

## Chapter 9

### Do Watershed Partnerships Enhance Beliefs Conducive to Collective Action?

By Mark Lubell  
Department of Political Science  
Florida State University  
Bellamy 542  
Tallahassee, FL 32303  
850-645-0084, [mlubell@garnet.acns.fsu.edu](mailto:mlubell@garnet.acns.fsu.edu)

Part of: Paul Sabatier, Will Focht, Mark Lubell, Zev Trachterberg, Arnold Vedlitz, and Marty Matlock

Swimming Upstream: Collaborative Approaches to Watershed Management

#### Abstract

Proponents argue that watershed partnerships are better than traditional watershed management institutions at facilitating stakeholder cooperation. Combining elements of Sabatier and Jenkin-Smith's (1993) Advocacy Coalition Framework with transaction cost economics, I argue the decision to cooperate is a function of *collective-action beliefs* related to the benefits and transaction costs of collective action. Hence, the ability of watershed partnerships to facilitate cooperation should be reflected in favorable changes in collective-action beliefs. I examine this hypothesis by comparing the collective-action beliefs of stakeholders in 20 estuaries with EPA's National Estuary Program to stakeholders in 10 estuaries without the NEP.

## Do Watershed Partnerships Enhance Beliefs Conducive to Collective Action?

Our dynamic framework for watershed management argues that one consequence of collaborative institutions is a change in the civic culture of cooperation in a particular watershed. An important aspect of the culture of cooperation is what I term *collective-action beliefs*: beliefs about the nature of estuary problems (e.g., problem severity, diffuseness, and uncertainty) and institutional performance (e.g., conflict resolution, trust among stakeholders, perceived fairness). Collective-action beliefs reflect incentives to cooperate and the costs of cooperation, and therefore directly influence the level of cooperation and ultimately the policy effectiveness of watershed management institutions.<sup>i</sup> In this chapter, I compare the beliefs of stakeholders participating in the USEPA National Estuary Program (NEP) to stakeholders from estuaries without the NEP, which are governed by the fragmented tapestry of traditional regulatory processes.<sup>ii</sup> The NEP is the leading national example of a coastal watershed partnership, and thus my study represents a quasi-experimental design for testing the results of collaborative processes.

The concept of collective-action beliefs combines insights from transaction cost economics (Eggertsson 1990; Libecap 1989; North 1990; Ostrom 1990; Weber 1998) with Sabatier and Jenkin-Smith's (1993) Advocacy Coalition Framework. Transaction cost economics (TCE) maintains that cooperation will be forthcoming when the benefits outweigh the transaction costs (i.e., the information, bargaining, monitoring, and enforcement costs) of negotiating and enforcing collective agreements within a watershed management institution. The transaction costs of collective-action are reduced when there is a good match between the structure (rules and practices) of institutions and the characteristics of the watershed action arena. Thus, because collective-action beliefs reflect the transaction costs of cooperation and institutions affect transaction costs, institutions also affect collective-action beliefs.

While transaction cost economics focuses on the structure of institutions (rules and practices), the Advocacy Coalition Framework focuses on the structure of stakeholder belief-systems. According to the ACF, belief-systems guide stakeholders in assigning problem priorities, understanding causal relationships, and evaluating policies. In particular, the ACF posits that more normative core beliefs about how public policy should be made—such as environmentalism, inclusiveness, and views on property rights—will influence stakeholders' perceptions of estuary problems and institutional performance.

This theoretical synthesis provides me two criteria to assess the ability of watershed partnerships to improve the culture of cooperation. First, I examine whether or not NEP stakeholders will have collective-action beliefs that are more supportive of cooperation than the beliefs of non-NEP stakeholders. If the NEP reduces the transaction costs of cooperation relative to traditional watershed management institutions, then NEP stakeholders should have more favorable beliefs. For example, the literature on social capital argues that social trust reduces the costs of monitoring and enforcing collaborative agreements. In the context of watershed management, trust refers to a belief by one stakeholder that other stakeholders will fulfill the promises and obligations they have made. I will demonstrate that levels of trust, along with other important collective-action beliefs, are higher among NEP stakeholders.

Second, I examine whether or not watershed partnerships alleviate what Lubell (2000b; see also Kenney and Lord 2000) calls *cognitive conflict* and Sabatier, Hunter, and McLaughlin (1987) call the “devil-shift”. Cognitive conflict occurs when policy-core beliefs lead to divergent perceptions of the watershed action arena.<sup>v</sup> For example, disagreements between environmental and economic development interests about the severity of environmental problems often impede cooperation. In particular, I will show that watershed partnerships tend to reduce cognitive conflict

regarding institutional processes, but not regarding the parameters of environmental problems. These findings suggest collaborative processes are best considered as an example of the science of “muddling through” (Lindblom 1959), where agreement on policies can occur without agreement on problem parameters.

My data comes from a combined mail/telephone survey of 1198 stakeholders from 20 estuaries with the NEP and 10 estuaries without the NEP, which provides a comparative perspective that is superior to research designs that look only at watershed partnerships, and not at watersheds without partnerships. For example, Yaffee et al.’s (1996) finding that 74% of ecosystem management efforts have improved stakeholder communication would not make an impressive case if 90% of the ecosystems *without* an ecosystem management program also had improved stakeholder cooperation.

However, this strategy requires a critical causal assumption—differences between NEP and non-NEP stakeholders are attributable to the presence or absence of the NEP. Clearly, the opposite case is possible—the NEP exists in a particular estuary because collective-action beliefs already supported cooperation and cognitive conflict was minimal. There are several reasons that I do not pay more attention to this causality problem in the context of this chapter.

First, personal interviews with NEP stakeholders suggest the NEP program has an independent causal effect on stakeholder belief systems. Many stakeholders noted how the NEP increased their knowledge of environmental problems and their trust and communication with other stakeholders. Second, in a previous paper I explicitly model the presence of the NEP as an endogenous variable using a treatment effects regression model and find no evidence of selection bias. This could be because the geographic distribution of the NEP programs has as much to do with pork barrel politics as placing the NEP in estuaries where the conditions for collective action are best developed. Third, even if the NEP is not the direct causal link (i.e., the stakeholders’ experience in the collaborative process in and of itself does not change belief-systems), any differences between NEP and non-NEP stakeholder at the very least represent different levels of progress in the evolution of cooperation. In this case, the NEP most likely plays an indirect role by providing an incentive for stakeholders to organize in order to secure the nomination.<sup>vi</sup>

In the next section I discuss watershed management as a collective-action problem and the role of beliefs about transaction costs, core beliefs, and watershed institutions in influencing cooperation. Then, I present regression analyses using several key beliefs related to benefits and transaction costs as dependent variables to investigate whether or not the NEP changes belief-systems in ways that would enhance the level of stakeholder cooperation.

### **Transaction Costs, Watershed Institutions, and Belief-Systems**

The transaction cost approach views watershed management as a collective-action problem. Because watershed resources are non-excludable, they are subject to the same collective dilemmas that plague other common-pool resources: overexploitation of ecosystem services (the flow problem), and under-investment in natural capital (the stock problem; see Ostrom 1990).<sup>vii</sup> Additional economic losses are incurred as a result of conflict between stakeholders attempting to secure property rights to watershed resources (Libecap 1989). For example, consider the high costs of environmental litigation under the Endangered Species Act and many permitting processes within EPA, the violent confrontations between Native American lobster fishers and Canadian fisheries authorities, direct action tactics in places like Vail, Colorado, and death threats levied by wise-use groups against environmentalists and natural resource managers. Hence, the welfare gains available from solving watershed problems include both protecting natural resources and reducing the costs of stakeholder conflict (Cheung 1970; Gordon 1954; Ostrom 1990).

