Journal of Behavioral
Public Administration
Vol 4(1), pp. 1-29
DOI: 10.30636/jbpa.41.166

Research Article

# The pitfalls associated with more intensive engagement in collaborative forums: The role of behavioral spillovers and cognitive load

**Jack Mewhirter*, Danielle M. McLaughlin***

**Abstract:** Polycentric governance systems feature numerous decision-making venues ("forums") where policy actors repeatedly interact to address a subset of policy problems. Previous studies find that forums where actors dedicate greater time and cognitive resources tend to be perceived as more effective. Drawing on behavioral game theory and the Ecology of Games, we argue that the improvements afforded to any one forum vis-à-vis more intensive participation may come at a cost: lower levels of perceived effectiveness in linked forums. We use survey data collected in the Tampa Bay (FL) and California Delta (CA) water governance systems to examine our contention. Using a series of spatial Durbin models, we find that perceived effectiveness of a given forum is directly impacted by the intensiveness by which actors participate in that forum (positive association). However, there are also behavioral spillovers: the intensity with which actors participate in other forums in the system has indirect negative consequences for perceived forum effectiveness.

Keywords: Polycentric governance, Behavioral spillovers, Cognitive load, Ecology of Games, Behavioral game theory

Supplements: Open data

---

Polycentricity—a term describing decision-making arrangements where authority over an issue-area is delegated to multiple entities (countries, agencies, private interests, etc.) operating at different scales—is a common feature of contemporary governance systems (Cairney, Heikkila, & Wood, 2019; Jordan, Huitema, Hildén, Van Asselt, Rayner, Schoenefeld, & Boasson, 2015). When problems arise that impact the interests of multiple entities in a system—a common occurrence when entities share overlapping jurisdictions and/or deal with interdependent policy problems—individuals working on behalf of relevant entities ("actors") can (potentially) work together within forums to develop mutually beneficial policy solutions (Berardo & Lubell, 2016, 2019). Forums tend to launch when cross-sectoral/scale coordination is seen as an effective mechanism to help solve collective action problems; they operate as fairly institutionalized venues for repeated and structured interactions between actors from many sectors active in certain policy areas (e.g., water, transportation; Maag & Fischer, 2018; Bryson, Crosby, & Stone, 2006; Emerson, Nabatchi, & Balogh, 2012). Across any single polycentric governance system, forums vary in terms of the specific problems being addressed, membership size and composition, and operating procedures (Berardo & Lubell, 2019)[1]. Collectively, the extent to which forum outputs resolve underlying problems and promote actor interests has a significant impact on the health of the system as a whole (McGinnis & Ostrom, 2012; Lubell, 2013).

An array of research surrounding polycentric systems has sought to understand conditions that promote

* Department of Political Science, University of Cincinnati
Address correspondence to Jack Mewhirter at (jack.mewhirter@uc.edu)

actor perceptions of forum effectiveness (Lubell, Mewhirter, Berardo, & Scholz, 2017; Emerson & Nabatchi, 2015; Mewhirter, McLaughlin, & Fischer, 2019; Newig, Challies, Jager, Kochskaemper, & Adzersen, 2018; Scott, 2015)[2]. In complex governance systems, forums prosper when actors buy in and perceive that forum participation is an effective use of their limited resources (Emerson & Nabatchi, 2015; Smaldino & Lubell, 2011). Thus, actor perceptions of forum effectiveness drive subsequent commitment and, ultimately, forum success. Findings demonstrate that an actor's perception of forum effectiveness is generally a function of the returns relative to costs associated with forum participation (Emerson & Nabatchi, 2015; Mewhirter, Lubell, & Berardo, 2018; Lubell et al., 2017; McLaughlin, Mewhirter, Wright, & Feiock, 2020). While the factors that impact perceived effectiveness tend to vary across systems, the extent to which actors dedicate resources to a given forum—what we call "participation intensity"—has shown to be one of the most consistent and impactful predictors (Lubell et al., 2017; Ansell & Gash, 2008; Margerum, 2002; Warner, 2006; Yaffee & Wondolleck, 2010). As such, altering institutional arrangements to encourage more intensive participation is seen as a relatively simple institutional tweak that can be used to promote forum success (Lubell et al., 2017).

In this manuscript we draw issue with such claims, introducing and testing a new micro-level theory of actor behavior which contends that the within-forum gains accrued through more intensive forum participation may come at the expense of other forums in the system. Drawing from behavioral game theory (Bednar, Chen, Xiao, & Page, 2012; Bednar & Page, 2007) and Ecology of Games (Berardo & Lubell, 2019) literatures, we argue that more intensive participation in any given forum may simultaneously drain resources (specifically, time and cognitive resources) that actors can dedicate to the other forums in which they participate. As actors within one forum begin to concentrate their efforts in alternate forums in a system, it can corrode within-forum efforts, leading to lower levels of within-forum perceived effectiveness.

We examine the validity of our argument using survey data collected from forum participants in the Tampa Bay and California Delta water governance systems. Results from a series of spatial Durbin models confirm the conventional argument that forums where actors exhibit more intensive participation tend to be perceived as more effective. That said, we also find evidence for behavioral spillovers: within-forum effectiveness is hampered when participants intensively participate in alternate forums. Our findings suggest that calls to promote more intensive engagement as a means to encourage forum success should be taken with caution and with an understanding of each forum's role in the broader governance system in mind.

### *Intensity of Participation and Perceived Forum Effectiveness*

The time and cognitive resources that forum participants collectively invest in a forum is one of the most consistent and impactful determinants of perceived forum effectiveness (Ansell & Gash, 2008; Margerum, 2002; Warner, 2006; Yaffee & Wondolleck, 2010; Lubell et al., 2017). More intensive forum participation affords actors the time and cognitive capacity to sufficiently learn about forum specific problems and derive solutions that readily address the root causes. It also promotes transparency regarding the interests and bargaining tactics of forum participants, leading to more productive dialogue, while promoting effective implementation and reduced noncompliance (Koontz & Bodine, 2008; Ostrom, 2000). While increases in the intensity of participation among participants enhances perceived forum effectiveness through these pathways, it may come at a cost: lower perceived effectiveness in socially linked forums.

### *Actor Level: How Intensive Forum Participation Impacts Actor Behavior*

Actors possess finite time and cognitive resources which limit their capacity to intensively engage within and across forums (Choi & Robertson, 2014; Lubell, Henry, & McCoy, 2010; Smaldino & Lubell, 2011; Mewhirter, Coleman, & Berardo, 2019). Consequently, actors are forced to strategically allocate scarce resources across the forums in which they participate. As actors allocate more time to a given forum, they may be forced to reduce the time dedicated to their other forums (Lubell, Henry, & McCoy, 2010; Smaldino & Lubell, 2011). In doing so, that actor has fewer opportunities to learn about policy problems and solutions, as well as build social connections with other participants.

The same relationship should exist when an actor dedicates greater cognitive resources to a particular forum. As demonstrated in game theoretic and experimental models evaluating actor-based decision-making in multiple games, cognitive constraints incentivize actors to develop heuristics built from prior experiences that can be applied across games (Bednar et al., 2012; Bednar & Page, 2007; Cason et al., 2010, 2012; Jehiel, 2005).

In an effort to more easily navigate complex systems and reduce cognitive load, actors develop expectations regarding i) the interests and network strategies of other participants, ii) the root causes of policy problems, and iii) the types, range, and efficacy of policy alternatives, all of which guide forum behaviors and strategies (Bednar et al., 2012; Jehiel, 2005; Mewhirter & Berardo, 2019). Reusing lessons learned about policy issues and other actors—a phenomenon referred to as "behavioral spillovers" (Bednar et al., 2012; Cason et al., 2012; Jehiel, 2005)—may be suboptimal for actors in polycentric systems. The lessons learned and behavioral strategies developed in one forum may not be applicable to others, which tend to be defined by their own sets of actors, policy issues, and rule structures.

When an actor begins to dedicate more cognitive resources to a single forum, their cognitive resources become depleted, forcing that actor to draw on the experiences and expectations derived from this forum when crafting strategies in other forums. Given the complexity and variation of games in polycentric systems, this patterned tendency for behavioral spillover may be suboptimal and/or ineffective in other games (Bednar & Page, 2007; Kimmich, 2013; McGinnis, 2011; Bednar et al., 2012), hindering actors' ability to meaningfully engage with other participants and potentially disrupting forum proceedings (Fogel, 2006; Bednar & Page, 2007; Cason et al., 2012). Applying this logic, when an actor dedicates intensive cognitive resources to a given forum, the extent to which they can optimize their participation in alternate forums is hampered[3].

