Collaborative Institutions in an Ecology of Games

Mark Lubell University of California, Davis
Adam Douglas Henry West Virginia University
Mike McCoy University of California, Davis

This article seeks to improve our understanding of policy institutions and cooperation by adapting Long's (1958) analysis of the ecology of games to the context of collaborative land use and transportation planning in California. The traditional institutional rational choice analysis argues that collaborative institutions reduce the transaction costs of cooperation among multiple policy actors. The ecology of games framework extends IRC by emphasizing the consequences of multiple institutions and identifies several reasons why collaborative institutions may actually reduce the amount of cooperation in existing policy venues. Analyses of survey data from policy actors in five California regions demonstrate that higher levels of cooperation in collaborative institutions are associated with lower levels of cooperation in other land-use and transportation planning institutions.

Collaborative institutions is one of the current buzzwords for solving collective-action problems in multi-actor settings. This article adapts Long's (1958) ecology of games (EG) framework to address a fundamental issue that is typically ignored by institutional rational choice (IRC) analyses of collaborative institutions—the existence of multiple institutions in a policy arena. IRC studies hypothesize that collaborative institutions have a positive effect on cooperation by reducing transaction costs and building social capital that should spread to other institutions (Lubell et al. 2002; Marshall 2005; Weber 1998). In contrast, the EG framework suggests that collaborative institutions may reduce the capacity of other existing policy games to produce cooperation. The empirical study explores these arguments in the context of collaborative land-use and transportation planning in California.

The IRC view of collaborative institutions has generated a body of research that does not adequately capture the reality that most collective-action situations involve multiple institutions. This literature consists predominantly of case studies of a single or a small number of isolated collaborative institutions (see Sabatier et al. 2005 for discussion). Only a few studies use large-N, comparative research designs and among these studies, few directly compare collaborative institutions to some other type of alternative institutional structure. For example, Leach, Pelkey, and Sabatier's (2002; see also Leach and Sabatier 2005) watershed partnerships project looks only at watersheds with partnerships, and not those without partnerships. Agrawal's (Agrawal and Goyal 2001; Agrawal and Ostrom 2001; Agrawal and Yadama 1997) series of important studies looks only at single resource management institutions in several countries, without direct analysis of other competing institutions in the same area. Lubell's (2003, 2004a, 2004b) National Estuary Program (NEP) study directly compares estuaries with and without a collaborative planning process, but fails to consider the rich institutional ecology in which individual NEP programs are embedded. Studies that focus on only single policy programs are ubiquitous in other policy areas as well and fail to recognize that policy outcomes are a product of decisions made in multiple institutions.

In contrast, the EG perspective assumes that policy outcomes emerge from actors pursuing their self-interests in multiple, interdependent, and rule-structured games taking place within a geographically defined policy

Mark Lubell is Associate Professor of Environmental Science and Policy, University of California, Davis, One Shields Avenue, Davis, CA 95616 (mnlubell@ucdavis.edu). Adam Douglas Henry is Assistant Professor of Public Administration, West Virginia University, P.O. Box 6322, Morgantown, WV 26506-6322 (Adam.Henry@mail.wvu.edu). Mike McCoy is Director of the Urban Land Use and Transportation Center, Institute of Transportation Studies, University of California, Davis, One Shields Avenue, Davis, CA 95616 (mcmccoy@ucdavis.edu).

American Journal of Political Science, Vol. 54, No. 2, April 2010, Pp. 287–300

 ISSN 0092-5853

arena.[1] Decisions made in one institution may generate positive or negative externalities for other institutions in a policy arena, by influencing either payoffs or strategies. Actors within individual games tend to ignore the potential cross-game externalities, and there are few institutional mechanisms to coordinate games. The uncoordinated nature of the individual games and actors is a recipe for the collective-action problems seen in land-use and transportation planning. Within any region, there are multiple public agencies, elected officials, local governments, and interest groups, each seeking to achieve their own particular objectives within multiple games such as city planning, regional transportation planning, environmental impact reporting, etc. These fragmented sets of "traditional"[2] planning institutions often lead to cumulative policy decisions that have negative effects for an entire region (e.g., increased air/water pollution, traffic, urban sprawl) or fail to engage in mutually beneficial policies (e.g., building a highway project that serves multiple jurisdictions).

Collaborative institutions are viewed as potential solutions to these types of collective-action problems and provide a useful laboratory for studying the IRC and EG arguments. Collaborative institutions are typically defined as inclusive decision processes that bring together multiple stakeholders, help build networks and trust, and emphasize consensus decision procedures and voluntary compliance. The relatively recent and widespread appearance of collaborative institutions both in the United States and internationally has provoked a thriving research agenda (O'Leary, Gerard, and Bingham 2006; Sabatier et al. 2005), but there is no agreement about whether these institutions are effective. We study collaborative land-use and transportation institutions in five regions of California: Merced County, the Sacramento metropolitan area, San Diego County, Riverside County, and Amador, Alpine, and Calaveras counties in the Sierra Nevada foothills (the Tri-County region). High population growth rates in these regions have created collective-action problems among stakeholders attempting to satisfy new transportation demands, provide economic development opportunities, meet environmental goals, and otherwise manage common resources. Collaborative institutions have emerged in each region with the goal of integrating land-use and transportation planning, increasing cooperation, and resolving conflict among the policy actors involved in these issues.

The next section provides a more detailed comparison of the IRC and EG frameworks to motivate some empirically testable hypotheses about how collaborative institutions affect cooperative behavior and attitudes among land-use and transportation stakeholders. The empirical analysis uses survey data from 752 stakeholders to estimate the marginal influence of collaborative institutions on cooperation throughout the ecology of games, taking into account participation in other types of policy games. In contrast to the positive role of collaborative institutions posited by most IRC analyses, the results suggest there are potential negative interactions between collaborative institutions and cooperation in other policy venues.

Theoretical Approaches to Collaborative Institutions

The IRC and EG frameworks offer alternative predictions about how collaborative institutions will influence cooperation in a multi-institutional setting. The central empirical question to be addressed is: what is the marginal effect of collaborative institutions for improving cooperative attitudes (fairness, policy satisfaction) and behaviors (cooperative policy implementation) relative to other ongoing policy games? The answer to this question hinges on whether or not individual participation in a collaborative institution increases or decreases cooperation throughout the ecology of games. From an empirical modeling standpoint, this means analyzing interaction effects between participation in the collaborative institution and participation in traditional land-use and transportation games, so that the effects of the collaborative institution are conditional on participation in other games. The following sections discuss how the IRC and EG frameworks address this question and whether they should be considered competing or complementary theories.