Solving watershed collective-action problems requires stakeholder cooperation. Watershed management will be successful when the potential benefits outweigh the transaction costs of cooperation. The welfare gains available from solving the underlying collective-action problems (i.e., reducing resource overexploitation and conflict, preserving natural capital) are the main benefits of cooperation. Transaction costs include the costs of searching for mutually beneficial policies, bargaining over which of those policies are chosen, and monitoring and enforcing the resulting political agreement (Heckathorn and Maser 1987; North 1990). When the net benefits (i.e., benefits minus transaction costs) of watershed management are positive, cooperation between stakeholders should be forthcoming and collective-action problems should be alleviated.

From this perspective, the primary advantage of watershed partnerships is to provide an alternative governance institution that reduces the transaction costs of cooperation in comparison to the traditional command-and-control model. Governance institutions consist of the set of formal and informal rules (what Ostrom 1990 calls “collective-choice” rules) that define how stakeholders make collective decisions about the patterns of behavior that constitute cooperation. Transaction costs are minimized when the structure of the governance institution is congruent with the structure of the collective-action problem. Hence, watershed partnerships should reduce transaction costs to the extent the collaborative governing style of watershed partnerships is better-suited than the command-and-control model to the complex, diffuse, and boundary-spanning nature of problems like non-point source pollution, habitat destruction, and biodiversity. In the next sections I discuss how these changes in transaction costs might be reflected in the belief-systems of stakeholders.

## **Beliefs about Benefits and Transaction Costs**

In the following sections, I identify the specific collective-action beliefs that are related to the perceived benefits and transaction costs of in a watershed and state hypotheses about how those beliefs should *differ* in watersheds with and without a watershed partnership. Because I use the National Estuary Program (NEP) as an example of watershed partnership, these hypotheses will receive empirical testing by examining differences in collective-action beliefs between NEP and non-NEP stakeholders.

### *Beliefs about Watershed Problem Characteristics*

Since one of the main benefits of collective-action is solving environmental problems, stakeholders who believe problems are severe are more likely to cooperate. If stakeholders do not believe environmental problems are severe, then the benefits of collective action appear low and they are not likely to support costly environmental policies. *Thus, to the extent watershed partnerships increase the salience of environmental problems in a watershed, NEP stakeholders will believe watershed problems are more severe.*<sup>viii</sup>

Another important belief about watershed problems is problem diffusion. By problem diffusion, I am referring to the number, diversity, and geographic dispersion of human activities that are causing a particular environmental impact. Diffuse problems raise the transaction costs of command-and-control regulation in ways similar to how migratory fish species increase the costs of fisheries management (Schlager, Blomquist, and Tang 1994). The inability of the National Pollution Discharge Elimination System’s permitting system to handle non-point sources of pollution is a case in point. Non-point pollution comes from heterogeneous, geographically diffuse sources spread throughout the population, which greatly raises the transaction costs of monitoring

and enforcing command-and-control policies. Proponents of watershed partnerships argue collaborative processes, by providing incentives for voluntary action and information about best management practices, have a comparative advantage over traditional watershed policies for solving diffuse problems. *Consistent with this comparative advantage, NEP stakeholders will believe problems are more diffuse, which leads to greater support for partnership policies.*

Lastly, the adequacy of scientific knowledge about watershed problems is related to transaction costs. Because transaction costs are a function of uncertainty, they are high when scientific knowledge is inadequate. The highly interconnected nature of watersheds challenges scientific knowledge because changes in one aspect of an ecosystem have complex, delayed, and serious influences on other aspects of the system (Costanza et al. 1997). General uncertainty about causes and consequences of environmental problems increases the difficulty of allocating the costs and benefits of collective action. Consequently, watershed partnerships like the NEP spend a great deal of time searching for scientific information and commissioning studies on specific watershed problems. *To the extent these research efforts are successful, NEP stakeholders should believe scientific knowledge is more adequate.*

### *Beliefs about Institutional Performance*

In addition to beliefs about problem characteristics, beliefs about institutional performance also affect cooperation. In this paper, institutional performance broadly refers to the ability of an institution to improve the relationships between stakeholders and thus reduce the transaction costs of collective decision-making. I focus on three basic beliefs about institutional performance here: conflict resolution, trust, and fairness.

Since stakeholder conflict is one of the main economic losses of common-pool resource situations, one of the main benefits of a governance institution is its ability to resolve conflict. Proponents argue collaborative processes resolve conflict between watershed stakeholders without resorting to outside legal or administrative arenas. *NEP stakeholders, therefore, should be more likely than non-NEP stakeholders to believe conflict resolution is possible.*

The amount of trust between stakeholders is another important belief that affects transaction costs. Research on social capital has demonstrated that trust, networks of civic engagement, and norms of reciprocity are critical resources for sustaining cooperation (Coleman 1990; Putnam 1993; Taylor and Singleton 1993). High levels of trust reduce transaction costs by reducing uncertainty about stakeholder motivations and behavior. From this perspective, trust encapsulates self-interest—a trustworthy partner in political or economic exchange is one who can be expected to behave in a manner beneficial to the person initiating the exchange.<sup>x</sup> Scherberle (1997) documents the importance of trust for facilitating implementation of environmental policies that span levels of the fragmented federalist system, where implementation requires bargains and coalition building between multiple stakeholders. *By providing an arena for repeated social interaction, the NEP should lead to higher levels of trust.*

However, stakeholders are not willing to participate in a new governance institution if they believe the costs and benefits of collective action are not distributed fairly. Thus, stakeholders who think their interests are not adequately represented in the decision-making process, or who believe that their opponents control the process and outcome of decision-making, are less likely to cooperate. One of the most common complaints environmental groups levy against watershed partnerships is that they represent a compromise to economic interests, allowing them greater local control of policy outputs. Of course, economic interests accuse environmental interests of controlling the process. Conversely, proponents of watershed partnerships argue the inclusive nature of collaboration within watershed partnerships should reduce the tendency of one interest to

dominate decision-making. *Thus, NEP stakeholders should believe policies are fairer and less subject to the domination of a particular narrow interest than stakeholders in non-NEP partnerships*

In sum, if watershed partnerships reduce the transaction costs of watershed management, they should influence this suite of collective-action beliefs in ways that increase attitudinal support and subsequent cooperation. *The testable hypotheses are that in comparison to stakeholders in watersheds without the NEP, stakeholders in watersheds with the NEP should believe that environmental problems are more severe and diffuse, scientific knowledge is more adequate, conflict resolution is more successful, other stakeholders are more trustworthy, and decision-making is fairer.* These types of differences in collective-action beliefs would lead to an increase in attitudinal support for cooperation, which in turn should increase cooperation and the performance of watershed institutions.