### *Forum Level: How Actor Level Behavior Impacts Perceived Forum Effectiveness*

The theory developed thus far demonstrates that as an actor intensifies their participation in a single forum, it can detract from their participation in linked forums by causing them to i) reduce the amount of time they dedicate to forum proceedings, and ii) misapply lessons and behavioral strategies. As participants in a given forum collectively begin to dedicate their time and cognitive resources to alternate forums in the system, it can have a corrosive effect on forum proceedings and consequently, outputs. As a greater proportion of forum participants misapply behavioral strategies and reduce the amount of time dedicated to building networks and learning about policy problems and solutions, the extent to which forum processes result in outputs that effectively address policy problems and promote participant interests will fall in tandem.

## Data

To examine the validity of our argument, we utilize survey data collected from forum participants involved in two polycentric water governance systems: the Tampa Bay Watershed (FL, US) and the Sacramento San Joaquin Delta (CA, US). This dataset was originally used in Lubell et al.'s (2017) seminal study on perceived forum effectiveness which found a positive association between intensity of forum participation and perceived effectiveness across systems. Our study uses the same dependent and independent variables as Lubell et al. (2017)[4]. We depart from their study by using the forum as the unit of analysis (instead of the actor) and utilizing spatial Durbin regression models (instead of OLS). The model—described in detail in the proceeding section—allows us to simultaneously examine how perceptions of within-forum effectiveness are impacted by i) intensity of within-forum participation, and ii) intensity of participation in socially linked forums (i.e., those with overlapping memberships).

### *Survey & Measurements*

Survey data was collected from actors who participated in forums from both Tampa Bay and the California Delta. Web and media searches were employed to identify water related forums in both regions. The names and email addresses of forum participants were collected from participant/member lists (either listed online or provided by forum staff/managers). This process generated 1,037 names and email addresses in Tampa and 1,494 in California. In Tampa, 388 completed the survey, 31 refused, and 97 deemed themselves ineligible; in California, 319 completed the survey, 42 refused, and 152 respondents deemed themselves ineligible. The estimated response rates vary from 32% to 37% in Tampa and between 31% and 36% in California, depending on the method used.

The survey asked participants to identify up to 15 forums that they attended during the prior year[5]. Respondents were then asked a series of questions regarding their organization, participation, and performance for each forum attended. This data structure allows us to identify i) the individual forums operating in the

systems, ii) the forums that each actor participated in, iii) the co-membership network that exists among actors and forums, and iv) actors' perceptions regarding each forum in which they participate. Note that we are interested in examining behavioral spillovers between forums; therefore, the final measures used in all analyses are aggregated at the forum level[6].

### *Dependent Variables*

The first two dependent variables measure actor perceptions of forum processes and performance. The first variable, Fairness, describes the extent to which actors believe that forum processes did not privilege specific actors. Efficacy captures the extent to which actors believe that they were able to shape policy outcomes in a meaningful way. To create these variables, participants were asked to respond to the following questions for each forum in which they participate: "How fair would you say that the process of reaching decisions in the forum is for all stakeholders"; "In each forum, how effective [has your | has your organization's] participation been in shaping water management decisions in the [__] region to reflect [your | your organization's] needs". Responses range from 0-10, where 0 indicates "very unfair" or "very ineffective" and 10 indicates "very fair" or "very effective".

The final two dependent variables capture actor perceptions regarding forum outputs and outcomes. Contribution captures the extent to which actors believe that forum outputs resolved policy problems, whereas Impact describes the extent to which actors believe that outputs reflect their organizational interests. To create these variables, participants were asked to respond to the following questions for each forum in which they participate: "Please rate each forum in terms of whether the activities that took place in the forum during the past year contributed significantly or not to improving water management in the [__] region"; "Overall, have the activities that took place in the forum during the past year had a major negative impact, no net impact, or a major positive impact on [your | your organization's] interests". Responses range from 0-10, where 0 indicates "no significant contribution" or "major negative impact" and 10 indicates "very significant contribution" or "major positive impact".

### *Independent Variable*

Our independent variable, Intensity, measures the frequency by which actors participate in a given forum. As argued elsewhere (Lubell et al., 2017; Lubell, Mewhirter, & Berardo, 2020), time commitments are likely highly correlated with cognitive commitments (among other resources: e.g., political, financial, etc.), thus making it a suitable proxy for participation intensity. To create the measure, actors were asked to respond to the following question for each forum in which they participate: "For each forum listed below, about how frequently on average [have you | has your organization] participated in forum activities in the past year?" Values range from 1-5, where 1= "Yearly", 2= "Quarterly", 3= "Monthly", 4= "Weekly", and 5= "Daily".

The final measure takes the mean value reported by actors in each forum. By collapsing the data, the variable—which takes ordered values at the actor-forum level— is treated as continuous. We consider how results are impacted when collapsing at the modal and median values in tables A4-A7 of the Appendix. In Tables A8-A13 in the Appendix, we examine how our results are impacted when these measurements are nominal (after rounding to the nearest integer). Given that our results are largely consistent across models, we solely consider and discuss the original variable conceptualization.

### *Other Variables*

Following Lubell et al. (2017), we include control variables designed to capture actors' varying capacities and resource inventories that have been shown to impact both participation and perceived forum effectiveness. Scientific Knowledge captures an actor's level of certainty regarding the state of science surrounding policy issues, whereas Political Knowledge captures an actor's knowledge of other actors in the system. Actors with uncertainty regarding the scientific merits of policy issues and/or the political interests of fellow actors face increased participation costs and tend to be unsatisfied with forum outcomes (Lubell et al., 2017; Ansell & Gash, 2008). Simultaneously, actors that lack such knowledge may be attending forums to reduce uncertainty which could impact their participation intensity (Fischer & Leifeld, 2015).

Experience and Breadth capture the extent to which actors are invested in water governance. Actors who broadly participate across forums accrue knowledge related to the root causes of policy issues (Emerson,

Nabatchi, & Balogh, 2012; Fischer & Leifeld, 2015). Such capital reduces participation costs and enhances performance (Lubell et al., 2017). Breadth and Experience may also impact the intensity of forum participation: those who participate across multiple forums may have less time to invest in each one (Mewhirter, Coleman, & Berardo, 2019). Actors with greater experience may have developed more efficient time management strategies, impacting the rate at which they invest in key forums (Mewhirter & Berardo, 2019). Government Agency actors frequently participate in large core forums (Lubell, Robins, & Wang, 2014) and tend to have access to resource advantages over others (Maag & Fischer, 2018; Leifeld & Schneider, 2012), promoting both their capacity to intensely invest in forums and impact forum processes/outputs.

Finally, Conflict captures the distribution of costs and benefits associated with forum processes and outcomes. Research shows that conflict disrupts forum processes, heightens participation costs, and reduces satisfaction with outcomes (Lubell, Mewhirter, & Berardo, 2020; Warner, 2006; Smaldino & Lubell, 2011; Heikkila & Weible, 2017). Survey questions for control variables can be found in Appendix B.

## Empirical Approach

We contend that perceptions of forum effectiveness are partially dependent upon intensity of actor participation in linked forums across the system. Prior research that neglects spatial dependencies inherent to polycentric systems results in overestimating the effects of independent variables (Franzese & Hays, 2007)[7]. The fundamental assumption of independence in traditional regression models such as OLS is unlikely to hold in the presence of spatially dependent observations, leading to potentially biased and inconsistent estimates (LeSage, 2008; Franzese & Hays, 2007).

To correct this bias and test our spillover contention, we adopt a variation of spatial autoregressive models called a spatial Durbin model (SDM). SDMs contain spatially lagged dependent and independent variable(s); in this case, the model permits variables that determine perceived forum effectiveness from spatially linked forums, j, (i.e., Intensity) to impact effectiveness of forum i (Lesage, 2008; Anselin, 1988). The strength of influence of other forums on i is a function of the weights in the ith row of the W spatial matrix (Leenders, 2002). The W matrix is theoretically driven and denotes the structure of connectivity between n spatial units (Franzese & Hays, 2008; Leenders, 2002)[8].

Our W matrix represents the proportion of actors shared between forums (co-membership, $c_{ij}$). A forum is considered "close" to another forum when a larger proportion of its actors also participate in that alternate forum. We theorize that participation intensity in spatially proximate forums will be negatively correlated with forum effectiveness. The extent to which participation intensity spills into a linked forum is a function of the proportion of actors shared between forums: the weight matrix has normalized entries of the form $w_{ij} = c_{ij} / size_i$. As specified, this model allows us to test our hypothesis of negative spillovers via intense participation between socially linked forums. The formal SDM model is: [9]

$$\boldsymbol{y} = \alpha i_n + \rho \boldsymbol{W}\boldsymbol{y} + \beta \boldsymbol{X} + \boldsymbol{\gamma}\boldsymbol{W}\boldsymbol{X} + \varepsilon$$
$$\varepsilon \sim N(0, \sigma^2 In)$$

where y is an n × 1 vector of observations on the dependent variable, X is an n × k matrix of observations on the explanatory variables, β is a k × 1 vector of parameters associated with the explanatory variables, $\boldsymbol{\gamma}$ is the spatial parameter associated with the spatial explanatory variable, W is a normalized n x n spatial weight matrix, $\rho$ is the spatially associated scalar dependence parameter, and ε is an i.i.d. error term. Estimation of the SDM via maximum likelihood efficiently estimates parameters (LeSage & Pace, 2010).