[1] We treat the terms *policy game, policy institution*, and *policy venues* as synonyms because they all refer to interactions among actors guided by rules (e.g., consensus versus voting, which actors can participate) about how collective decisions are made. The process of interaction that occurs in a given institution could also be referred to as a policy or planning process, which are the terms normally used in the vernacular of real policy actors.

[2] The term *traditional* is used here because these types of institutions have historically been the primary method of land-use and transportation planning in California and most of the United States. Local government planning is the oldest type, with environmental and regional transportation planning emerging later and often as constraints on local government decisions. Collaborative planning institutions are the most recent type of institution and have evolved to try to coordinate the fragmented nature of the existing ecology of games. The evolution of land-use and transportation planning from isolated local governments to collaborative institutions is a story unto itself, and the evolutionary processes driving such phenomena need further theoretical and empirical scrutiny.

Collaborative Institutions and Institutional Rational Choice

The IRC label encompasses Ostrom's Institutional Analysis and Development Framework (E. Ostrom 1999), transaction cost approaches to institutions (North 1990), and what is generally referred to as neoinstitutional economics. IRC has become the dominant framework in political science for understanding institutions and cooperation (Moe 2005). The core argument of IRC is that institutions reduce the transaction costs of negotiating, enforcing, and monitoring cooperative agreements (North 1990). Institutions can thus increase social welfare by helping secure the efficiency gains of cooperation. From the normative perspective, this argument leads policy analysts to recommend institutions that they believe reduce transaction costs. The argument also drives social science hypotheses that institutions should evolve to minimize transaction costs (Alchian 1950; Lubell et al. 2002).

Applied to collaborative institutions, IRC begins with the assumption that policy stakeholders are attempting to solve collective-action problems that occur when two or more interdependent actors make decisions that ignore social costs and benefits. For example, in the context of transportation and land-use planning, there are many interrelated issues such as road systems, patterns of housing development, and habitat quality. The policy actors involved with these issues, such as local governments and state transportation agencies, make independent decisions that fail to take into account the consequences for other actors. When all actors in a region ignore the social consequences of their individual management decisions, the resulting fragmentation can produce overall inefficient outcomes for the entire region. Along with such inefficiencies comes a high level of conflict as different stakeholders attempt to secure their most preferred outcome through administrative, legislative, or legal processes.

Collaborative institutions are hypothesized to be a mechanism for creating cooperation among all of these stakeholders. They reduce transaction costs by providing a venue for developing a common understanding of the issues, gathering information about the consequences of different decisions, and building policy networks and trust among the actors. The success of collaborative institutions can be evaluated in the short term by observing increases in cooperative behavior such as joint research projects and shared implementation activities and also by increases in cooperative attitudes such as overall satisfaction and perceived fairness of existing policies. Because collaborative institutions reduce transaction costs, these indicators of cooperation should not be limited to the specific collaborative institution, but should also increase in the other policy games in a particular arena. For example, if trust among policy actors increases due to interaction in the context of a collaborative institution, or new scientific information clarifies complex causal relationships, the benefits should spread to other policy games like city/county planning where the same actors may be making decisions over the same issues. The following hypothesis summarizes the standard IRC argument:

IRC Hypothesis: Participation in a collaborative institution increases the capacity of other existing institutions to produce cooperative attitudes and behaviors.

Collaborative Institutions in an Ecology of Games

Our adaptation of the ecology of games framework relies on four main concepts: policy issues, policy actors, policy games, and policy arenas. Policy issues involve some type of substantive collective-action problem such as water pollution, air pollution, traffic congestion, or loss of biodiversity. The strategic structure of these collective-action problems is the same as the IRC framework—payoffs from using resources are interdependent, actors ignore the social costs of their decisions, and equilibrium outcomes are often inefficient. The EG framework adds the complication that issues may be interconnected through biophysical, economic, or social processes, so decisions made in the context of one issue may directly affect payoffs in other issues. Policy outcomes depend on how individuals make decisions regarding the resources involved with each issue, for example, the amount of agricultural land converted to urban land in rural California or the amount of habitat lost when a new road is built.

Policy games are "arenas of competition and cooperation structured by a set of rules and assumptions about how to act in order to achieve a particular set of objectives" (Dutton 1995, 381). Political decisions made within each game directly affect policy implementation and resulting resource allocations. In Ostrom's (1999) terminology, policy games are "collective-choice" institutions that produce "operational" rules governing individual issues. Each individual game derives its authority from some type of legislative, administrative, or judicial decision made at higher levels of the political system. Policy games typically have jurisdiction over multiple issues at a given time, and hence conversely policy issues are linked to multiple games. For instance, city planning might address land-use

and biodiversity, and biodiversity is also affected by water resources planning and state parks legislation. These interconnections increase the likelihood of decisions in one game affecting payoffs in other games.

Policy actors have some "stake" (hence the policy vernacular term *stakeholder*) in the outcomes of policy games and the resulting rules governing specific issues. Policy actors could be individual resource users like farmers or fishermen, or political actors like agency officials, interest groups, or elected officials. The exact nature and magnitude of the stakes may vary across different policy actors—fishermen care about the fish populations and catch limits, bureaucrats care about budgets, politicians care about votes, and interest groups care about members and funding. Actors participate in policy games with jurisdiction over issues they care about and also form networks with others actors in order to gain key political resources like information, credibility, and political influence (Berardo and Scholz 2010). The central focus of this article is how participation in different policy games affects individual actors' levels of collaboration and cooperative attitudes.

Policy arenas are territorially defined subsystems that encompass multiple issues (e.g., water pollution and air pollution), multiple games (e.g., city planning, state transportation planning), and multiple actors (e.g., local governments and interest groups). In our research, the policy arenas are metropolitan regions consisting of single or multiple counties. These regions are trying to solve a variety of policy issues involved with land-use and transportation planning. Multiple games exist in each region, and the empirical study operationalizes these games as city and county planning, transportation planning, environmental review processes, natural resources planning, planning commissions, and city council/county board meetings. These games, together with the collaborative institution that exists, constitute the set of governance institutions at hand in each region. Each game provides different opportunities for involved actors to acquire resources and achieve their policy goals. The set of governance institutions may succeed or fail in facilitating cooperation and solutions to regional collective-action problems. For example, if one is interested in the overall level of biodiversity (a common-pool resource) or the efficiency of transportation systems (a public good) in a region, then all of these games should be considered.