### **Policy-core Beliefs and Cognitive Conflict**

However, the formation of collective-action beliefs is not affected exclusively by the benefits and transaction costs of collective action in the watershed action arena. Sabatier and Jenkin-Smith's Advocacy Coalition Framework (ACF) argues that more abstract "policy-core" beliefs specific to how environmental policy should be made will constrain the formation of "secondary" beliefs about specific policy solutions within the watershed action arena. When forming secondary beliefs, people use information processing strategies that give greater weight to information bits that are consistent with their core beliefs, and less weight to inconsistent information (Lubell 2000a). "Cognitive conflict" occurs when people with different policy-core beliefs have different secondary beliefs related to the benefits and transaction costs of collective action within the watershed action arena. Lubell (2000a, 2000b) finds three policy-core beliefs to be particularly important for generating cognitive conflict within the National Estuary Program:

- Environmentalism: Preference for environmental protection over economic development and a general belief in the value of biodiversity.
- Conservatism: Preference for private property rights and a belief that the market is superior to government for determining allocation of natural resources.
- Inclusiveness: Belief that public participation in policy-decisions should be maximized.

The clash between environmentalism and conservatism produces the greatest cognitive conflict. Environmentalists think problems are severe and diffuse, and that economic interests exert undue control over watershed policies. Conservatives think environmental problems are less severe and more concentrated (i.e., somebody else must be responsible), and also that environmental interests exert undue control. As stakeholders express more extreme beliefs from on either side of the environment/property rights debate, they believe systems are much less likely to trust other stakeholders with different perspectives. These divergent beliefs reduce the likelihood of consensus and collective action. When stakeholders cannot even agree on fundamental parameters such as the severity or causes of environmental problems or the fairness of the decision-making process, it is unlikely they will be able to sustain cooperation.

Inclusiveness, on the other hand, somewhat reduces negative perceptions of institutional performance. As stakeholders' commitment to inclusiveness increases, they are more likely to believe the watershed policies are fair and less likely to believe any advocacy coalition has undue influence.

One goal of watershed partnerships is to reduce cognitive conflict by encouraging interaction between advocacy coalitions that are typically in direct opposition. Instead of trying to convince an administrator or judge that their particular viewpoint is right, collaborative learning processes facilitate understanding of divergent viewpoints. The exposure to opposite viewpoints should reduce the motivation of stakeholders to use their core beliefs as guides for information processing. Instead, they should evaluate information about the watershed action arena in a more evenhanded manner in an effort to discover an “optimal” or at least mutually beneficial solution to watershed-scale problems. Moreover, the emphasis on collaborative processes within watershed partnerships should encourage stakeholders to abandon their traditional policy positions in favor of a more common vision. There should be fewer differences between stakeholders with competing core beliefs in terms of how they view critical aspects of the action arena like problem severity, fairness, trust, and interest group influence. *The testable hypothesis is that for NEP stakeholders, policy-core beliefs should have less of an effect on the formation of secondary beliefs.*

To the extent watershed partnerships alleviate cognitive conflict, they can reduce transaction costs and facilitate cooperation. However, the ability of watershed partnerships to reduce cognitive conflict might be substantially greater for beliefs about institutional processes relative to beliefs about the parameters of environmental problems. Proponents of collaborative processes often argue that the negotiation process should create common understanding of about problem characteristics and policy means and objectives. At the same time, critics of collaborative processes argue insistence on agreement might lead to lowest common denominator decisions. But according to Lindblom’s (1959) science of “muddling through”, the test of a good policy is not agreement on means and objectives. Rather, there is often agreement on a particular policy because that policy serves different ends for different actors. This suggests stakeholders in watershed partnerships may often “agree to disagree” on the outlines of environmental problems, but still find common ground through participation in the collaborative *process* as a mechanism of conflict resolution.<sup>xi</sup>

### **Research Design and Methods**

To test the effects of watershed partnerships on collective-action beliefs and cognitive conflict, I use survey data of 1198 stakeholders from 20 estuaries with the US Environmental Protection Agency’s National Estuary Program (NEP) and 10 estuaries without the NEP. The NEP data combines a mail survey sent to a sample of 1668 estuary stakeholders, and a follow-up telephone survey of 796 mail survey non-respondents from 12 of the original 20 NEP sites (See Appendix. The mail survey generated 501 usable responses (30% response rate), and the follow-up telephone survey generated 405 responses (50% response rate), for a combined mail/phone total of 906 NEP respondents (54% response rate for initial sample of 1668).<sup>xii</sup> The non-NEP data consists of telephone interviews from a sample of 466 estuary stakeholders, which generated 312 usable interviews for a response rate of 65% (see Appendix B for complete list of estuaries and response rates).<sup>xiii</sup>

I generated the NEP sample universe by combining lists of contacts provided by EPA’s Office of Wetlands, Oceans, and Watersheds with lists of stakeholders provided by individual NEP directors. The NEP stakeholders were generally individuals directly involved with the Management Conference. Generating the non-NEP sample was considerably more difficult because there were no existing lists of stakeholders. Hence, I generated my own lists by searching the Internet for active projects and interest groups in the particular estuary and using the National Wildlife Federation’s *1998 Conservation Directory* to find additional stakeholders. I then called the initial list of contacts generated by the search process and asked them to identify additional

stakeholders active in the estuary, for a total baseline sample population of 340 contacts. The telephone survey company then used a snowball procedure, which asked the original 340 contacts for more names, to generate 126 more potential respondents, for a total of 446 potential non-NEP respondents.

To demonstrate the survey respondents are representative of a wide range of estuary stakeholders, Table 1 presents a cross-tabulation of respondents according to stakeholder type and location in the federal system. As can be seen, 56% of the sample are government representatives (mostly from administrative agencies), 12% environmental groups, 10% business groups, 7% research, and 16% other types such as citizens-at-large and consultants.<sup>xiv</sup> Clearly, estuary politics is heavily devoted to intergovernmental coordination, but interest groups from both sides of the environment/economy debate and researchers are involved as well. The small proportion of non-governmental actors does not mean they are unimportant; although they constitute a minority of the sample, many individuals represent much larger groups.

**[Table 1 about here]**

Estuary politics also involves stakeholders from all federal levels. Overall, state (33%) and local (26%) stakeholders are the most active players. This makes sense given the central role of state agencies in the NEP process, and the overall role of states in protecting ecosystems within their boundaries. Similarly, local government actors always play an important role in estuary politics because they control land-use, are usually the main operators of drinking, storm, and wastewater treatment facilities, and are always on the lookout for environmental funding from higher levels of the federal system. However, the Federal government is also represented, reflecting the facts that the NEP is an EPA initiative, and many different Federal agencies have jurisdiction over different aspects of estuarine systems. Environmental and business groups are also most likely to come from lower levels of the federal system because estuary politics involve primarily local issues that frequently fall beneath the radar scope of national interest groups.

Before empirically testing the ability of the NEP to change collective-action beliefs and moderate cognitive conflict, I want to quickly discuss how I selected the estuaries included in the study. I attempted to include all 28 NEP estuaries in the study, but only 20 agreed to participate. Fortunately, the 20 NEP estuaries are well distributed geographically and chronologically across the five cohorts (Tier I through Tier V) of the NEP program.

I used geographic proximity as the main criterion to select non-NEP estuaries. I wanted at least one non-NEP estuary from each of the regions represented by NEP estuaries. Matching on regions minimizes the potential biases associated with differences in environmental problems and political cultures. For example, Pacific Northwest estuaries face problems with logging, endangered species, and hydrological alteration. Gulf of Mexico estuaries face problems of emerging development, disappearing wetlands, and the decline of Gulf fisheries. Furthermore, environmental values are more salient in the Northwest than in the Southeast. The secondary criterion I used was population density. Even if estuaries face the same variety of environmental problems within a region, the severity of these problems is exacerbated by the intensity of human settlement.