## Results and Analysis

Tables 1 and 2 provide the maximum likelihood parameter estimates of the SDM models. This allows us to test our contention of the presence of behavioral spillovers specifically via one factor (i.e., intensity), which is not implied by the general autoregressive contagion process. SDMs incorporate two sources of spatial dependence;

in our case, forum effectiveness is partially determined by the outcomes (i.e., forum effectiveness) and causes (i.e., intensity) of linked forums.

In Tables 1 and 2, both spatial components, ρ and $\gamma$, are statistically significant. Here, ρ is the spatial coefficient on the lagged dependent variable (i.e., Wy), which measures spatial spillover as defined by the co-membership link. The estimated coefficient for the effectiveness lag variable (ρ), suggests positive spatial dependence at both study sites. In Tampa Bay, the ρ coefficient indicates that forum effectiveness does signifi-

**Table 1: SDM Results for Tampa Bay**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity* | 0.61*** | 0.47*** | 0.45*** | 0.53*** |
| | (0.16) | (0.14) | (0.14) | (0.17) |
| *Conflict* | -0.78*** | -1.41*** | -0.75*** | -0.91*** |
| | (0.23) | (0.21) | (0.21) | (0.24) |
| *Forum-Count* | -0.39* | -0.56*** | -0.48** | -0.09 |
| | (0.20) | (0.19) | (0.19) | (0.22) |
| *Uncertain* | 0.02 | 0.02 | -0.09 | -0.22*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Science* | 0.20*** | 0.17*** | 0.31*** | 0.25*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Experience* | 0.64* | -0.07 | 0.04 | -0.12 |
| | (0.36) | (0.32) | (0.32) | (0.37) |
| *Government* | 1.11*** | 0.37 | 0.47 | 0.67* |
| | (0.34) | (0.29) | (0.30) | (0.34) |
| **Spatial Effects** | | | | |
| *Effectiveness (ρ)* | 0.57*** | 0.41*** | 0.48*** | 0.44*** |
| | (0.08) | (0.08) | (0.09) | (0.09) |
| *Intensity (γ)* | -1.01*** | -0.61** | -0.76*** | -0.82*** |
| | (0.27) | (0.25) | (0.28) | (0.29) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

cantly depend on the effectiveness of other spatially linked forums. In the CA Delta, the ρ coefficient shows positive spatial dependence across linked forums for efficacy, contribution, and fairness.

**Table 2: SDM Results for the California Delta**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity* | 0.70*** | 0.26 | 0.56*** | 0.55*** |
| | (0.18) | (0.17) | (0.15) | (0.19) |
| *Conflict* | -0.82*** | -1.60*** | -1.10*** | -0.51** |
| | (0.22) | (0.20) | (0.18) | (0.23) |
| *Forum-Count* | -0.14 | -0.15 | 0.08 | 0.02 |
| | (0.21) | (0.19) | (0.17) | (0.22) |
| *Uncertain* | 0.34*** | 0.03 | -0.03 | 0.05 |
| | (0.09) | (0.09) | (0.08) | (0.09) |
| *Science* | -0.05 | 0.05 | 0.05 | 0.10 |
| | (0.08) | (0.07) | (0.06) | (0.08) |
| *Experience* | -0.37 | -0.28 | -0.51 | -1.02** |
| | (0.47) | (0.42) | (0.37) | (0.48) |
| *Government* | -0.17 | -0.54 | 0.36 | 0.54 |
| | (0.44) | (0.40) | (0.35) | (0.46) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\rho$) | 0.42*** | 0.10 | 0.21* | 0.46*** |
| | (0.11) | (0.12) | (0.11) | (0.10) |
| *Intensity* ($\gamma$) | -0.70** | 0.12 | -0.44 | -0.66** |
| | (0.30) | (0.33) | (0.29) | (0.29) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

The coefficient estimates for the spatially lagged independent variable (Intensity), $\gamma$, denoting the degree of dependence defined by the theoretical W, suggest that participation Intensity spills over and significantly impacts (reduces) perceptions of forum effectiveness in spatially linked forums. Specifically, the negative coefficient supports our contention, indicating that intensive participation in linked forums is associated with reduced evaluations of effectiveness in a given forum. Again, this finding is substantive and statistically significant across all four measures in Tampa, and for Efficacy and Contribution in the CA Delta. At both study sites, spatial spillovers appear substantive: forum features have performance effects across forums, via the mechanism of behavioral spillover. Ultimately, these results demonstrate that $Y_i$ is a result of i) the effectiveness of spatially linked forums, $Y_j$; ii) forum-level variables, $X_i$; and iii) intensity of participation in spatially linked forums, $X_{ji}$.[10]

### *Alternative Explanations*

While our findings are strongly suggestive, absent longitudinal data, alternative mechanisms of actor participation on perceived effectiveness remain. First, there may be a tendency for actors to ex-post perceive forums in which they dedicate increased resources to in a more favorable manner. If true, and actors remain more satisfied with forums they heavily invest in, then institutional arrangements designed to instigate more intensive participation may still have dire impacts on the polycentric system as a whole. Second, there may be a tendency for actors to slowly opt out of poorly performing forums and migrate to historically better performing forums (e.g., a form of venue shopping).[11] While logically consistent, our theory yields different results that have immense policy ramifications; thus, it is an important addition and competing theory that sparks new questions into actor motivations/behaviors and forum effectiveness.

## Discussion and Conclusion

In this manuscript, we challenge calls to amend institutional structures that encourage more intense forum participation. Such work has found that intense participation facilitates cooperation between actors, providing individual forums stability and longevity, and individual actors with increased knowledge and understanding of forum processes (Smaldino & Lubell, 2011; Lubell et al., 2017). Drawing on behavioral game theory, we develop an innovative model of actor behavior that challenges these claims. Utilizing a series of spatial econometric models, our work demonstrates that the gains afforded to individual forums via this mechanism of intense participation may come with indirect costs: decreased effectiveness of socially linked forums. Here, actors' system wide performances are attenuated by their increased focus on any one forum.

This study contributes to scholarship exploring the interdependence between actors' system-wide participation patterns and performance (Ingold & Leifeld, 2016; Shrestha, 2013; Mewhirter, Coleman, & Berardo, 2019). Specifically, our findings provide support for the tenets of various literatures on institutional complexity—most notably, the Ecology of Games, which stresses the importance of modeling systemic interdependence when evaluating the effectiveness of individual forums and actors operating within a system. We also provide evidence regarding the presence and impact of behavioral spillovers in a real-world setting: a well-theorized concept whose exploration has been mostly limited to game-theoretic and lab-based experimental studies. We contend that actors should strategically allocate resources across the forums of most concern, while being mindful of the likelihood of behavioral spillovers and negative externalities between interdependent forums.

Finally, the practical repercussions of this study are poignant for actors and forums embedded in such complex institutional webs. For instance, individual forums that are more likely designed to benefit from intense participation such as core forums that draw large numbers of diverse actors and thus require repeated and intense interactions to make decisions (Olson, 1965; Fischer & Leifeld, 2015), will overwhelmingly profit off of the positive impact of intensive participation on within-forum effectiveness. Such core forums draw myriads of actors because their decisions reverberate throughout the governance system. If intense participation is necessary for effective governance in these forums, peripheral forums will bear the direct brunt of this negative spillover. Are such governance systems indirectly supplanting the ideals of decentralized and collaborative decision-making venues: calling into question, yet again, power inequities in systems designed to reduce just that.

There are several limitations to this study. Notably, while our argument details how changes in participation intensity within a forum impact effectiveness in linked forums, our reliance on cross-sectional data limits us from observing such changes and, consequently, capturing causal effects. This problem is exacerbated by endogeneity concerns: if actors tend to concentrate resources in forums that ex-ante exhibit high effectiveness, then this tendency could be impacting our results. Next, as discussed in our "alternative explanations" section, though our findings are strongly suggestive, there is a potential that alternative mechanisms of actor behavior are driving our results. Finally, while our arguments detail the impact of time and cognitive resource investments on perceived forum effectiveness, our measure solely captures time commitments, which we (and others) argue are serially correlated with cognitive investments, among other resource types (e.g., political, financial, etc.) As such, it is unclear which type of investments are driving this relationship.

The findings and limitations detailed in this study open up a number of research avenues that can contribute to a better understanding regarding the function and structure of polycentric governance systems. In addition to building time-series datasets and exploring measures that disaggregate resource commitment-types (addressing our study's limitations), future studies should continue to dissect how forum-level attributes promote or hinder effectiveness in linked forums (Mewhirter, McLaughlin, & Fischer, 2019). Exploring how rule-based, participant-based, and issue-based factors impact within and across forum effectiveness seems like a natural and potentially fruitful step forward. Similarly, while our study details how social linkages provide a path for forum spillovers, exploring alternate linkages—for example, overlapping policy problems, shared jurisdictions, and geographic proximity—would yield valuable insights.