The linkages among issues, games, and actors are likely to be dynamic and change over time, and such dynamics are a critical topic for future research. An important aspect of collaborative institutions is that they usually do not absorb policy activities from previously existing venues. For example, in the collaborative regional land-use and transportation institutions that we study, local governments continue to make key land-use decisions and federal transportation funding is allocated through existing formulas developed by other regional institutions. Collaborative institutions may influence decision making in other policy games by increasing the quantity and quality of information, clarifying common objectives, building social capital (i.e., networks and trust), and providing grant funding that might not be available in other games. In some cases, collaborative institutions are designed to reduce the conflict associated with the regulatory role of state and federal laws like the Endangered Species Act (ESA), but the resulting decisions still require compliance from local governments or other actors. These potentially positive results of collaborative institutions are the basis for the standard IRC hypothesis.

The EG framework offers four possible reasons—increased transaction costs, venue shopping, symbolic policy, and limited attention—for an alternative hypothesis:

EG Hypothesis: Participation in a collaborative institution reduces the capacity of other existing institutions to produce cooperative attitudes and behaviors.

The EG framework suggests that collaborative institutions may increase rather than reduce transaction costs because they constitute a new game overlaid on all of the prior "traditional" games. If successful governance requires developing cooperative relationships throughout the ecology, there may be budget constraint on cooperation that is strained by the introduction of any new game. This idea is supported by the oft-heard complaint from practitioners that collaborative institutions are "unnecessary" bureaucracy that takes too much time and resources away from other projects.

Some actors and groups view collaborative institutions as an opportunity for strategic venue shopping and select to participate in games that increase the chance of realizing their policy goals. For example, many environmental interests accuse collaborative institutions as being a compromise to economic interests and feel their interests are best protected by existing "command-and-control" institutions. Other actors may view the voluntary nature of collaborative institutions as a way to reduce regulatory requirements. Actors may choose to participate in a particular institution to obtain bargaining power that will help them secure a greater relative share of any gains from cooperation (Knight 1992). Those actors that prefer collaborative institutions to traditional processes will spend more energy developing cooperation in the new venue and move away from the other games. This

type of self-selection may cause cooperation to migrate away from existing games, although the limited authority of collaborative institutions may be a disincentive for switching games.

The increased transaction costs and venue selection arguments are still consistent with the IRC *framework* because they are based on rational choice. But these arguments question the standard IRC *hypothesis* about collaborative institutions by forcing the analysis to take seriously the existence of multiple games. The IRC is certainly not averse to the concept of multiple institutions. In their classic article, Ostrom, Tiebout, and Warren describe multiple institutions as "polycentric" governance where different local government units within a metropolitan area provide different mixtures of public goods and conflicts are resolved by a "variety of informal arrangements. . .for negotiating basic policies" (1961, 841–42). Collaborative institutions fit squarely into the idea of negotiating common benefits through informal arrangements, and the standard IRC hypothesis is that such negotiations will reduce transaction costs and levels of cooperation throughout the polycentric system. In contrast, the EG framework recognizes that multiple games strain resources and provide opportunities for strategic venue shopping.

In addition to these rational choice considerations, the EG framework questions the efficacy of collaborative institutions on the basis of political psychology. Collaborative institutions can function similarly to what Edelman (1971, 1985) calls "symbolic policy," which produces policy agreements that quell political discontent without alleviating underlying collective-action problems. Consistent with the symbolic policy argument, Lubell (2004a) finds that policy actors in estuaries that are included in the collaborative National Estuary Program (NEP) have higher levels of consensus but the same levels of cooperation as estuaries outside the NEP. If collaborative institutions serve as an "emotion-satisfying symbol" (Edelman 1985, 31), then any resources spent engaged in such games may reduce cooperation by deflecting attention away from underlying problems.

The limited attention resources of political actors prevent them from simultaneously tracking activities in every game (Jones and Baumgartner 2005; Kahneman 1973; Liu and Jones 2005). Thus, there may be "payoff externalities" where actors are completely unaware of how their decisions and actions in one game affect their opportunities and outcomes in other games. There may also be "strategic externalities" where cognitive constraints cause strategies played in one game to affect strategies in other games, even though the optimal choice in each game would be two separate strategies (Bednar and Page 2007). Thus, by focusing attention on the new collaborative institution, actors may not recognize how their behaviors are negatively affecting patterns of cooperation in other games.

The research presented here cannot distinguish which of these four arguments is most important for analyzing the ecology of games. The relevance of the different ideas depends on which "model of the individual" is used as a theoretical assumption about how actors make decisions (Schlager and Blomquist 1995). Further theoretical development in the ecology of games framework requires specifying whether the IRC's "bounded rationality" assumption or a more "psychological" or "behavioral" model of the individual is appropriate. Maintaining the IRC model of the individual requires revising that framework to properly account for multiple games. For example, Tsebelis (1990) shows how game theory can be used to analyze behavior in networks of "nested games," where the optimal strategy in a single game will often change when an actor considers multiple games.

A more psychological model may call for developing a new and competing EG theory that incorporates behavioral approaches to individual decision making such as Payne, Betteman, and Johnson's (1990) adaptive decision maker. Bednar and Page's (2007) "game(s)" theory formalizes the cognitive constraints on individual strategies, but still relies on an optimization framework. Another promising avenue is agent based and computational approaches that incorporate diverse models of individual decision making and utilize concepts from complex adaptive systems (Miller and Page 2007). Complex adaptive systems are well suited to understanding the emergent patterns of cooperation, attitudes and networks that exist in policy systems featuring multiple collective-action problems, multiple actors, and multiple governance institutions with overlapping jurisdictions (Connick and Innes 2003).

These considerations place a greater burden on future empirical research, which should seek to identify the conditions under which collaborative institutions have a negative versus positive effect on cooperation, delineate the possible reasons for a negative effect from the four arguments (increased transaction costs, venue shopping, symbolic policy, limited attention) considered here, and invent ways for empirically differentiating between rational and psychological models of decision making in the field. The contribution of this article is to direct attention to the importance of analyzing multiple games and provide some empirical evidence that challenges the standard IRC hypothesis about collaborative institutions.