Unfortunately, the geographic distribution of NEP estuaries makes it impossible to choose estuaries that are identical on all characteristics except the presence of absence of the NEP. EPA's selection process tends to focus on nationally visible estuaries where population pressure is threatening the environmental and economic values of the ecosystem. Hence, NEP estuaries are on average larger, more densely populated, richer, have more environmental problems, more urban land-use, and more agriculture than non-NEP estuaries. In most regions, the most-developed and best-defined estuaries are already part of the NEP, leaving only less-developed areas for comparison.

To control for these differences, the models below include several estuary-level characteristics as control variables: 1990 population density, % agricultural land-use, and total watershed size (miles<sup>2</sup>). These are some of the same estuary characteristics I used in the treatment effects regression model discussed in Lubell (2000a). Here, I choose the alternative strategy of directly including them in linear regression models. Not only does this strategy increase confidence in the current findings, it also serves as an additional analysis to compare with the treatment effects models from the previous paper. The only complication is that because the estuary-level variables spread a single observation across multiple units of analysis, it creates the possibility of correlated error terms between respondents within the same estuary. Hence, all results report Huber-White robust standard errors and allow for correlation between the error terms of respondents from the same estuary (Huber 1967; StataCorp 1999; White 1980, 1982)

### **Does the NEP Change Collective-Action Beliefs?**

The first test involves regressing the critical beliefs about the benefits and transaction costs of collective action on a dummy variable indicator coded [0= Non-NEP estuaries, 1= NEP estuaries], three policy-core beliefs of environmentalism, inclusiveness, and neo-classical conservatism, and the estuary-level control variables. There are seven dependent variables representing collective action beliefs: problem severity, problem diffusion, scientific knowledge, external conflict resolution, trust, fairness, and economic interest domination (see Appendix A for exact question wording). To reiterate, beliefs about attributes of watershed problems include severity, problem diffusion, and scientific knowledge. Beliefs about institutional performance include conflict resolution, trust, overall fairness, and domination by economic interests.

All measures of beliefs, including the dependent variables, are linearly rescaled to a continuous [0,1] range. For the beliefs originally measured on a [0,10] scale, this means dividing the original measurement by ten. This transformation does not change the statistical relationship between the variables, but does provide a convenient way to compare regression coefficients among different variables without using confusing standardized coefficients. When multiplied by 100, the ordinary least squares regression coefficients for the belief variables are interpreted as the change in the expected value (expressed as a percentage of the range of the dependent variable in the sample) of the dependent variables moving across the entire range of the relevant independent variable. For example, if the expected value of trust equals .497 when the NEP dummy and all policy-core beliefs equal zero and the slope coefficient for the NEP dummy equals .050, then *ceteris paribus* the expected value of trust when the NEP dummy equals 1 will be .547 (an absolute change of 5% points). For brevity, I will discuss the effects of the independent variables in terms of *absolute* percentage point change, not to be confused with percent change.<sup>xv</sup>

If the NEP is reducing transaction costs, then the regression coefficient for the NEP dummy in each model should be statistically significant and in a direction that increases the likelihood of cooperation. The NEP dummy coefficient should be positive for problem severity, scientific knowledge, problem diffusion, trust, and fairness, and negative for external conflict resolution and economic interest domination. This analysis will also demonstrate the incidence of cognitive conflict due to differences between stakeholders in terms of their policy-core beliefs. In particular, stakeholders' commitments to environmental and conservative values should affect beliefs about the benefits and transaction costs of collective action in opposite directions, especially for perceptions of estuary problems and economic domination of the policy process (the devil-shift). A commitment to inclusiveness should positively affect perceptions of institutional performance, reflecting a faith in the ability of inclusive decision-making to resolve collective-action problems among competing interests.

**[Table 2 about here]**

Table 2 presents the results of these regressions.<sup>xvi</sup> Most importantly, the NEP dummy is statistically significant and in the right direction in six of the seven models. The NEP increases the expected value of scientific knowledge by 5% points, and problem diffusion by 9%. At the same time, the NEP reduces the belief that conflict must be moved outside the estuary by 15% and that economic interests dominate by 15%, while increasing stakeholder trust by 6% and overall fairness perceptions by 12%. The NEP does not appear to have an effect on perceptions of problem severity. This is most likely due to the fact that both problem severity and the presence of the NEP are partly affected by broader estuary characteristics like watershed size. Given the relationship of these collective-action beliefs to overall levels of attitudinal support for governance institutions (e.g., trust increases attitudinal support), these differences suggest the NEP increases attitudinal support for estuary policies and subsequent cooperation.

The large effects of the NEP on indicators of institutional performance like fairness, conflict resolution, and interest domination corroborates Yaffee et al's (1996) finding that the most obvious effect of ecosystem management is improved communication and cooperation. This is not surprising given how the NEP provides a new forum for stakeholder interaction and dialogue, and emphasizes consensus. However, the NEP also has a strong influence on perceptions of problem diffusion, which reflects the comparative advantage of the NEP for solving diffuse problems like non-point source pollution. The large amount of information generated by the NEP not only increases overall scientific knowledge, but apparently persuades (or reveals to) stakeholders that watershed problems are more complex than point-source discharges. Changing beliefs about problem diffusion in a way that is more consistent with the governing style of watershed partnerships should increase the likelihood of the NEP becoming a stable, self-perpetuating institution.

Cognitive conflict is also apparent. Moving across the range of the environmentalism scale significantly increases beliefs about problem severity by 17% points and problem diffusion by 19%, while conservatism decreases the same beliefs by 10% and 18% respectively. In a confirmation of the devil-shift hypothesis, environmentalism increases the belief that economic interests dominate decision-making by 25%, while conservatism decreases the same belief by 13%. These different perceptions of the estuary action arena reflect the policy preferences of conflicting advocacy coalitions. Environmentalists emphasize problem severity because serious problems receive more public attention and government resources. Conservatives downplay severity to avoid the restrictions and economic costs of environmental regulations. If environmentalists can convince decision-makers that economic interests dominate the policy arena, they may be able to gain more power for themselves. Of course, economic interests will disagree because they do not want to give up any power. These divergent beliefs reflect the traditional battle lines of environmental conflicts, and pose major barriers to consensual decision-making.

The analyses also demonstrate the moderating influence of inclusiveness. Inclusiveness increases trust by 13% and fairness by 11% points, while reducing the perception that conflict will be moved outside the estuary by 13% and that economic interests dominate by 7%. People who place faith in public participation are more optimistic about institutional performance, perhaps reflecting a faith in democratic processes to reduce conflict in a fair manner and build social capital among conflicting interests. Interestingly, inclusiveness also increases beliefs about problem severity by 8% points, and problem diffusion by 14%. Stakeholders' beliefs about estuary problems are consistent with their perspective on the breadth of public participation.<sup>xvii</sup> Broad public participation is more effective for diffuse problems; hence stakeholders who believe

estuary decision-making should be inclusive also think more people are involved in producing the problem, and the problem is more severe.