## Notes

1. A comparison of two water governance forums in the California Delta—the Bay Area Stormwater Management Association of Agencies (BASMAA) and the Delta Stewardship Council Meetings (DSCM)—helps demonstrate the roles that forums play and how they can vary. BASMAA is composed of representatives from nine municipal stormwater programs who meet to develop and implement stormwater management plans. While the forum is primarily concerned with such plans, a number of other organizations are involved with tertiary BASMAA activities and decisions (basmaa.org). DSCM, on the other hand, is composed of hundreds of organizational representatives that meet to discuss management plans for the Delta as a whole (deltacouncil.ca.gov; see Mewhirter, McLaughlin, & Fischer, 2019, p. 1241 for a discussion regarding the interactions between these two forums).
2. We adopt a relatively broad definition of forum effectiveness: the gains afforded to actors via forum outputs (Emerson & Nabatchi, 2015). While actors may have different goals that motivate participation—and thus, different variables that factor into individual calculations of forum benefits—previous studies contend that "solving policy problems" and "asserting policy positions" are some of the most impactful goals/drivers (Lubell, Henry, & McCoy, 2010; Fischer & Leifeld, 2015). See Fischer & Leifeld, 2015, p. 6-9 for an in-depth discussion of this matter.
3. While actors may be equipped with the capacity to shift schedules to make more time, they are less able to expand or accrue cognitive resources that allow them to more readily build strategies unique to each game or to maximize payoffs across games.
4. Extending Lubell et al.'s (2017) established model allows us to simultaneously test their contention regarding the positive association between participation intensity and within-forum effectiveness using a model that accounts for unit interdependence (failing to do so could have potentially biased original estimates: see Franzese & Hays, 2007) while also testing for the presence of negative spillovers.
5. The survey asked respondents to "fill in the names of the forums in the [INSERT SITE NAME] with which [you have | your primary organization has] been actively involved in the past year." While the goal was to capture forums in which the respondent participated, it is possible that respondents could list forums in which their organization was involved but that they did not personally attend. While possible, this is unlikely to occur at high rates. First, only 29.75% of organizations we identified in our study have more than one forum representative. For actors working for organizations with only one forum representative, it is reasonable to assume that the actor responding to the survey actually served as the organizational representative in that forum. Second, respondents in our dataset who work for the same organization tend to not list the same forums when prompted, indicating that respondents appear to list forums in which they were more closely connected. Of the forums listed by respondents who work for organizations with more than one respondent in our dataset, only 19.77% of listed forums were also named by one or more of the other respondents that share the same organizational affiliation. Collectively, this indicates that by and large, survey respondents listed forums in which they were directly involved, though some measurement error likely exists.
6. Descriptive statistics for all variables can be found in Table A1 in the Appendix.
7. OLS models do not allow for spatial effects. If the proposed spatial parameters=0, an OLS model may be used. Tables A2 and A3 in the appendix show OLS benchmark results.

8. SDMs allow us to examine how effectiveness of Forum i is impacted by endogenous forum variables, including within-forum participation intensity, as well as exogenous forum variables, participation intensity from spatially linked forums j. Here, intensity spills over from units j to their spatially linked neighbor(s) according to the pre-specified W matrix. This model is logically consistent with our argument that heightened intensity increases within forum effectiveness while decreasing "across" or "linked" forum effectiveness. In other words, heightened intensity of neighboring forums reduces within-forum effectiveness. SDMs accurately capture this interactivity and dependence between units.
9. Reduced form is as: $\boldsymbol{y} = (I_n - \rho \boldsymbol{W})^{-1}(\alpha i_n + \boldsymbol{X}\beta + \boldsymbol{W}\boldsymbol{X}\boldsymbol{\gamma} + \varepsilon)$
10. While this paper is theoretically contingent on the $\boldsymbol{\gamma}$ spatial effects parameter, we include the indirect effects and total effects of the β coefficients that capture the feedback of changes across units (LeSage & Pace, 2010) in the Tables A14-A17 in the Appendix.
11. While our model attempts to adjust for both of these issues by including a lagged dependent variable, time series data is needed to fully model this process.

## Acknowledgments

We would like to thank Rob Franzese for his helpful comments and feedback regarding the spatial econometric models used in this article.

## References

Anselin, Luc. (1988). *Spatial Econometrics: Methods and Models*. Dordrecht, Netherlands: Kluwer.

Ansell, C., & Gash, A. (2008). Collaborative governance in theory and practice. *Journal of Public Administration Research and Theory, 18*(4), 543–571.

Bednar, J., & Page, S. (2007). Can game(s) theory explain culture? The emergence of cultural behavior within multiple games. *Rationality and Society, 19*(1), 65-97.

Bednar, J., Chen, Y., Xiao T.L., & Page, S. (2012). Behavioral spillovers and cognitive load in multiple games: An experimental study. *Games and Economic Behavior, 74*(1), 12-31.

Berardo, R., & Lubell, M. (2016). Understanding what shapes a polycentric governance system. *Public Administration Review, 76*(5), 738-751.

Berardo, R., & Lubell, M. (2019). The ecology of games as a theory of polycentricity: Recent advances and future challenges. *Policy Studies Journal, 47*(1), 6-26.

Bryson, J.M., Crosby, B.C., & Stone, M.M. (2006). The design and implementation of cross-sector collaborations: Propositions from the literature. *Public Administration Review, 20*(s1), 45-55.

Cairney, P., Heikkila, T., & Wood, M. (2019). *Making policy in a complex world.* Cambridge: Cambridge University Press.

Cason, T.N., Gangadharan, L., Savikhin, A., & Sheremeta, R.M. (2010). Cooperation spillovers in coordination games. Working paper.

Cason, T.N., Savikhin, A.C., & Sheremeta, R.M. (2012). Behavioral spillovers in coordination games. *European Economic Review, 56*(2), 233-245.

Choi, T., & Robertson, P.J. (2014). Deliberation and decision in collaborative governance: A simulation of approaches to mitigate power imbalance. *Journal of Public Administration Research and Theory, 24*(2), 495-518.

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An integrative framework for collaborative governance. *Journal of Public Administration Research and Theory, 22*(1), 1-29.

Emerson, K., & Nabatchi, T. (2015). Evaluating the productivity of collaborative governance regimes: A performance matrix. *Public Performance & Management Review, 38*(4), 717-747.

Fischer, M., & Leifeld, P. (2015). Policy forums: Why do they exist and what are they used for? *Policy Science, 48*(3), 363-382.

Fogel, D.B. (2006). Evolutionary computation: Toward a new philosophy of machine intelligence. Hoboken, New Jersey: John Wiley & Sons.

Franzese, R.J., & Hays, J.C. (2007). Spatial econometric models of cross-sectional interdependence in political science panel and time-series-cross-section data. *Political Analysis, 15*(2), 140-164.

Franzese, R.J., & Hays, J.C. (2008). Contagion, common exposure, and selection: Empirical modeling of the theories and substance of interdependence in political science. *IPSA Concepts & Methods Newsletter*, *4*(2), 2-8.

Heikkila, T., & Weible, C.M. (2017). Unpacking the intensity of policy conflict: A study of Colorado's oil and gas subsystem. *Policy Sciences, 50*(2), 179-193.

Ingold, K., & Leifeld, P. (2016). Structural and institutional determinants of influence reputation: A comparison of collaborative and adversarial policy networks in decision making and implementation. *Journal of Public Administration Research and Theory, 26*(1), 1-18.

Jehiel, P. (2005). Analogy-based expectation equilibrium. *Journal of Economic Theory, 123*(2), 81-104.

Jordan, A.J., Huitema, D., Hildén, M., Van Asselt, H., Rayner, T.J., Schoenefeld, J.J., & Boasson, E.L. (2015). Emergence of polycentric climate governance and its future prospects. *Nature Climate Change*, *5*(11):977-982.

Kimmich, C. (2013). Linking action situations: Coordination, conflicts, and evolution in electricity provision for irrigation in Andhra Pradesh, India. *Ecological Economics, 90*, 150-158.

Koontz, T. M., & Bodine, J. (2008). Implementing ecosystem management in public agencies: Lessons from the US Bureau of Land Management and the Forest Service. *Conservation Biology*, *22*(1), 60-69.

Leenders, R.T.A. (2002). Modeling social influence through network autocorrelation: Constructing the weight matrix. *Social Networks*, *24*(1), 21-47.

Leifeld, P., & Schneider, V. (2012). Information exchange in policy networks. *American Journal of Political Science*, *56*(3), 731-744.