The Ecology of Transportation and Land-Use Planning in California

Table 1 summarizes the five regional, collaborative land-use and transportation planning institutions analyzed in this article, including the primary authoritative decisions that were the output of the planning processes. These collaborative institutions are designed to respond to state and federal transportation law and to alleviate the collective-action problems that occur when local jurisdictions make independent land-use and transportation decisions, ignoring regional costs/benefits and linked policy issues. These are exactly the types of collective-action problems predicted by the ecology of games perspective when actors attend only to the outcomes of a narrow, particular game. In practical terms, the collaborative institutions seek to integrate expenditures and implementation procedures for transportation, urban development, and conservation projects. For instance, the San Diego Association of Governments uses the proceeds from a half-cent sales tax increase to acquire land identified by the habitat plan as suitable for mitigating the impacts of regional transportation projects. Every collaborative process studied here has similar examples.

Many of the collaborative processes are centered on Councils of Government (COGs), Metropolitan Planning Organizations (MPOs), or Regional Transportation Planning Agencies (RTPAs). Each of these is a regional institution that attempts to coordinate across multiple local governments on a variety of issues. COGs are voluntary associations of city and county governments, with boards of directors consisting of elected officials from member jurisdictions. The main function of COGs is to assist member local governments with regional planning for issues of multijurisdictional interest. Along with a variety of information and data analysis services, COGs often formulate specific policy recommendations to be considered by member governments. However, COGs play a strictly advisory role in planning, and the member governments retain all authority for land-use planning.

MPOs and RTPAs both exist to distribute transportation funding to regional and local needs, with MPOs largely handling federal funding and RTPAs predominantly state funds. Transportation plans are the key policy instrument of these regional organizations; funding will only flow to approved plans. MPOs exist only in larger metropolitan regions; there are 12 single-county MPOs, and four multicounty MPOs in California. California RTPAs are statutorily required to create Regional Transportation Plans (RTPs) for the area of their jurisdiction every three years in urban areas and every four years in nonurban areas. These RTPs serve as guidelines for the distribution of state transportation funds to local and regional projects. In regions with MPOs, such as Merced, RTPA and MPOs are combined into the same planning institution. In regions without MPOs, such as the Sierra Tri-County area, RTPAs are the only regional transportation planning agencies. Also, in cases like Sacramento, the COG, RTPA, and MPO are all combined into a single planning entity.

While COGs, MPOs, and RTPAs are the closest thing California has to regional planning institutions, local land-use planning remains the exclusive domain of California's 480 incorporated cities and, for unincorporated land, planning is the domain of its 58 counties. The only real authority of MPOs and RTPAs comes from the development and approval of regional transportation plans and the distribution of state and federal transportation funds. Along with regional planning entities and local government planning, land-use and transportation decisions are also affected by environmental impact statement/review requirements, natural resources planning under laws like the Endangered Species Act (ESA), and a variety of other environmental and resource laws and rules. Each law or rule generally determines who can participate in the games, and what types of policy issues are subject to collective decision making.

Habitat Conservation Planning (HCPs) under the ESA plays a key role in the Riverside and San Diego collaborative institutions. HCPs identify conservation lands and mitigation measures that must be implemented in order to protect endangered species. Local governments are supposed to comply with the conservation plan in order to grant permits for new development. HCPs thus tend to be controversial because they exert regulatory control over local decisions. In the cases of Riverside and San Diego, the HCPs were developed in coordination with other transportation and land-use plans with the goal of integrating decision making, avoiding conflict, and enhancing cooperation.

The key insight of the ecology of games perspective is that collaborative institutions cannot be understood in isolation from all of the other traditional planning processes in each region, and actual outcomes of land-use and transportation planning emerge from a very large ecology of games. For example, the outcome of a regional road building project is affected by existing transportation plans developed in a statewide planning process, the land-use plans of local governments in whose jurisdiction the road will go, and a variety of environmental requirements originating at the federal, state, regional, and local levels. These same sets of games will affect many other infrastructure or environmental projects in the same region.

TABLE 1 Summary of Five Regional, Collaborative Land-Use and Transportation Processes in California

Name	Summary	Authoritative Decisions
Merced County Project for Integrated Planning	Began in 2002 as a result of an interagency agreement between the Merced County Association of Governments and several state and federal agencies.	Resulted in regional transportation impact fee assessment for new development. Funding used for regional transportation projects consistent with regional plan.
The Tri-County Memorandum of Understanding	Began in 2005 when the California State Department of Transportation proposed that a collaborative transportation planning effort including land-use considerations be undertaken by the Regional Transportation Planning Authorities in Alpine, Calaveras, and Amador counties. Built on several previous revenue-sharing Memorandums of Understanding.	Revenue-sharing MOUs identify regional priority projects for distribution of pooled state transportation funding.
Sacramento Council of Governments (SACOG) Blueprint Process	Began in 2000 when the Sacramento County Council of Governments instructed its staff to develop a land-use plan in conjunction with the update of the Metropolitan Transportation Plan required by the federal government. The collaborative nature of the process was in response to local government and environmental criticisms of previous planning efforts.	Transportation plan manages spending of regional transportation funding. Awards planning grants to cities and counties undertaking studies of development consistent with the regional Blueprint plan.
Riverside County Integrated Project	Began in 1998 with the drafting of a multi-stakeholder "vision statement" accompanying the update of the Riverside County General Plan. The integrated project then evolved to encompass the county general plan, a habitat conservation plan, and a transportation plan. These plans were completed in 2003.	Transportation plan manages spending of regional transportation funds; General Plan identifies desired land uses throughout the county; Habitat Conservation Plan identifies conservation lands acquisitions and mitigation measures for protection of endangered species.
San Diego Association of Governments North County Multiple Habitat Conservation Program	Began in 1997 when San Diego County adopted a Multiple Species Conservation Program under the auspices of the Federal and State Endangered Species Acts. The conservation planning efforts explicitly consider land-use and transportation issues associated with urban growth. Ongoing collaborative planning efforts are focused on the North County subregion.	Habitat Conservation Program identifies conservation lands acquisitions and mitigation measures for protection of endangered species. Mitigation and monitoring is coordinated with expenditures on regional transportation projects.

These games are at best loosely synchronized across the physical and legal landscape of a particular region, leading to the types of collective-action problems and unintended consequences described by the ecology of games.