Judged in terms of its ability to change collective-action beliefs in ways that facilitate cooperation, the NEP appears to be an effective program. Assuming stakeholders' belief-systems reflect the benefits and transaction costs of cooperation with a moderate degree of accuracy, these belief changes are evidence that the NEP does reduce the transaction costs of watershed management. In the next section I analyze whether or not the NEP has the additional effect of alleviating cognitive conflict, which is still clearly present in the above analyses.

### **Does the NEP Moderate Cognitive Conflict?**

To analyze the effect of the NEP on cognitive conflict, I add two interaction terms to the seven regression equations presented above: NEP\*Environmentalism and NEP\*Conservatism.<sup>xviii</sup> To assess the significance of the interaction terms, I first computed all seven regression equations with both interaction terms. To avoid potential problems of multicollinearity, I then dropped any insignificant interaction terms and recomputed the regressions retaining only the significant interactions. I found significant interaction terms for three of the key collective-action beliefs: trust, fairness, and interest domination. Table 3 presents the final results of these analyses.

#### **[Table 3 about here]**

If the regression coefficients for these interaction terms are significant, then the marginal effects of the policy-core beliefs on collective-action beliefs are *conditional* on the presence or absence of the NEP. To compute the effect of a particular policy-core belief in the NEP, the regression coefficient for that policy-core belief must be added to the regression coefficient of the relevant interaction term. In contrast, the effect of a policy-core belief among non-NEP stakeholders is simply the regression coefficient for the policy-core belief alone. For example, the effect of environmentalism on trust for NEP stakeholders is  $(-.179 + .176 = -.003, \text{ or } -.3\%)$ , while for non-NEP stakeholders the effect is  $-.179$  (or  $-17.9\%$ ).

If the NEP completely eliminates cognitive conflict, then the interaction terms should reduce the effects of environmentalism and conservatism to zero for NEP stakeholders (as is the case for the effect of trust in the numerical example above). This would provide evidence that NEP stakeholders are more likely to form their collective-action beliefs using policy-relevant information they encounter while participating in the partnership, and processing that information in an evenhanded manner. In contrast, policy-core beliefs will still have a large effect on the collective-action beliefs of non-NEP stakeholders, leading to divergent perceptions. Non-NEP stakeholders would continue to process information in a biased manner, giving more weight to information consistent with their policy-core beliefs.

#### **[Figure 1 about here]**

To better visualize the results for all models, Figure 1 presents the marginal effects of environmentalism and conservatism for NEP and non-NEP stakeholders for all three collective-action beliefs that have significant interactions. If the NEP reduces cognitive conflict, then the marginal effects of policy-core beliefs among NEP stakeholders should be close to zero. Continuing the trust example, in NEP estuaries, the marginal effect of environmentalism on trust within the NEP equals  $-0.3\%$  points (significant, positive NEP\*Environmentalism interaction), while the marginal effect of conservatism on problem trust within the NEP equals  $3.5\%$  (significant, positive NEP\*Conservatism interaction). In non-NEP estuaries, the marginal effect of environmentalism on trust is  $-17.9\%$  points, while the marginal effect of conservatism equals  $-8.6\%$ . The trust equation demonstrates the first interesting effect: the NEP appears to reduce the tendency of stakeholders with strong policy-core beliefs to distrust other estuary stakeholders, and

even leads to greater trust among conservatives. In non-NEP estuaries, as stakeholders' commitments to both these values increases, they are less likely to trust other stakeholders. *The traditional lines of conflict are clearly apparent in non-NEP estuaries. However, as envisioned by proponents of watershed partnerships, the NEP appears to diminish barriers to the accumulation of social capital.*

Similar reductions in cognitive conflict are seen for both measures of fairness, especially for environmentalism. The marginal effect of environmentalism in non-NEP estuaries equals negative 16.1% points, while in NEP estuaries the marginal effect of environmentalism is positive 5.9%. Environmentalists, in other words, feel their interests are better represented in the NEP. The pattern for interest domination substantiates this conclusion. The strong positive effect (50.6%) of environmentalism on beliefs about economic interest domination in non-NEP estuaries is greatly reduced in NEP estuaries (16.8%). Environmentalists continue to think economic interests have undue influence over NEP policies, reflecting a reluctance to give economic interests any claim over estuary resources. But the devil-shift is much more apparent among non-NEP stakeholders, where moving across the range of the environmentalism scale increases perceptions of economic interest domination by 50.6%, by far the largest effect in any of the models. The NEP\*Conservatism interaction effects are not significant for either measure of fairness. In both NEP and non-NEP estuaries, conservatives are more likely to think environmental policies are unfair, while at the same time believing economic interests do not dominate policy-making.

In terms of its ability to reduce cognitive conflict, the NEP appears to have several positive consequences. It reduces the tendency of strong ideologues to distrust stakeholders from conflicting advocacy coalitions. Environmentalists in particular are more likely to feel their interests are represented and less likely to believe their opponents dominate the process. The positive effects of the NEP on the possibility of collective action are most evident in terms of perceptions of institutional performance. This is consistent with the baseline findings that show the NEP causes the most favorable changes in beliefs about fairness, trust, and conflict resolution.

However, the NEP does not eliminate all cognitive conflict. Especially with respect to problem diffusion and problem severity, conservatives and environmentalists have competing beliefs regardless of institutional structure. They may agree collaborative institutions are superior to adversarial institutions for solving environmental conflicts, but they are still bringing their differences of opinion regarding problem characteristics to the negotiating table.

From the "consensus" or "belief system" perspective, resolving these differences may be necessary for successful policy implementation. However, as the strategy of "muddling through" argues, reaching agreement on a policy solution does not require agreement on causes and consequences (Lindblom 1959). Thus, the ability of the NEP to reduce cognitive conflict over institutional performance suggests that consensus should be defined as agreement on the *process* of resolving conflict and choosing policies despite continuing disagreement over problem characteristics.

### **Conditional Effects of the NEP**

Interaction effects cut both ways. Not only are the marginal effects of policy-core beliefs conditional on the presence or absence of the NEP, the marginal effect of the NEP on collective-action beliefs is conditional on policy-core beliefs. The marginal effect of the NEP in each equation is simply the first derivative with respect to NEP. For example, the marginal effect of conservatism on trust equals  $(-.117 + .176 * \text{environmentalism} + .121 * \text{conservatism})$ . Using these derivatives, Figures 2 and 3 display the marginal effect of the NEP on collective-action beliefs

moving across the range of environmentalism and conservatism respectively, holding the other relevant policy-core belief at the mean level in the sample. Lines with a positive (negative) slope indicate the NEP has a more positive (negative) effect among stakeholders committed to a particular policy-core belief, while flat lines indicate no interaction.

Examining the interactions between the NEP, environmentalism, and conservatism reveals that the positive effects of the NEP reported in Table 1 is in reality concentrated among stakeholders with certain types of policy-core beliefs. Indeed, for some types of stakeholders, the NEP may actually change collective-action beliefs in ways that reduce the likelihood of collective action.

**[Figures 2 and 3 about here]**

Moving across the range of conservatism increases the marginal effect of the NEP on trust from 1.2% points to 13.3%. The ability of the NEP to build trust is actually more pronounced among more conservative stakeholders, confirming the ability of the NEP to build social capital between conflicting advocacy coalitions. Conservatism does not influence the marginal effect of the NEP on either interest domination (-15.1%) or procedural fairness (11.6%), holding environmentalism at the mean.