LeSage, J.P. (2008). An introduction to spatial econometrics. *Revue D'économie Industrielle, 123,* 19-44.

LeSage, J.P., & Pace, R.K. (2010). Spatial econometric models. *In: Fischer M., Getis A. (eds) Handbook of Applied Spatial Analysis.* Berlin, Heidelberg: Springer.

Lubell, M. (2013). Governing institutional complexity: The ecology of games framework. *Policy Studies Journal*, *41*(3), 537–559.

Lubell, M., Robins, G., & Wang, P. (2014). Network structure and institutional complexity in an ecology of water management games. *Ecology and Society*, *19*(4), 23.

Lubell, M., Henry, A.D., & McCoy, M. (2010). Collaborative institutions in an ecology of games. *American Journal of Political Science, 54*(2), 287-300.

Lubell, M., Mewhirter, J.M., Berardo, R. & Scholz, J.T. (2017). Transaction costs and the perceived effectiveness of complex institutional systems. *Public Administration Review, 77*(5), 668-680.

Lubell, M., Mewhirter, J.M., Berardo, R. (2020). The origins of conflict in polycentric governance systems. *Public Administration Review, 80*(2), 222-233.

Maag, S., & Fischer, M. (2018). Why government, interest groups, and research coordinate, the different purposes of forums. *Society & Natural Resources*, *31*(11), 1248-1265.

Margerum, D.D. (2002). Collaborative planning, building consensus and building a distinct model for practice. *Journal of Planning Education and Research, 21*, 237–53.

McGinnis, M.D. (2011). An introduction to IAD and the language of the Ostrom workshop: A simple guide to a complex framework. *Policy Studies Journal, 39*(1), 169-183.

McGinnis, M.D., & Ostrom, E. (2012). Reflections on Vincent Ostrom, public administration, and polycentricity. *Public Administration Review, 72*(1), 15-25.

McLaughlin, D.M., Mewhirter, J.M., Wright II, J.E., & Feiock, R. (2020). The perceived effectiveness of collaborative approaches to address domestic violence, the role of representation,'reverse-representation,'embeddedness, and resources. *Public Management Review.*

Mewhirter, J.M., Lubell, M., & Berardo, R. (2018). Institutional externalities and actor performance in polycentric governance systems. *Environmental Policy and Governance, 28*(4), 295-307.

Mewhirter, J.M., Coleman, E. & Berardo, R. (2019). Participation and political influence in complex governance systems. *Policy Studies Journal, 47*(4), 1002-1025.

Mewhirter, J.M., & Berardo, R. (2019). The impact of forum interdependence and network structure on actor performance in complex governance systems. *Policy Studies Journal, 47*(1), 159-177.

Mewhirter, J., McLaughlin, D.M., & Fischer, M. (2019). The role of forum membership diversity on institutional externalities in resource governance systems. *Society & Natural Resources, 32*(11), 1239-1257.

Newig, J., Challies, E., Jager, N.W., Kochskaemper, E., & Adzersen, A. (2018). The environmental performance of participatory and collaborative governance, A framework of causal mechanisms. *Policy Studies Journal, 46*(2), 269-297.

Olson, M. (1965). The theory of collective action, public goods and the theory of groups. Cambridge: Harvard University Press.

Ostrom, E. (2000). Social capital, a fad or a fundamental concept. *Social Capital, A Multifaceted Perspective, 172*(173), 195-98.

Ostrom, E. (2012). Nested externalities and polycentric institutions, must we wait for global solutions to climate change before taking actions at other scales? *Economic Theory, 49*(2), 353-369.

Scott, T. (2015). Does collaboration make any difference? Linking collaborative governance to environmental outcomes. *Journal of Policy Analysis and Management, 34*(3), 537-566.

Shrestha, M.K. (2013). Self-organizing network capital and the success of collaborative public programs. *Journal of Public Administration Research and Theory, 23*(2), 307– 329.

Smaldino, P.E., & Lubell, M. (2011). An institutional mechanism for assortment in an ecology of games. *PLoS ONE, 6*(8), 23019.

Warner, J.F. (2006). More sustainable participation? Multi-stakeholder platforms for integrated catchment management. *Water Resources Development, 22*(1), 15–35.

Yaffee, S.L., & Wondolleck, J.M. (2010). Collaborative ecosystem planning processes in the United States, evolution and challenges. *Environments, A Journal of Interdisciplinary Studies, 31*(2).

# Appendix

## Appendix A

### Table A1: Descriptive Statistics

| | N | Mean | SD | Min | Max |
|---|---|---|---|---|---|
| **Tampa Bay** | | | | | |
| *Efficacy* | 246 | 6.04 | 2.67 | 0 | 10 |
| *Fairness* | 250 | 7.21 | 2.34 | 1 | 10 |
| *Impact* | 251 | 6.70 | 2.20 | 0 | 10 |
| *Contribution* | 252 | 6.14 | 2.60 | 0 | 10 |
| *Intensity* | 254 | 2.24 | .93 | 1 | 5 |
| *Conflict* | 276 | 1.49 | .65 | 1 | 3 |
| *Forum-Count* | 336 | 3.47 | 1.57 | 1 | 7 |
| *Uncertain* | 330 | 7.63 | 2.21 | 0 | 10 |
| *Science* | 323 | 6.19 | 2.11 | 0 | 10 |
| *Experience* | 336 | .64 | .45 | 0 | 1 |
| *Government* | 336 | .65 | .45 | 0 | 1 |
| **CA Delta** | | | | | |
| *Efficacy* | 191 | 5.22 | 2.44 | 0 | 10 |
| *Fairness* | 192 | 6.74 | 2.57 | 0 | 10 |
| *Impact* | 199 | 6.17 | 2.10 | 0 | 10 |
| *Contribution* | 197 | 4.84 | 2.45 | 0 | 10 |
| *Intensity* | 210 | 2.64 | .97 | 1 | 5 |
| *Conflict* | 233 | 1.72 | .74 | 1 | 3 |
| *Forum-Count* | 271 | 3.60 | 2.05 | 1 | 12 |
| *Uncertain* | 259 | 7.26 | 2.44 | 0 | 10 |
| *Science* | 255 | 4.67 | 2.40 | 0 | 10 |
| *Experience* | 271 | .53 | .45 | 0 | 1 |
| *Government* | 271 | .70 | .41 | 0 | 1 |

**Table A2: OLS Results for CA Delta**

| | *Contribution* | *Impact* | *Efficacy* | *Fairness* |
|---|---|---|---|---|
| *Conflict* | -0.52** | -1.12*** | -0.77*** | -1.57*** |
| | (0.24) | (0.18) | (0.22) | (0.20) |
| *Intensity* | 0.60*** | 0.55*** | 0.73*** | 0.29* |
| | (0.20) | (0.15) | (0.19) | (0.17) |
| *Forum-Count* | 0.05 | 0.05 | -0.17 | 0.11 |
| | (0.11) | (0.09) | (0.11) | (0.10) |
| *Uncertain* | 0.02 | -0.07 | 0.34*** | 0.02 |
| | (0.10) | (0.08) | (0.10) | (0.09) |
| *Science* | 0.10 | 0.06 | -0.07 | 0.06 |
| | (0.08) | (0.06) | (0.08) | (0.07) |
| *Experience* | -1.02** | -0.50 | -0.36 | -0.21 |
| | (0.50) | (0.38) | (0.48) | (0.43) |
| *Government* | 0.50 | 0.32 | -0.28 | -0.49 |
| | (0.47) | (0.36) | (0.46) | (0.41) |
| Constant | 3.60*** | 6.83*** | 3.50*** | 8.48*** |
| | (0.94) | (0.74) | (0.93) | (0.81) |
| Observations | 184 | 185 | 178 | 176 |
| R-squared | 0.11 | 0.27 | 0.21 | 0.31 |

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table A3: OLS Results for Tampa Bay**

| | *Contribution* | *Impact* | *Efficacy* | *Fairness* |
|---|---|---|---|---|
| *Conflict* | -0.96*** | -0.74*** | -0.85*** | -1.45*** |
| | (0.25) | (0.22) | (0.25) | (0.21) |
| *Intensity* | 0.40** | 0.41*** | 0.53*** | 0.41*** |
| | (0.17) | (0.15) | (0.17) | (0.14) |
| *Forum-Count* | 0.17 | -0.19* | -0.06 | -0.16 |
| | (0.12) | (0.10) | (0.12) | (0.10) |
| *Uncertain* | -0.24*** | -0.11 | -0.00 | 0.04 |
| | (0.08) | (0.07) | (0.08) | (0.07) |
| *Science* | 0.24*** | 0.33*** | 0.19** | 0.17** |
| | (0.08) | (0.07) | (0.08) | (0.07) |
| *Experience* | 0.01 | 0.22 | 1.01*** | 0.12 |
| | (0.39) | (0.34) | (0.39) | (0.33) |
| *Government* | 0.97*** | 0.70** | 1.37*** | 0.54* |
| | (0.35) | (0.32) | (0.36) | (0.30) |
| Constant | 5.93*** | 5.76*** | 3.71*** | 7.26*** |
| | (0.97) | (0.84) | (0.96) | (0.84) |
| Observations | 227 | 227 | 222 | 228 |
| R-squared | 0.20 | 0.18 | 0.23 | 0.26 |

Standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

**Table A4: SDM Results for Tampa Bay with Alternate (modal) *Intensity* Measure**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity* | 0.63*** | 0.46*** | 0.45*** | 0.53*** |
| | (0.17) | (0.15) | (0.15) | (0.18) |
| *Conflict* | -0.78*** | -1.34*** | -0.67*** | -0.91*** |
| | (0.25) | (0.22) | (0.23) | (0.26) |
| *Forum-Count* | -0.17 | -0.35** | -0.31** | 0.05 |
| | (0.17) | (0.15) | (0.15) | (0.18) |
| *Uncertain* | 0.03 | 0.03 | -0.07 | -0.23*** |
| | (0.09) | (0.07) | (0.07) | (0.09) |
| *Science* | 0.22*** | 0.19*** | 0.31*** | 0.26*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Experience* | 0.63 | -0.02 | 0.12 | -0.12 |
| | (0.39) | (0.34) | (0.35) | (0.39) |
| *Government* | 1.15*** | 0.28 | 0.43 | 0.76** |
| | (0.37) | (0.32) | (0.33) | (0.37) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\rho$) | 0.53*** | 0.35*** | 0.38*** | 0.39*** |
| | (0.09) | (0.08) | (0.10) | (0.10) |
| *Intensity* ($\gamma$) | -1.17*** | -0.62** | -0.72** | -0.90*** |
| | (0.29) | (0.28) | (0.32) | (0.31) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A5: SDM Results for the California Delta with Alternate (modal) *Intensity* Measure**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity* | 0.57*** | 0.21 | 0.47*** | 0.54*** |
| | (0.18) | (0.17) | (0.15) | (0.20) |
| *Conflict* | -0.85*** | -1.60*** | -1.11*** | -0.47** |
| | (0.23) | (0.21) | (0.19) | (0.25) |
| *Forum-Count* | -0.21 | -0.13 | -0.01 | 0.12 |
| | (0.18) | (0.16) | (0.15) | (0.20) |
| *Uncertain* | 0.32*** | 0.03 | -0.02 | 0.02 |
| | (0.10) | (0.10) | (0.08) | (0.11) |
| *Science* | -0.01 | 0.03 | 0.04 | 0.14 |
| | (0.08) | (0.08) | (0.07) | (0.09) |
| *Experience* | -0.42 | -0.28 | -0.54 | -1.04** |
| | (0.50) | (0.45) | (0.39) | (0.52) |
| *Government* | 0.10 | -0.56 | 0.45 | 0.89* |
| | (0.50) | (0.45) | (0.40) | (0.51) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\varrho$) | 0.45*** | 0.10 | 0.16 | 0.43*** |
| | (0.11) | (0.12) | (0.12) | (0.10) |
| *Intensity* ($\gamma$) | -0.68** | 0.10 | -0.23 | -0.77*** |
| | (0.28) | (0.33) | (0.30) | (0.29) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A6: SDM Results for Tampa Bay with Alternate (median) *Intensity* Measure**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity* | 0.58*** | 0.44*** | 0.43*** | 0.49*** |
| | (0.16) | (0.14) | (0.14) | (0.17) |
| *Conflict* | -0.77*** | -1.42*** | -0.75*** | -0.92*** |
| | (0.24) | (0.21) | (0.21) | (0.24) |
| *Forum-Count* | -0.42** | -0.59*** | -0.50** | -0.14 |
| | (0.20) | (0.18) | (0.19) | (0.21) |
| *Uncertain* | 0.01 | 0.01 | -0.10 | -0.23*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Science* | 0.21*** | 0.18*** | 0.31*** | 0.26*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Experience* | 0.60* | -0.09 | 0.02 | -0.14 |
| | (0.36) | (0.32) | (0.33) | (0.37) |
| *Government* | 1.15*** | 0.39 | 0.49 | 0.69** |
| | (0.34) | (0.29) | (0.30) | (0.34) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\varrho$) | 0.55*** | 0.39*** | 0.46*** | 0.42*** |
| | (0.08) | (0.08) | (0.09) | (0.09) |
| *Intensity* ($\gamma$) | -0.90*** | -0.50** | -0.69** | -0.69** |
| | (0.26) | (0.25) | (0.28) | (0.29) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A7: SDM Results for the California Delta with Alternate (median) *Intensity* Measure**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity* | 0.62*** | 0.22 | 0.49*** | 0.48** |
| | (0.18) | (0.16) | (0.15) | (0.19) |
| *Conflict* | -0.83*** | -1.61*** | -1.11*** | -0.52** |
| | (0.22) | (0.20) | (0.18) | (0.23) |
| *Forum-Count* | -0.15 | -0.15 | 0.08 | 0.05 |
| | (0.21) | (0.19) | (0.17) | (0.22) |
| *Uncertain* | 0.34*** | 0.02 | -0.04 | 0.06 |
| | (0.09) | (0.09) | (0.08) | (0.10) |
| *Science* | -0.05 | 0.05 | 0.06 | 0.10 |
| | (0.08) | (0.07) | (0.06) | (0.08) |
| *Experience* | -0.36 | -0.26 | -0.49 | -1.01** |
| | (0.47) | (0.42) | (0.37) | (0.48) |
| *Government* | -0.17 | -0.54 | 0.36 | 0.55 |
| | (0.45) | (0.40) | (0.36) | (0.46) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\varrho$) | 0.41*** | 0.10 | 0.19* | 0.48*** |
| | (0.11) | (0.11) | (0.11) | (0.10) |
| *Intensity* ($\gamma$) | -0.66** | 0.14 | -0.38 | -0.71*** |
| | (0.29) | (0.31) | (0.28) | (0.27) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A8: SDM Results for Tampa Bay when Treating *Intensity* Measure as Nominal**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity (2)* | 1.22*** | 0.99*** | 0.65* | 1.09*** |
| | (0.39) | (0.34) | (0.35) | (0.40) |
| *Intensity (3)* | 1.31*** | 0.88** | 0.56 | 1.04** |
| | (0.42) | (0.36) | (0.37) | (0.43) |
| *Intensity (4)* | 1.49** | 1.36** | 1.24** | 1.50** |
| | (0.71) | (0.62) | (0.63) | (0.74) |
| *Intensity (5)* | 2.93*** | 2.27*** | 2.55*** | 2.65*** |
| | (0.94) | (0.79) | (0.81) | (1.01) |
| *Conflict* | -0.74*** | -1.39*** | -0.71*** | -0.89*** |
| | (0.24) | (0.21) | (0.21) | (0.24) |
| *Forum-Count* | -0.38* | -0.35* | -0.27 | -0.16 |
| | (0.22) | (0.20) | (0.21) | (0.23) |
| *Uncertain* | 0.04 | 0.04 | -0.06 | -0.21** |
| | (0.08) | (0.07) | (0.07) | (0.03) |
| *Science* | 0.21*** | 0.17*** | 0.31*** | 0.27*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Experience* | 0.55 | -0.13 | -0.08 | -0.21 |
| | (0.36) | (0.31) | (0.32) | (0.37) |
| *Government* | 1.08*** | 0.27 | 0.42 | 0.64* |
| | (0.34) | (0.29) | (0.30) | (0.34) |
| **Spatial Effects** | | | | |
| *Effectiveness* (ϱ) | 0.54*** | 0.41*** | 0.45*** | 0.40*** |
| | (0.09) | (0.08) | (0.09) | (0.09) |
| *Intensity (2)* | -1.98** | -2.63*** | -2.75*** | -1.11 |
| | (0.84) | (0.79) | (0.87) | (0.90) |
| *Intensity (3)* | -2.97*** | -2.24*** | -2.92*** | -2.18** |
| | (0.92) | (0.80) | (0.94) | (0.94) |
| *Intensity (4)* | -1.77 | -0.87 | -1.42 | 0.46 |
| | (2.31) | (2.06) | (2.48) | (2.63) |
| *Intensity (5)* | -3.85** | -2.78* | -3.31** | -3.68** |
| | (1.65) | (1.47) | (1.69) | (1.84) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A9: SDM Results for the California Delta when Treating *Intensity* Measure as Nominal**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity (2)* | 1.05* | -0.86 | -0.18 | -0.03 |
| | (0.59) | (0.55) | (0.47) | (0.62) |
| *Intensity (3)* | 0.99* | -0.71 | 0.05 | 0.04 |
| | (0.57) | (0.53) | (0.46) | (0.60) |
| *Intensity (4)* | 2.25*** | 0.20 | 1.40** | 1.40* |
| | (0.68) | (0.63) | (0.55) | (0.72) |
| *Intensity (5)* | 3.09*** | 0.72 | 2.34*** | 1.98* |
| | (0.97) | (0.90) | (0.79) | (1.03) |
| *Conflict* | -0.84*** | -1.66*** | -1.14*** | -0.60** |
| | (0.22) | (0.20) | (0.18) | (0.24) |
| *Forum-Count* | -0.11 | -0.15 | 0.13 | 0.009 |
| | (0.20) | (0.19) | (0.17) | (0.22) |
| *Uncertain* | 0.34*** | 0.04 | -0.006 | 0.05 |
| | (0.09) | (0.09) | (0.07) | (0.10) |
| *Science* | -0.06 | 0.06 | 0.08 | 0.11* |
| | (0.08) | (0.07) | (0.06) | (0.08) |
| *Experience* | -0.38 | -0.17 | -0.56 | -0.93* |
| | (0.47) | (0.42) | (0.37) | (0.49) |
| *Government* | -0.08 | -0.41 | 0.56 | 0.71 |
| | (0.45) | (0.40) | (0.35) | (0.46) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\rho$) | 0.39*** | 0.10 | 0.27** | 0.42*** |
| | (0.11) | (0.12) | (0.11) | (0.11) |
| *Intensity (2)* | -1.54 | 0.71 | -2.38** | -1.21 |
| | (1.16) | (1.20) | (0.96) | (1.11) |
| *Intensity (3)* | -2.35** | 0.39 | -1.57* | -1.91** |
| | (0.92) | (1.03) | (0.88) | (0.89) |
| *Intensity (4)* | -1.57 | 0.45 | -2.06* | -1.76 |
| | (1.31) | (1.33) | (1.17) | (1.28) |
| *Intensity (5)* | -2.38 | 0.005 | -6.53*** | -1.24 |
| | (3.05) | (2.96) | (2.50) | (3.21) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A10:**
**SDM Results for Tampa Bay when treating Alternate (median) *Intensity* Measure as Nominal**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity (2)* | 1.22*** | 0.99*** | 0.66* | 1.13*** |
| | (0.39) | (0.34) | (0.35) | (0.40) |
| *Intensity (3)* | 1.32*** | 0.88** | 0.55 | 0.99** |
| | (0.42) | (0.36) | (0.37) | (0.43) |
| *Intensity (4)* | 1.47** | 1.35** | 1.23* | 1.46* |
| | (0.71) | (0.62) | (0.63) | (0.74) |
| *Intensity (5)* | 2.94*** | 2.27*** | 2.55*** | 2.63*** |
| | (0.91) | (0.79) | (0.81) | (1.01) |
| *Conflict* | -0.75*** | -1.39*** | -0.71*** | -0.89*** |
| | (0.24) | (0.21) | (0.21) | (0.24) |
| *Forum-Count* | -0.38* | -0.35* | -0.27 | -0.15 |
| | (0.22) | (0.20) | (0.21) | (0.23) |