Many different actors participate in these games, ranging from state agencies like the California Department of Transportation, to local government officials, to environmental and economic development interest groups. Most of these actors participate in more than one policy game, and each game provides opportunities for stakeholder participation, requires information gathering from other actors, and sometimes mandates coordination from other agencies. In other words, all of the traditional policy games have multiple opportunities for cooperation and political discussion, not just the collaborative institution. The ecology of games essentially constitutes the set of governance institutions in these regions, and these governance institutions may succeed or fail in solving regional collective-action problems.

Survey Research Design and Empirical Analysis

We conducted an Internet/telephone survey of land-use and transportation stakeholders in all five study regions from March 2006 to June 2007.[3] The survey population consisted of participants in the respective collaborative process, all stakeholders in the region identified as participants in Environmental Impact Statements in the California Environmental Quality Act database, and all planning staff/elected officials from city and county governments within the region. The sample frame sought to encompass the broad range of policy actors associated with the entire land-use and transportation planning ecology of games, not just those involved in the collaborative institution as is frequently done in other research. There was a total of 752 respondents, with response rates of 46% (127) respondents for Merced, 41% (111 respondents) for Tri-County, 25% (116 respondents) for Riverside, 42% (291 respondents) for Sacramento, and 30% (107 respondents) for San Diego.[4]

To test the IRC and EG predictions, we estimate regression models with individual-level cooperative attitudes and behaviors as the dependent variables and measures of participation in the collaborative institutions and other policy games as the main independent variables. Interaction effects between collaborative policy participation and traditional policy participation are the main theoretical focus of these models, because they show how the marginal effect of participation in the collaborative institution is conditional on participation in the other games. The standard IRC hypothesis predicts a positive interaction, while the EG hypothesis predicts a negative interaction.

Measurement of Cooperative Attitudes and Behaviors

Three different types of cooperative attitudes and behaviors serve as dependent variables related to the effectiveness of collaborative policy: cooperative policy implementation, perceived policy fairness, and policy satisfaction. Following the EG framework, these questions are asked about land-use and transportation policies in general within a particular region, which can be affected by all of the games and not just the collaborative institution.[5] The empirical models can thus estimate the marginal influence of participation in different games on the overall indicators of cooperation within a region.

Cooperative implementation ranges from [0–7] and sums the number of "yes" answers from a list of seven joint policy implementation activities identified by Bardach (1998) as indicators of "interagency collaborative capacity": sharing information/data, sharing personnel, joint research projects, joint grant/funding proposal, joining an interagency task force, signing a Memorandum of Understanding, or sharing permitting activities. The attitude scales consist of averaged responses to multiple 7-point Likert questions. Perceived fairness is a

[3]The research occurred in three phases. The first phase (3/06–5/06) collected data in Merced and Tri-County. The second phase (9/06–11/06) collected data for SACOG, San Diego, and Riverside. The third phase (5/07–6/07) contacted a small number of respondents for SACOG, San Diego, and Riverside who were identified as policy stakeholders by initial survey respondents but were not on our original sample list. The respondents were first contacted by email, and then nonrespondents were contacted via telephone. Some of the nonrespondents opted to complete the survey on the Internet, while others completed a telephone interview.

[4]The lower response rates in Riverside and San Diego can be attributed to the 2003 completion of the planning effort in Riverside and the fairly narrow focus on the North County area of San Diego. One of the future challenges of research using the EG framework will be to construct surveys that remain relevant to respondents, who are normally more motivated when the survey focuses on a narrow, identifiable, and ongoing policy process.

[5]The questions were prefaced with "Based on your experience with regional land-use and transportation planning issues, please provide us your opinions on the following questions." These questions were asked without any references to a specific collaborative institution; questions about the specific collaborative institution came later in the survey.

three-item scale (Cronbach's alpha = .65) that asks respondents to rate the overall fairness of regional policies, how well their interests are represented, and whether or not their participation influences outcomes. Policy satisfaction is a three-item scale (Cronbach's alpha = .79) that asks whether existing policies will resolve regional problems, have effective leadership, and generate innovative solutions.

Measurement of Policy Game Participation and Control Variables

The most important independent variables measure the frequency of participation in collaborative institutions and other policy games in each region. *Collaborative institution participation* sums the number of "yes" answers (Cronbach's alpha = .91) from a list of 11 different planning activities specifically associated with the collaborative institution in each region, such as speaking with representatives, reading materials, going to meetings, writing plan alternatives, participating in vision exercises, commenting on decision documents, etc. The collaborative participation variable is differentiated from cooperative implementation because it measures activities associated with planning (i.e., collective choice) rather than implementation efforts. To facilitate interpretation, this scale is normalized to range from 0 to 1.

The frequency of participation is coded (1 = Never, 2 = Annually, 3 = Quarterly, 4 = Monthly, 5 = Weekly, 6 = Daily) for six traditional policy games: environmental review processes, city/county planning, transportation planning, natural resources planning, local planning commissions, and county board/city council meetings. *Traditional planning participation* is constructed using the following formula, where N = number of processes available in the region and the denominator is the maximum frequency of participation minus one:

$$\sum_{1}^{N} (frequency_i - 1)/5.$$

This summation creates a scale (Cronbach's alpha = .79) ranging from 1 to N that is then normalized to [0–1]; thus, a score of one equals a respondent who participated daily in all traditional processes.

Following the Advocacy Coalition Framework's (Sabatier and Jenkins-Smith 1993) arguments about the relationship between belief systems and policy perceptions, four measures of political values serve as control variables: environmentalism, economic conservatism, inclusiveness, and smart growth values. *Environmentalism* is a three-item scale (Cronbach's alpha = .77) derived from Dunlap and colleagues' (2000) New Ecological Paradigm battery. *Economic conservatism* is a four-item scale (Cronbach's alpha = .66) measuring whether the respondent believes government should not interfere with private property rights. *Inclusiveness* is a three-item scale (Cronbach's alpha = .53) measuring preferences about the appropriate breadth of public participation in policy, with higher values indicating a broader range of interests. *Smart growth* is a five-item battery (Cronbach's alpha = .67) measuring agreement with five smart growth principles: affordable housing, livable communities, cultural diversity, in-fill development, and alternative transportation.

Also included are single agree-disagree questions adapted from more general studies of political behavior and participation. *Trust in government* asks whether or not government can generally be trusted to do what is right. *Trust in people* asks whether or not people generally can be trusted. *Internal political efficacy* asks whether the respondent feels well qualified to participate in politics, while *external political efficacy* focuses on whether or not people have any say in government decisions.