The ability of the NEP to change attitudes in ways that enhance collective action is most pronounced among strong environmentalists. As seen in Figure 3, moving across the range of environmentalism increases the marginal effect of the NEP on trust from -6.9% to 10.7% points, and fairness from -4.4% to 17.6%, while decreasing beliefs about economic interest domination from 8.8% to -24%. As with strong conservatives, the NEP does a better job of building social capital among strong environmentalists. The effects of the NEP on fairness considerations are particularly interesting. Strong environmentalists think their interests are better represented and economic interests are less dominant in the NEP relative to traditional watershed management. Supporters of economic development, on the other hand, are less likely to think estuary policies are fair. For environmentalists, the NEP represents a superior venue for achieving their policy preferences—which is hardly surprising, given the environmental mission of the EPA.

My analyses of cognitive conflict and the conditional effects of the NEP highlight an important theoretical advancement in the study of collective action, belief-systems and institutions. Institutions and belief-systems cannot be considered independently of one another. The performance of institutions depends on the belief-systems of the actors involved. Stakeholders' belief-systems determine how they process the information generated by the institution, and how they evaluate the governing style of both collective choice and operational rules. For example, the NEP does a better job of improving fairness evaluations among strong environmentalists. This suggests that different types of institutions will be more or less successful in solving collective-action problems when applied to different types of belief-systems. Thinking about the aggregation of belief-systems in a particular watershed as one way to define the concept of political culture, one could argue that policy performance depends on political culture.

At the same time, the functioning of belief-systems depends on institutional structures. In particular, the relationship between policy-core beliefs and collective-action beliefs changes in different institutional settings. For example, in watershed management, the relationships between trust and the policy-core beliefs of conservatism and environmentalism are different in NEP versus non-NEP estuaries. By moderating cognitive conflict, the NEP actually reduces the constraining influence of policy-core beliefs on the formation of secondary, collective-action beliefs. Belief-systems and institutional structures are interconnected components of the overall system of governance.

## **Conclusion: Watershed Management and the Possibility of Cooperation**

The analyses in this chapter demonstrate that watershed partnerships like the National Estuary Program affect the belief-systems of stakeholders in ways that increase the likelihood of cooperation. In comparison to non-NEP stakeholders, on average NEP stakeholders believe estuary problems are more diffuse, estuary policies are fairer and better at conflict resolution, scientific knowledge is more adequate, and other stakeholders more trustworthy. These changes in collective-action beliefs are consistent with the hypothesis that the NEP increases the benefits and decreases the transaction costs of watershed management. The findings corroborate proponents' claims that the structure of watershed management institutions is better suited to the complex structure of watershed collective-action problems than traditional command-and-control policies.

The NEP also reduces cognitive conflict with regard to beliefs about institutional performance. Strong commitments to either environmentalism or conservatism are much less likely to generate distrust among NEP stakeholders than among non-NEP stakeholders. Environmentalists in particular appear to believe their interests are better represented and policy decision-making less dominated by economic interests within the NEP. As stakeholders' commitment to environmental values increases, the NEP becomes a more attractive governance institution. While one possible interpretation of this finding is that the NEP is "captured" by environmental interests, even strong conservatives think the NEP improves the overall level of fairness as long as they have an average level of environmentalism. Only among strong anti-environmentalists does the NEP have negative effect on perceptions of fairness, reflecting the tendency of some economic interests to oppose any environmental policy, whether "new" or traditional.

In general, the NEP appears to have the strongest effects on beliefs about institutional performance. The NEP builds social capital and resolves conflict between competing advocacy coalitions, and is perceived as fairer than traditional watershed management institutions. At the same time, cognitive conflict over institutional processes is less apparent in NEP estuaries. This generalization is not surprising because the most immediate policy change due to the NEP is providing a new venue for stakeholder interaction. Because environmental outcomes are often a longer-term process, changing beliefs about characteristics of watershed problems is also more difficult.

One policy implication of the NEP's strong effect on beliefs about institutional performance is that consensus-based processes should be evaluated from the perspective of "muddling through" (Lindblom 1959). The success of NEP policies may not depend on complete agreement between stakeholders on the characteristics of environmental problems or the means and objectives of watershed policies. Rather, the success of watershed partnerships and other collaborative institutions should be judged with respect to the ability of stakeholders to agree on the legitimacy of the collective-choice process. Effective collective-choice processes do not always eliminate disagreements, but instead find efficient ways to make collective decisions despite disagreements. From this perspective, the advantage of watershed partnerships over traditional command-and-control institutions lies in their ability to reduce the real or perceived transaction costs of collective choice.

The limitations of evaluating watershed partnerships using belief-system criteria deserve reiteration. Belief change is a necessary but not sufficient step in the evolution of collective action. Because expressing beliefs involves minimal costs to an individual, there is no guarantee that belief change is followed by behavioral change. Consequently, belief change may be short-term or fluctuate over time. Actual changes in policy outputs and environmental outcomes are

even further down the chain of causal linkages that lead to the successful resolution of collective-active problems. The challenge facing watershed partnerships is to use belief change as a foundation for building sustainable institutions that structure the behavior of succeeding generations of policy-makers, stakeholders, and citizens, while also surviving fluctuations in political, economic, and ecological fortunes. While the ability of watershed partnerships to change beliefs justifies continuing these policy experiments, the experiments will fail if belief changes do not lead to changes in behavior and environmental outcomes. The next chapter explores whether or not there is at least a short-term link between beliefs like trust and actual agreements and watershed projects.

The challenge facing research on watershed partnerships is to discover valid and reliable methods for measuring behavioral, policy, and environmental changes over time to more comprehensively evaluate the impact of various institutional arrangements. The analysis in this paper takes constitutes a significant improvement over analyses that rely only on qualitative data. While case study work is invaluable to developing hypotheses, testing those hypotheses in a comparative perspective requires quantitative data that can be generalized across different watershed settings. In addition, the sort of conditional analyses conducted in this chapter—where, for example, NEPs had a greater impact on moderating the beliefs of environmentalists than conservatives—would be extraordinarily difficult with only qualitative data.

## **Appendix A: Question Wording and Variable Construction**

Unless otherwise noted, all variables are measured on a disagree/agree scale with integer response values ranging between [0,10], with 0 = strongly disagree and 10 = strongly agree. Specific value labels are included in the descriptions below if needed. For some questions (e.g., problem severity), respondents were asked to evaluate seven specific estuary issues and provide an overall evaluation as well; this analysis uses the overall evaluations. Question wording was slightly different for non-NEP and NEP respondents to reflect participation in different collective choice arenas. Remember that for purposes of analysis all variables were linearly transformed to a [0,1] range.

### **Dependent Variables Measure Collective-Action Beliefs**

#### Problem Severity

Concerning the overall health of your estuary, do you think the problems associated with each issue listed below are very severe, not severe, or somewhere in between? 0= The problems are not severe, 10= The problems are very severe.

#### Science

On average, do you perceive the level of scientific understanding about the causes and causes of problems in your estuary to be very inadequate, very adequate, or somewhere in between? 0 = Scientific understanding is very inadequate, 10= Scientific understanding is very adequate.

