phenomena over time (Larsson 1993).

Larsson (1993) describes the case survey method as four sequential steps. First is selection of a relevant case data set. This step requires establishment of research questions, followed by defining the case selection criteria based on the theoretical domain of interest. Here it is important to be inclusive across publication status, time, and research design. Following Yin’s (1984) notion of theoretical replication, cases should be selected to ensure variability across the key variables of interest. Physically collecting the cases involves multiple search strategies (computer databases, experts, etc.) and sources (published journal articles, books, unpublished dissertations, conference papers, reports, etc.). As in quantitative sampling methodology, the number to be collected depends on the number of independent variables to be tested.

The second step is coding scheme creation. The coding document can be more or less detailed, with a trade-off between level of detail and inter-coder reliability. Typical coding categories include Likert-type scales (3-, 5-, or 7-point scales) and bivariate measures. Also suggested is a scale indicating the coder’s confidence level in his or her rating of the particular item, given the level of information provided by the case (Yin and Heald 1975).

The third step is case coding. At least two, and ideally more, raters should code each case, starting with a few pilot cases to calibrate ratings across coders. The majority of the raters should be those who are blind to the theoretical propositions being tested. Moreover, where available the authors of cases should participate in the coding, as they are most familiar with their own cases. A critical check on reliability is the calculation of interrater reliability, which can be done using the average pairwise percent agreement (APPA), which is “the number of pairwise identical codes divided by the total number of pair comparisons” (Larsson 1993, p. 1553). This method accounts for different numbers of raters across cases, but because it is sensitive to the number of levels available in a coding category (e.g., 3-point versus 5-point Likert-type scale), Larsson recommends calculating the APPA both before and after coding discrepancies have been discussed and scales have been collapsed where appropriate.

The fourth step is statistical analysis. Conventional bivariate and multivariate statistics such as correlations, t-tests, ANOVA, and regression analysis may be applied to the data set generated by the raters. Moreover, given the inclusive nature of the case selection (Step 1), it is valuable to check for differences across key case characteristics such as publication status, time, and research design. The statistical analysis results, along with the prior three steps, should be fully documented and reported for peer review.

While case surveys are not the modal strategy for social science inquiry, they have been used, along with reviews of research, to examine watershed partnerships (Leach and Pelkey 2001), citizen participation in environmental decision-making (Beierle and Cayford 2002), common pool resources (Ostrom 1990), ecosystem management (Grumbine 1994), irrigation systems (Tang 1991) and advisory committees (Lynn and Busenberg 1995). I propose to use the case survey method to examine prior studies of collaborative environmental management.

In the proposed study, cases will be collected that describe collaborative environmental management efforts, especially for watersheds, in the U.S. context. The burgeoning literature on this topic in the last decade should provide ample case material. Cases will be identified through

computer searches of articles, books, reports, conference papers, and dissertations, as well as through queries of scholars who have recently conducted such research. To be as inclusive as possible, and in recognition of the significant overlap in terms, I will query using not only the term “collaborative environmental management,” but also “community based environmental management,” “collaborative conservation,” “grassroots ecosystem management,” “participatory natural resource management,” “co-management,” “partnering,” “ecosystem management,” “stakeholder-based management,” and “stakeholder partnerships.” It is expected that at least 100 cases will be collected.

The coding scheme will be developed based on research questions derived from the literature. In particular, variables suggested by the Koontz, et al. (2004) theoretical framework as well as the CPR literature and CEM studies will be included. A computer spreadsheet or database will be developed so that raters can enter scores electronically. Most items will use a 7-point Likert-type scale, at least initially, with positions ranging from “very low” to “very high.” Pilot coding of several cases will provide suggestions for coding modification, including development of a coding guide with explicit definitions of coding values. In addition, raters will indicate their level of confidence for each assigned coding value.

Coding will proceed with the researcher, a research assistant, and several additional students participating. Pilot cases will be coded and discussed for calibration, and raters will follow the coding guide. Interrater reliability will be calculated using APPA, and discussions and scale collapsing will be used to maximize consistency while retaining a sufficient level of detail in the ratings.

Statistical analysis will include conventional methods to test for patterns in the data, including links between independent and dependent variables related to the research questions. Summary statistics will be provided as well (means, frequency counts, variance, etc). Further analysis will check for differences across study age, design, and publication status. In addition,



analysis will allow testing of patterns that fit watershed management collaborative initiatives to CEM initiatives more generally.

*Phase 2: Gathering new empirical data*

An inherent limitation in the case study approach is that the researcher is limited to what is reported in the original case studies. Thus a complementary research strategy that involves gathering primary data will be employed. In Phase 2, the researcher will conduct a multiple case study of collaborative environmental management to obtain rich data related to CEM efforts and their link to government. Each case in the case study will draw on a comparable set of data, and case selection will be based on Yin's (1984) concept of theoretical replication. This phase will involve at least two cases in Ohio, where the research assistant will be immersed in the setting for a substantial period of time. Interviews, document analysis, and observation will provide multiple sources of data for analyzing how governments affect collaborative watershed management efforts, and how such efforts affect government policy.

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