Different types of government agencies or stakeholder types may also have different opportunities, constraints, and mandates for collaborative activities. Thus, the analysis includes dummy variables for state government, local government, social interest groups, or economic interest groups. Social interest groups include environmental groups, and economic interest groups include land developers and real estate interests; these two categories of groups are typically at the heart of land-use and transportation conflicts. Federal government respondents are the baseline category in the regression analyses.

Regression Analysis: The Marginal Effects of Collaborative Institutions

Table 2 begins the analysis by showing the frequency of participation in the six traditional policy games and the collaborative institution, as well as the correlation between participation and the measures of cooperation. Respondents participate on average somewhere between quarterly and monthly in traditional planning institutions, with the frequency a bit lower for planning commissions and council/board meetings. They participate somewhat more than annually in the collaborative institution, with an average of 3.38 specific collaborative institution activities. These results suggest that participation in the collaborative institution is not part of the regular job activities of most policy actors.

The correlations provide the first evidence that while collaborative institution participation is associated with more positive policy outputs, so are the traditional

Table 2 Venue Participation Frequency and Relationship to Policy Outputs

	Mean Participation Level	Percentage of Regular Participants	Cooperative Implementation Activities	Policy Satisfaction	Policy Fairness
Environmental Review Processes	3.64	56.91%	.22	.18	.19
City/County Planning	4.02	66.20%	.13	.26	.25
Transportation Planning	3.21	48.80%	.24	.36	.30
Natural Resources Planning	3.48	53.06%	.28	.15	.16
County Board/City Council Meetings	2.69	38.96%	.13	.20	.20
Planning Commission	2.36	30.72%	.05(NS)	.17	.13
Collaborative Institution Frequency	2.70	36.04%	.35	.38	.35
Collaborative Institution Activities	3.38	N/A	.25	.17	.25

Notes: Cell entries in Column 2 are average scores for frequency of participation in policy venues as measured on a 6-point scale (1 = Never, 2 = Annually, 3 = Quarterly, 4 = Monthly, 5 = Weekly, 6 = Daily) and collaborative process activities selected from a checklist of 11 options. Regular participants are defined as having at least monthly participation. Columns 3 through 6 show correlations between venue participation scores and policy outputs. All correlations are significantly different from zero at $p < .05$ except where noted (NS).

planning venues. All the traditional venues except planning commissions are positively correlated with cooperative implementation, and all of them have a positive effect on perceptions of policy fairness and satisfaction. Cooperation is not limited to a particular institutional structure that has the label of collaborative planning—effective governance most likely requires cooperation throughout the ecology of games.

Table 3 provides a more robust analysis with random intercept regression models for all three of the dependent variables, combining data for all regions and including the control variables. The random intercept models control for unobserved differences across the regions in the mean levels of the dependent variables, and robust standard errors are included to guard against heteroskedasticity.

Most importantly, the Table 3 models contain an interaction term between traditional and collaborative institution participation in order to estimate any positive or negative feedback. With the interaction term included, the slope coefficients for traditional and collaborative institution participation should be interpreted as the marginal effect of participation in that particular institution when participation in the other institution is zero. The results confirm that both types of institutions have some positive influence on cooperation. When participation in traditional processes is zero, then collaborative institutions do indeed have a positive marginal effect on cooperative implementation, perceived fairness, and policy satisfaction. At the same time, when participation in the collaborative institution is zero, then traditional planning processes increase the level of cooperative implementation, policy satisfaction, and fairness.

However, the interaction term in all three models is negative, statistically different from zero at conventional levels, and large in magnitude. As participation in the collaborative institution increases, the positive relationship between traditional processes and cooperative attitudes/behaviors decreases. The interaction effect can also be interpreted in reverse: as participation in traditional processes increases, the marginal positive influence of participation in the collaborative institution decreases. The *negative* interaction is consistent with the EG framework but is not predicted by standard IRC argument or by the more general literature on collaborative institutions.

A more detailed picture of the interaction effects is provided by analyzing the data separately for each region. IRC theories, rightly understood, are concerned with matching the appropriate institutional structure to the particular circumstances of a given collective-action problem. Thus, it may be the case that regions in which circumstances are favorable will have positive interactions between collaborative institutions and traditional processes, while in other cases there may be negative effects. For example, SACOG is discussed as the leading example of collaborative planning in California, and thus might have a positive interaction effect, while the narrower and conflictual process in San Diego might have a stronger negative interaction effect.

To test this possibility, separate regression models for each region are estimated using the same exact variables as in Table 3.[6] Figure 1 summarizes these results by plotting for each region the size of the collaborative institution regression coefficient on the x-axis and the size of the

[6]This is basically like a random coefficient model for the interaction and collaborative process coefficients, but a random coefficient model failed to converge when it contained the interaction effect. We thus estimate each region separately.