#### Problem Diffusion

Would you say that a full resolution of the problem would require changes in the activities or behavior of a small number of citizens and businesses, would it require changes of almost everyone in the estuary, or somewhere in between? 0= Only a small number would need to change, 10= Almost everybody would need to change.

#### External Conflict Resolution

When conflicts arise, do you think that you can resolve conflicts to the satisfaction of your organization with the partnership, or do you think your organization will need to shift the dispute to courts, political, or other administrative arenas? 0= Resolve conflict inside partnership; 10= Shift disputes outside partnership.

#### Trust

Thinking about the range of contacts you have had with other stakeholders, do you completely trust these stakeholders to fulfill the promises and obligations made on each issue in the context of the partnership, completely distrust them, or somewhere in between? 0= Completely distrust, 10= Completely trust.

#### Procedural Fairness (alpha= .76)

1. Overall, the decision-making process in the partnership is fair to all stakeholders.  
Disagree/Agree.
2. My organization's interests and concerns are adequately represented in the partnership.  
Disagree/Agree.

### Economic Domination

Economic interest groups have an undue influence on partnership decisions. Disagree/Agree.

### **Independent Variables Measuring Policy-Core Beliefs**

#### Environmentalism

In general, how would you describe your policy orientation on estuary issues when tradeoffs between environmental protection and economic development are important? 1-7 scale; 1= pro-development, 7= pro-environment.

#### Government Role (alpha = .70)

1. Preserving the rights of individual citizens is more important than protecting the environment. Disagree/Agree.
2. In general, government agencies and regulations intrude too much on the daily lives of private citizens. Disagree/Agree.

#### Inclusiveness

Maximizing the scope of public participation in environmental policy improves policy effectiveness. Disagree/Agree.

## Appendix B: Survey Details

**Table B.1: Survey Response Rates by Estuary and Instrument Type**

<i>NEP Estuaries</i>			
<u>Estuary</u>	<u>Mail</u>	<u>Telephone Follow-up</u>	<u>Total Response Rate</u>
Albemarle-Pamlico, NC	20/101 (20%)	35/81 (43%)	55/101(54%)
Barataria-Terrebonne, LA	24/77 (31%)	N/A	24/77(31%)
Barnegat Bay, NJ	34/115 (30%)	37/81 (46%)	71/115 (62%)
Casco Bay, ME	17/42 (40%)	14/25 (56%)	31/42 (73%)
Charlotte Harbor, FL	40/137 (29%)	57/97 (59%)	97/137 (71%)
Corpus Christi, TX	45/141 (32%)	57/96 (59%)	102/141 (73%)
Delaware Inland Bays, DE	28/92 (30%)	27/64 (42%)	55/92 (60%)
Galveston Bay, TX	10/40 (25%)	N/A	10/40(25%)
Long Island Sound, NY	22/101 (22%)	33/79 (42%)	55/101 (55%)
Lower Columbia River, WA/OR	23/65 (35%)	21/42 (50%)	44/65 (68%)
Maryland Coastal Bays, MD	27/100 (27%)	29/73 (39%)	56/100 (56%)
Mobile Bay, AL	33/105 (31%)	33/72 (46%)	66/105 (62%)
Narragansett Bay, MA, RI	13/32 (41%)	N/A	13/32 (41%)
New Hampshire Estuaries, NH	26/73 (36%)	33/47 (70%)	59/73 (80%)
NY/NJ Harbor	14/42 (33%)	N/A	14/42 (33%)
Peconic Bays, NY	19/111 (17%)	N/A	19/111 (17%)
Puget Sound, WA	6/25 (24%)	N/A	6/25 (24%)
San Francisco Bay, CA	25/73 (34%)	N/A	25/73 (34%)
Tillamook Bay, OR	28/96 (29%)	N/A	28/96 (29%)
Tampa Bay, FL	32/100 (32%)	<u>29/68 (43%)</u>	61/100 (61%)
Unknown, ID Tag Removed	<u>15</u>		
<b>Total</b>	<b>501/1668 (29%)</b>	<b>405/825 (51%)</b>	<b>906/1668 (54%)</b>
<i>Non-NEP Estuaries</i>			
<u>Estuary</u>	<u>Telephone Seeds</u>	<u>Telephone Snowball</u>	<u>Total Response Rate</u>
Apalachicola Bay Estuary	17/22 (77%)	16/18 (89%)	33/40 (83%)
Atchafalaya Bay Estuary	20/23 (87%)	9/16 (56%)	29/39 (74%)
Cape Fear River Estuary	19/34 (56%)	10/16 (63%)	29/50 (78%)
Gray's Harbor Estuary	24/35 (69%)	5/6 (83%)	29/41 (71%)
Lower Saint John's River Estuary	26/39 (67%)	10/19 (53%)	36/58 (62%)
Martha's Vineyard Estuary	14/31 (45%)	5/10 (50%)	19/41 (47%)
Penobscot Bay Estuary	22/42 (52%)	6/10 (60%)	28/52 (54%)
Pensacola Bay Estuary	25/26 (96%)	16/21 (76%)	41/47 (87%)
Saco Bay Estuary	26/42 (62%)	9/9 (100%)	35/51 (69%)
St Andrew's Bay Estuary	<u>28/49 (57%)</u>	<u>5/8 (63%)</u>	<u>33/57 (59%)</u>
<b>Total</b>	<b>221/343 (64%)</b>	<b>91/133 (69%)</b>	<b>312/476 (65%)</b>

Note: Entries in cells are surveys completed divided by total sample number in each estuary, for each type of survey instrument. NEP survey respondents consist of original mail targets, plus a telephone survey follow-up of mail survey non-respondents. N/A indicates estuaries that did not receive a telephone follow-up. Non-NEP telephone survey respondents include original “seed” lists of stakeholders identified by author, and “snowball” list of additional stakeholders identified by seeds. Response percentages are in parentheses. Response rates include respondents who were ineligible because they were not active in the estuary in the 12 months preceding the survey, or who had incorrect contact information. Ineligible respondents constitute the bulk of non-respondents; hence the refusal rate is substantially lower than the response rates reported above.



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**Table 1. Cross-Tabulation of Stakeholder Type by Federal Level**

<i>Federal Level</i>	<i>Stakeholder Type</i>					<u>Total</u>
	<u>Government</u>	<u>Environmental Group</u>	<u>Business Group</u>	<u>Research and Education</u>	<u>Other</u>	
National	134 (11.6%)	16 (1.4%)	19 (1.7%)	23 (2.0%)	22 (1.9%)	214 (18.6%)
State	229 (19.9%)	43 (3.7%)	26 (2.3%)	32 (2.8%)	47 (4.1%)	377 (32.7%)
Regional	94 (8.2%)	37 (3.2%)	27 (2.3%)	14 (1.2%)	46 (3.9%)	217 (18.8%)
Local	170 (14.8%)	39 (3.4%)	28 (2.4%)	3 (0.3%)	54 (4.7%)	294 (25.5%)
<u>Other</u>	<u>16 (1.4%)</u>	<u>5 (0.4%)</u>	<u>10 (0.9%)</u>	<u>6 (0.5%)</u>	<u>13 (1.1%)</u>	<u>50 (4.3%)</u>
<b>Total</b>	<b>643 (56.8%)</b>	<b>140 (12.1%)</b>	<b>110 (9.5%)</b>	<b>78 (6.8%)</b>	<b>181 (15.7%)</b>	<b>1152 (100%)</b>

Note: Cell entries are total number of respondents from each category of stakeholder type and federal level, with percentages of valid sample (N=1152) in parentheses.