| *Uncertain* | 0.04 | 0.04 | -0.06 | -0.21** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Science* | 0.21*** | 0.17*** | 0.31*** | 0.27*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Experience* | 0.54 | -0.13 | -0.08 | -0.21 |
| | (0.36) | (0.31) | (0.32) | (0.37) |
| *Government* | 1.08*** | 0.27 | 0.42 | 0.64* |
| | (0.34) | (0.29) | (0.30) | (0.34) |
| **Spatial Effects** | | | | |
| *Effectiveness* (ϱ) | 0.54*** | 0.41*** | 0.44*** | 0.39*** |
| | (0.08) | (0.08) | (0.09) | (0.09) |
| *Intensity (2)* | -2.01** | -2.66*** | -2.79*** | -1.13 |
| | (0.84) | (0.79) | (0.87) | (0.90) |
| *Intensity (3)* | -2.92*** | -2.22*** | -2.87*** | -2.12** |
| | (0.92) | (0.80) | (0.94) | (0.94) |
| *Intensity (4)* | -1.81 | -0.87 | -1.38 | 0.57 |
| | (2.32) | (2.06) | (2.48) | (2.63) |
| *Intensity (5)* | -3.86** | -2.78* | -3.32** | -3.67** |
| | (1.65) | (1.47) | (1.69) | (1.84) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A11:**
**SDM Results for the California Delta when treating Alternate (median) *Intensity* Measure as Nominal**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity (2)* | 1.09* | -0.59 | -0.23 | 0.04 |
| | (0.59) | (0.55) | (0.47) | (0.61) |
| *Intensity (3)* | 0.91 | -0.62 | -0.15 | -0.05 |
| | (0.56) | (0.52) | (0.45) | (0.59) |
| *Intensity (4)* | 2.05*** | 0.32 | 1.24** | 1.26* |
| | (0.67) | (0.62) | (0.54) | (0.71) |
| *Intensity (5)* | 3.23*** | 0.88 | 2.16*** | 2.19** |
| | (0.92) | (0.86) | (0.75) | (0.97) |
| *Conflict* | -0.82*** | -1.65*** | -1.18*** | -0.53** |
| | (0.22) | (0.20) | (0.18) | (0.23) |
| *Forum-Count* | -0.11 | -0.15 | 0.14 | 0.01 |
| | (0.20) | (0.19) | (0.17) | (0.21) |
| *Uncertain* | 0.34*** | 0.03 | 0.004 | 0.06 |
| | (0.09) | (0.09) | (0.07) | (0.10) |
| *Science* | -0.05 | 0.06 | 0.07 | 0.13 |
| | (0.08) | (0.07) | (0.06) | (0.08) |
| *Experience* | -0.41 | -0.20 | -0.52 | -0.95** |
| | (0.47) | (0.42) | (0.36) | (0.48) |
| *Government* | -0.10 | -0.42 | 0.52 | 0.77* |
| | (0.45) | (0.41) | (0.35) | (0.46) |
| **Spatial Effects** | | | | |
| *Effectiveness* (ϱ) | 0.42*** | 0.09 | 0.25** | 0.46*** |
| | (0.11) | (0.12) | (0.11) | (0.10) |
| *Intensity (2)* | -1.90* | 0.21 | -2.64*** | -1.07 |
| | (1.15) | (1.22) | (0.96) | (1.11) |
| *Intensity (3)* | -2.36*** | 0.59 | -1.26 | -2.18** |
| | (0.91) | (1.04) | (0.88) | (0.87) |
| *Intensity (4)* | -1.41 | 0.59 | -1.69 | -1.47 |
| | (1.32) | (1.35) | (1.18) | (1.30) |
| *Intensity (5)* | -5.10** | -1.78 | -6.09*** | -6.69*** |
| | (2.50) | (2.44) | (2.08) | (2.60) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A12:**
**SDM Results for Tampa Bay when treating Alternate (modal) *Intensity* Measure as Nominal**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity (2)* | 1.31*** | 1.08*** | 0.74** | 1.20*** |
| | (0.42) | (0.36) | (0.37) | (0.42) |
| *Intensity (3)* | 1.35*** | 0.81** | 0.47 | 1.05** |
| | (0.45) | (0.38) | (0.39) | (0.45) |
| *Intensity (4)* | 1.74** | 1.44** | 1.52** | 1.64* |
| | (0.82) | (0.71) | (0.73) | (0.88) |
| *Intensity (5)* | 3.11**** | 2.47*** | 2.77*** | 2.87*** |
| | (0.94) | (0.81) | (0.84) | (1.04) |
| *Conflict* | -0.73*** | -1.30*** | -0.63*** | -0.85*** |
| | (0.25) | (0.22) | (0.22) | (0.26) |
| *Forum-Count* | -0.13 | -0.24 | -0.20** | 0.07 |
| | (0.17) | (0.15) | (0.16) | (0.17) |
| *Uncertain* | 0.06 | 0.05 | -0.06 | -0.20** |
| | (0.09) | (0.07) | (0.07) | (0.09) |
| *Science* | 0.21** | 0.17** | 0.31*** | 0.27*** |
| | (0.08) | (0.07) | (0.07) | (0.08) |
| *Experience* | 0.50 | -0.13 | -0.06 | -0.22 |
| | (0.39) | (0.33) | (0.34) | (0.39) |
| *Government* | 1.18*** | 0.37 | 0.51 | 0.71* |
| | (0.37) | (0.31) | (0.33) | (0.37) |
| **Spatial Effects** | | | | |
| *Effectiveness* (ρ) | 0.52*** | 0.40*** | 0.41*** | 0.36*** |
| | (0.09) | (0.09) | (0.09) | (0.10) |
| *Intensity (2)* | -3.24*** | -3.56*** | -3.32*** | -1.78* |
| | (0.88) | (0.84) | (0.92) | (0.94) |
| *Intensity (3)* | -3.87*** | -2.62*** | -2.94*** | -2.90*** |
| | (0.96) | (0.84) | (0.98) | (0.96) |
| *Intensity (4)* | -2.93 | -0.44 | 0.23 | -0.45 |
| | (2.86) | (2.51) | (2.84) | (2.96) |
| *Intensity (5)* | -3.89** | -2.49* | -2.95* | -3.23* |
| | (1.72) | (1.51) | (1.74) | (1.88) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A13:**
**SDM Results for the California Delta when treating Alternate (modal) *Intensity* Measure as Nominal**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Direct Effects** | | | | |
| *Intensity (2)* | 1.04* | -0.57 | -0.36 | -0.34 |
| | (0.61) | (0.57) | (0.45) | (0.62) |
| *Intensity (3)* | 0.66 | -0.55 | -0.19 | -0.16 |
| | (0.60) | (0.55) | (0.45) | (0.62) |
| *Intensity (4)* | 2.52*** | 0.74 | 1.87*** | 1.96** |
| | (0.76) | (0.70) | (0.57) | (0.79) |
| *Intensity (5)* | 2.58*** | 0.53 | 1.66** | 1.91** |
| | (0.91) | (0.84) | (0.70) | (0.96) |
| *Conflict* | -0.92*** | -1.66*** | -1.20*** | -0.50** |
| | (0.23) | (0.21) | (0.17) | (0.24) |
| *Forum-Count* | -0.14 | -0.11 | 0.06 | 0.06 |
| | (0.21) | (0.16) | (0.14) | (0.19) |
| *Uncertain* | 0.34*** | 0.04 | 0.02 | 0.05 |
| | (0.09) | (0.10) | (0.08) | (0.11) |
| *Science* | -0.05 | 0.03 | 0.04 | 0.17* |
| | (0.08) | (0.08) | (0.06) | (0.09) |
| *Experience* | -0.37 | -0.23 | -0.63* | -1.06** |
| | (0.47) | (0.45) | (0.37) | (0.51) |
| *Government* | -0.17 | -0.44 | 0.58 | 1.19** |
| | (0.44) | (0.45) | (0.37) | (0.51) |
| **Spatial Effects** | | | | |
| *Effectiveness* ($\rho$) | 0.37*** | 0.10 | 0.10 | 0.30** |
| | (0.12) | (0.12) | (0.11) | (0.12) |
| *Intensity (2)* | -1.09 | -0.36 | -2.50*** | -0.87 |
| | (1.16) | (1.14) | (0.88) | (1.11) |
| *Intensity (3)* | -1.39 | 0.66 | 0.32 | -1.38 |
| | (0.89) | (1.01) | (0.87) | (0.85) |
| *Intensity (4)* | -1.24 | -0.73 | -0.85 | 0.008 |
| | (2.16) | (2.03) | (1.74) | (2.26) |
| *Intensity (5)* | -4.03* | -0.80 | -3.05* | -5.89*** |
| | (2.12) | (2.04) | (1.70) | (2.19) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A14: SDM Indirect Effect Results for the California Delta**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Indirect Effects** | | | | |
| *Intensity* | 0.50 | 0.12 | -0.30 | -0.51 |
| | (0.37) | (0.24) | (0.55) | (0.38) |
| *Conflict* | -0.42** | -0.13 | -0.21 | -0.30* |
| | (0.21) | (0.16) | (0.14) | (0.18) |
| *Forum-Count* | -0.07 | -0.01 | 0.02 | 0.01 |
| | (0.11) | (0.02) | (0.03) | (0.13) |
| *Uncertain* | 0.17** | 0.002 | -0.006 | 0.03 |
| | (0.09) | (0.008) | (0.01) | (0.06) |
| *Science* | -0.03 | 0.004 | 0.01 | 0.06 |
| | (0.04) | (0.007) | (0.09) | (0.05) |
| *Experience* | -0.19 | -0.02 | -0.10 | -0.59* |
| | (0.25) | (0.05) | (0.09) | (0.35) |
| *Government* | -0.09 | -0.05 | 0.07 | 0.31 |
| | (0.23) | (0.06) | (0.08) | (0.29) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A15: SDM Total Effect Results for the California Delta**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Total Effects** | | | | |
| *Intensity* | 0.20 | 0.38 | 0.26 | 0.05 |
| | (0.44) | (0.30) | (0.30) | (0.46) |
| *Conflict* | -1.24*** | -1.73*** | -1.31*** | -0.81** |
| | (0.37) | (0.27) | (0.25) | (0.38) |
| *Forum-Count* | -0.22 | -0.16 | 0.10 | 0.03 |
| | (0.31) | (0.20) | (0.20) | (0.34) |
| *Uncertain* | 0.51*** | 0.03 | -0.04 | 0.08 |
| | (0.16) | (0.09) | (0.09) | (0.15) |
| *Science* | -0.07 | 0.05 | 0.07 | 0.16 |
| | (0.12) | (0.08) | (0.07) | (0.13) |
| *Experience* | -0.56 | -0.30 | -0.60 | -1.61** |
| | (0.71) | (0.46) | (0.44) | (0.78) |
| *Government* | -0.26 | -0.59 | 0.43 | 0.86 |
| | (0.67) | (0.44) | (0.43) | (0.73) |
| Observations | 178 | 176 | 185 | 184 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A16: SDM Indirect Effect Results for Tampa Bay**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Indirect Effects** | | | | |
| *Intensity* | -0.82** | -0.42* | -0.51* | -0.60** |
| | (0.35) | (0.25) | (0.26) | (0.29) |
| *Conflict* | -0.55** | -0.59*** | -0.33** | -0.41** |
| | (0.22) | (0.19) | (0.13) | (0.16) |
| *Forum-Count* | -0.27 | -0.23* | -0.21* | -0.04 |
| | (0.18) | (0.12) | (0.12) | (0.10) |
| *Uncertain* | 0.01** | 0.006 | -0.04 | -0.10** |
| | (0.06) | (0.03) | (0.03) | (0.05) |
| *Science* | 0.14** | 0.07** | 0.13** | 0.12** |
| | (0.07) | (0.04) | (0.05) | (0.05) |
| *Experience* | 0.45 | -0.03 | 0.02 | -0.05 |
| | (0.28) | (0.13) | (0.14) | (0.17) |
| *Government* | 0.79*** | 0.15 | 0.20 | 0.30* |
| | (0.30) | (0.13) | (0.14) | (0.17) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Table A17: SDM Total Effect Results for Tampa Bay**