TABLE 3 Random Intercept Models of Policy Outputs

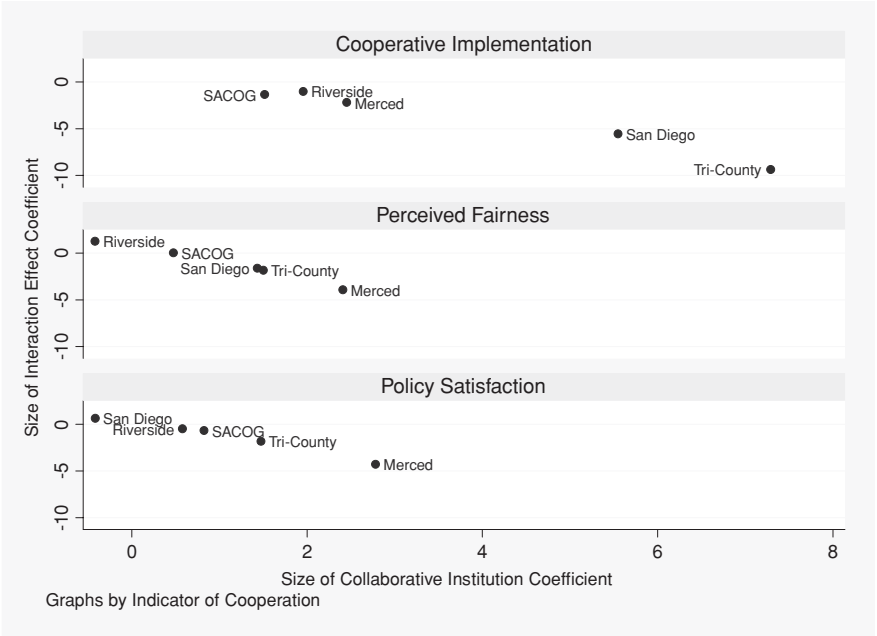
	Cooperative Implementation	Perceived Policy Fairness	Policy Satisfaction
Policy Game Participation			
Traditional Policy Processes	2.31(.43)*	1.05(.24)*	.53(.24)*
Collaborative Institution	2.88(.65)*	1.32(.38)*	1.41(.41)*
Interaction: Traditional × Collaborative Institution	−2.82(1.00)*	−1.49(.60)*	−1.72(.66)*
Policy-Core Beliefs			
Environmental Values	.03(.06)	−.07(.04)^	−.06(.04)
Inclusiveness	−.10(.08)	.07(.06)	.16(.06)*
Economic Conservatism	−.003(.07)	.02(.04)	.05(.04)
Smart Growth	.02(.10)	−.04(.06)	.09(.06)
General Political Attitudes			
Trust in Government	.14(.05)*	.13(.03)*	.20(.03)*
Trust in People	−.02(.06)	.09(.03)*	.05(.04)
Internal Political Efficacy	.09(.04)^	.07(.03)*	.05(.03)
External Political Efficacy	.17(.05)*	.15(.03)*	.10(.04)*
Organization Type (Federal government is baseline)			
State Government	.39(.22)^	−.19(.13)	−.09(.13)
Local Government	−.64(.18)	−.12(.10)	.07(.11)
Social Interest Group	.04(.29)	−.22(.14)	−.25(.17)
Economic Interest Group	−1.00(.28)*	−.08(.16)	.14(.18)
Model Fit Statistics			
Constant	3.14	3.06	1.49
F	11.71*	12.52*	8.56*
R^2	.19	.24	.19
σ_u (intercept)	.19	.14	.29
σ_e (residual)	1.85	1.06	1.16
Rho (Fraction of variance from u_i)	.01	.02	.06

Note: Table entries are unstandardized slope coefficients from fixed effects random intercept regression model; robust standard errors in parentheses. *Reject null hypothesis of coefficient = 0, $p < .05$, ^$p < .10$, one-tailed tests.

interaction effect on the y-axis for all three dependent variables. None of the interaction effects are statistically greater than zero, and most strikingly, the larger the positive coefficient for the collaborative process, the larger the *negative* coefficient for the interaction effect. In other words, when cooperation is higher in collaborative institutions, it is lower in traditional institutions. The results are consistent across the range of the collaborative institution coefficient, although it is hard to compare the effectiveness of different regions because the regions do not line up in the same order across variables. However, SACOG and Riverside in general appear to have the smallest interaction effects, suggesting the negative feedback is less important in those regions. Again, these results are consistent with the EG predictions although the data cannot distinguish between the range of mechanisms (i.e., budget constraint, venue shopping, symbolic policy, or limited attention) that might produce these interaction effects.

There are also some interesting effects of policy core beliefs and more general political attitudes. Environmentalists are less likely to believe the policies are fair, reflecting the general criticism of environmentalists that collaborative institutions cater to business interests. Inclusiveness increases the level of perceived satisfaction; people who want to include a wide range of interests tend to believe some common ground can be found among them. More consistently, respondents who trust government and believe government is responsive to ordinary citizens are more likely to have cooperative attitudes and behaviors. This reflects the importance of these variables for political cooperation in general.

FIGURE 1 Size of Interaction Effect as Function of Collaborative Process Coefficient



Conclusion

The goal of this article is to integrate institutional rational choice with Long's ecology of games framework to address how cooperation emerges from multiple institutions interconnected by networks of actors seeking both political power and social capital. Although IRC theory does not explicitly reject the existence of multiple institutions, this issue is rarely addressed by theory and almost never analyzed in empirical research. Collaborative institutions provide a useful laboratory for comparing the two approaches, because proponents suggest that collaborative institutions reduce transaction costs and spread cooperation throughout the ecology of games. In contrast, consistent with the EG framework, our empirical study shows a negative interaction between collaborative institutions and traditional planning institutions in terms of their effects of cooperative attitudes and behaviors. Thus, the question of governance requires understanding the evolution of cooperation across the entire ecology of games and not just a single institution.

The theoretical contribution of this analysis is manifest in the development of new and surprising hypotheses regarding collaborative institutions. Both the hypotheses and findings run counter to the prevailing wisdom about the effectiveness of collaborative institutions. Effectiveness is directly concerned with whether or not policies improve welfare, generally by increasing the efficiency or equity of resource allocations. The prevailing wisdom is consistent with the theoretical arguments of the IRC—collaborative institutions increase welfare by increasing social capital and reducing the transaction costs of cooperation. This view is not only popular among academic researchers, but is also one reason that collaborative institutions have become so widespread among real-world policy makers.

The EG framework directly challenges the sanguine view of collaborative institutions provided by IRC. As outlined in this article, four potential mechanisms may cause trade-offs between collaborative institutions and other traditional land-use and transportation planning games. Two of those reasons, budget constraints on cooperation and venue shopping, can potentially be accounted for by revising the IRC framework to deal with multiple games. The other two, symbolic policy and limited attention, may require a more realistic behavioral model of individual decision making and thus spark the development of the EG framework as a new policy theory. Even though this analysis is limited to five regions of California, it will hopefully motivate researchers and practitioners to question current trends and think about how the benefits of collaborative institutions are balanced with the necessity of developing cooperation in other policy games.

Overall, analyses of multiple games deserve a more central place in the study of public policy and governance. Even at this early stage in the empirical research, the EG framework has provided some new insights about collaborative institutions that go well beyond the traditional policy analysis strategy of comparing one policy institution to another and asking which is better for solving some particular problem. The EG framework requires considering how all of the institutions combine to solve—or cause—collective-action problems. Cooperation occurs in all policy games, not just institutions with the label of "collaborative policy." There is potentially negative or positive feedback between the evolution of cooperation in one policy game and the potential for cooperation in other games. Future research needs to include better identification of games and measurement of game-specific behavior, dynamic analyses that show the consequences of leaving and joining games over time for the structure of policy networks and the availability of political resources, and more formal mathematical or computational analyses of game ecologies that can sharpen the theory and hypotheses.

References

Agrawal, Arun, and Sanjeev Goyal. 2001. "Group Size and Collective Action: Third-party Monitoring in Common-pool Resources." *Comparative Political Studies* 34(1): 63–93.

Agrawal, Arun, and Elinor Ostrom. 2001. "Collective Action, Property Rights, and Decentralization in Resource Use in India and Nepal." *Politics Society* 29(4): 485–514.

Agrawal, Arun, and Gautam Yadama. 1997. "How Do Local Institutions Mediate Market and Population Pressures on Resources? Forest Panchayats in Kumaon, India." *Development and Change* 28(3): 435–65.

Alchian, Armen A. 1950. "Uncertainty, Evolution, and Economic Theory." *Journal of Political Economy* 58: 211–21.

Bardach, Eugene. 1998. *Getting Agencies to Work Together: The Practice and Theory of Managerial Craftsmanship*. Washington, DC: The Brookings Institution.

Bednar, Jenna, and Scott Page. 2007. "Can Game(s) Theory Explain Culture? The Emergence of Cultural Behavior within Multiple Games." *Rationality and Society* 19(1): 65–97.

Berardo, Ramiro, and John T. Scholz. 2010. "Self-Organizing Policy Networks: Risk, Partner Selection and Cooperation in Estuaries." *American Journal of Political Science*. Forthcoming.

Connick, Sarah, and Judith E. Innes. 2003. "Outcomes of Collaborative Water Policy Making: Applying Complexity Thinking to Evaluation." *Journal of Environmental Planning and Management* 46(2): 177–97.

Dunlap, Riley E., Kent D. Van Liere, Angela G. Mertig, and Robert E. Jones. 2000. "Measuring Endorsement of the New Ecological Paradigm: A Revised NEP Scale." *Journal of Social Issues* 56(3): 425–42.

Dutton, William H. 1995. "The Ecology of Games and Its Enemies." *Communication Theory* 5(4): 379–92.

Edelman, Murray. 1971. *Politics as Symbolic Action: Mass Arousal and Quiescence*. New York: Academic Press.

Edelman, Murray. 1985. *The Symbolic Uses of Politics*. Chicago: University of Illinois Press.

Jones, Bryan D., and Frank R. Baumgartner. 2005. *The Politics of Attention: How Government Prioritizes Problems*. Chicago: University of Chicago Press.

Kahneman, Daniel. 1973. *Attention and Effort*: Englewood Cliffs, NJ: Prentice-Hall.

Knight, Jack. 1992. *Institutions and Social Conflict*. Cambridge, MA: Cambridge University Press.

Leach, William D., Neal W. Pelkey, and Paul A. Sabatier. 2002. "Stakeholder Partnerships as Collaborative Policymaking: Evaluation Applied to Watershed Management in California and Washington." *Journal of Policy Analysis and Management* 21: 645–70.

Leach, William D., and Paul A. Sabatier. 2005. "To Trust an Adversary: Integrating Rational and Psychological Models of Collaborative Policymaking." *American Political Science Review* 99(4): 491–503.

Liu, Xinsheng, and Bryan D. Jones. 2005. "How Do Nations Choose What Games to Play? A Spatial Supergame Model of Bilateral Interactions." Presented at the annual meeting of the International Studies Association, Honolulu, HI.

Long, Norton E. 1958. "The Local Community as an Ecology of Games." *The American Journal of Sociology* 64: 251–61.

Lubell, Mark. 2003. "Collaborative Institutions, Belief-Systems, and Perceived Policy Effectiveness." *Political Research Quarterly* 56(3): 309–23.

Lubell, Mark. 2004a. "Collaborative Environmental Institutions: All Talk and No Action?" *Journal of Policy Analysis and Management* 23(3): 549–73.

Lubell, Mark. 2004b. "Resolving Conflict and Building Cooperation in the National Estuary Program." *Environmental Management* 33(5): 677–91.

Lubell, Mark, Mark Schneider, John T. Scholz, and Mihriye Mete. 2002. "Watershed Partnerships and the Emergence of Collective Action Institutions." *American Journal of Political Science* 46(1): 148–63.

Marshall, Graham. 2005. *Economics for Collaborative Environmental Management: Renegotiating the Commons*. London: Earthscan.

Miller, John H., and Scott E. Page. 2007. *Complex Adaptive Systems: An Introduction to Computational Models of Social Life*. Princeton, NJ: Princeton University Press.

Moe, Terry. 2005. "Power and Political Institutions." *Perspectives on Politics* 3(2): 217–33.

North, Douglass C. 1990. *Institutions, Institutional Change, and Economic Performance*. New York: Cambridge University Press.

O'Leary, Rosemary, Catherine Gerard, and Lisa Blomgren Bingham. 2006. "Introduction to the Symposium on

Collaborative Public Management." *Public Administration Review* 66(s1): 6–9.

Ostrom, Elinor. 1999. "Institutional Rational Choice: An Assessment of the Institutional Analysis and Development Framework." In *Theories of the Policy Process*, ed. P. Sabatier. Boulder, CO: Westview Press, 35–71.

Ostrom, Vincent, Charles M. Tiebout, and Robert Warren. 1961. "The Organization of Government in Metropolitan Areas: A Theoretical Inquiry." *The American Political Science Review* 55(4): 831–42.

Payne, John W., James R. Betteman, and Eric J. Johnson. 1990. "The Adaptive Decision Maker: Effort and Accuracy in Choice." In *Insights in Decision Making: A Tribute to Hillel J. Einhorn*, ed. R. M. Hogarth. Chicago: University of Chicago Press, 129–73.

Sabatier, P. A., and Hank Jenkins-Smith. 1993. *Policy Change and Learning: An Advocacy Coalition Approach*. Boulder, CO: Westview Press.

Sabatier, Paul A, Will Focht, Mark Lubell, Zev Trachtenburg, Arnold Vedlitz, and Marty Matlock, eds. 2005. *Swimming Upstream: Collaborative Approaches to Watershed Management*. Cambridge, MA: MIT Press.

Schlager, Edella, and William Blomquist. 1995. "A Comparison of Three Emerging Theories of the Policy Process." *Political Research Quarterly* 49(3): 631–50.

Tsebelis, George. 1990. *Nested Games: Rational Choice in Comparative Politics*. Berkeley: University of California Press.

Weber, Edward P. 1998. *Pluralism by the Rules: Conflict and Cooperation in Environmental Management*. Washington, DC: Georgetown University Press.