| | *Efficacy* | *Fairness* | *Impact* | *Contribution* |
|---|---|---|---|---|
| **Total Effects** | | | | |
| *Intensity* | -0.21 | -0.05 | -0.05 | -0.70 |
| | (0.41) | (0.28) | (0.30) | (0.33) |
| *Conflict* | -1.33*** | -2.01*** | -1.08*** | -1.31*** |
| | (0.42) | (0.33) | (0.30) | (0.37) |
| *Forum-Count* | -0.66* | -0.79*** | -0.69** | -0.14 |
| | (0.37) | (0.30) | (0.30) | (0.32) |
| *Uncertain* | 0.03 | 0.02 | -0.13 | -0.32** |
| | (0.14) | (0.10) | (0.10) | (0.12) |
| *Science* | 0.35** | 0.25** | 0.44*** | 0.37*** |
| | (0.14) | (0.10) | (0.11) | (0.12) |
| *Experience* | 1.09* | -0.11 | 0.06 | -0.18 |
| | (0.63) | (0.45) | (0.47) | (0.54) |
| *Government* | 1.90*** | 0.52 | 0.67 | 0.97* |
| | (0.59) | (0.41) | (0.44) | (0.49) |
| Observations | 222 | 228 | 227 | 227 |

*Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1*

**Appendix B: control variable questions**

*Political Knowledge* is captured through the following question: "For water issues most important to [you | the organization you represent], would you say that [you know | your organization knows] the policy interests of the most active water management stakeholders in the [__] region?" *Scientific Knowledge* is captured through the following question: "In your opinion, how adequate is the currently-available scientific knowledge to understand the future impacts of water policies?" For each, values range from 0-10 where 0 indicates "do not know their interests" or "not adequate" and 10 indicates "definitely know their interests" or "very adequate". The final measure is the mean value reported by forum participants.

*Conflict* is captured through the following question: "characterize the typical decision processes about water-related issues" in each forum over the past year. Values range from 1-3: 1= "For most decisions in this venue, most groups can gain as long as they can develop a common policy"; 2= "Although most groups can gain from most decisions, there is conflict over who will gain the most"; 3= "For most decisions, one group's gain involves another group's loss." The final measure is the mean value reported by forum participants.

*Experience* is the proportion of actors in a given forum that indicate that their forum participation is "a major part" of their work. *Breadth* is the mean number of forums in which participants of a given forum participate. *Government Agency* is the proportion of actors in a given forum that represent a government agency (as opposed to those who are private entity, NGO, or those that participate on their own behalf).