**Table 2: Does the NEP Change Collective-Action Beliefs?**

Independent Variables	Dependent Variables: Beliefs about Estuary Problems			Dependent Variables: Beliefs about Institutional Performance			
	<i>Problem Severity</i>	<i>Scientific Knowledge</i>	<i>Problem Diffusion</i>	<i>External Conflict Resolution</i>	<i>Trust</i>	<i>Fairness</i>	<i>Interest Domination</i>
<i>NEP Institution</i>	.006 (.047)	.046 (.018)*	.086 (.037)*	-.151 (.024)*	.055 (.021)*	.116 (.021)*	-.152 (.029)*
<i>Inclusiveness</i>	.075 (.027)*	.047 (.035)	.137 (.029)*	-.130 (.046)*	.133 (.030)*	.114 (.040)*	-.070 (.036)^
<i>Environmentalism</i>	.169 (.032)*	.007 (.026)	.191 (.038)*	.082 (.034)*	-.043 (.029)	.009 (.031)	.251 (.046)*
<i>Conservatism</i>	-.100 (.046)*	-.065 (.033)^	-.180 (.039)*	-.043 (.052)	.007 (.028)	-.022 (.033)	-.126 (.049)*
Watershed Control Variables							
<i>1990 Population Density</i>	.0001(.0001)	.0001 (.0001)	.0001 (.0001)	-.0001(.0001)	-.0001(.0001)	-.0001(.0001)	<.0001(.0001)
<i>% Agricultural Land</i>	.0012 (.0015)	.0018 (.0008)*	.00014 (.0011)	.0015 (.0012)	-.0001(.0008)	.0009 (.0007)	.0023 (.0015)
<i>Total Watershed Area (Miles<sup>2</sup>)</i>	.0004 (.0004)	-.0005 (.0001)*	.0005 (.0002)*	.0007 (.0001)*	-.0003 (.0001)*	-.0004 (.0001)*	.0001(.0002)
Constant	.404 (.052)*	.498 (.044)*	.382 (.047)*	.624 (.049)*	.510 (.044)*	.465 (.047)*	.477 (.042)*
Model Fit	F = 6.70*	F=11.94*	F=12.84*	F=11.93*	F=5.44*	F=7.73*	F=12.25
	R <sup>2</sup> =.079	R <sup>2</sup> =.040	R <sup>2</sup> =.131	R <sup>2</sup> =.080	R <sup>2</sup> =.035	R <sup>2</sup> =.072	R <sup>2</sup> =.117

Note: Cell entries are unstandardized regression coefficients, robust standard errors in parentheses. Hypothesis tests of coefficient=0, \*p<.05, ^ p<.10.

**Table 3: Does the NEP Moderate Cognitive Conflict?**

Independent Variables	Dependent Variables		
	<u>Trust</u>	<u>Fairness</u>	<u>Interest Domination</u>
<i>NEP Institution</i>	-.117 (.068)^	-.044 (.052)	.088 (.054)
<i>Inclusiveness</i>	.133 (.029)*	.118 (.040)*	-.077 (.035)*
<i>Environmentalism</i>	-.179 (.067)*	-.161 (.090)*	.506 (.046)*
<i>Conservatism</i>	-.086 (.030)*	-.021 (.032)	-.128 (.049)*
Interactions			
<i>NEP*Environmentalism</i>	.176 (.067)*	.220 (.091)*	-.328 (.069)*
<i>NEP*Conservatism</i>	.121 (.045)*	---	---
Constant	.641 (.071)*	.589 (.077)*	.292 (.053)
Model Fit	F=11.23*	F=8.34*	F=33.02*
	R <sup>2</sup> =.042	R <sup>2</sup> =.080	R <sup>2</sup> =.127

Note: Cell entries are unstandardized regression coefficients, standard errors in parentheses. Hypothesis tests of slope coefficient=0, \*p<.05, ^ p<.10. Table does not report slope coefficients for watershed control variables, but they were included in the estimation procedure.

Figure 1: Marginal Effects of Policy-Core Beliefs in NEP vs. Non-NEP Estuaries

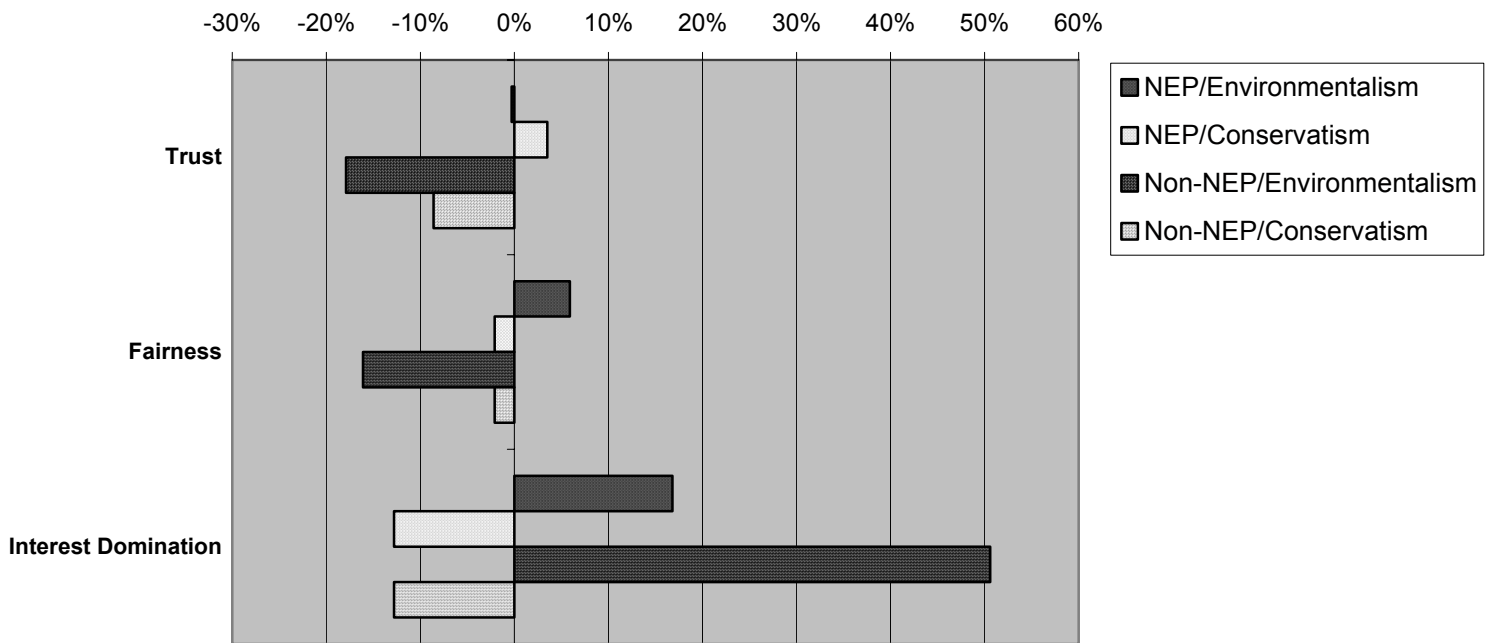


Figure 2: Marginal Effect of the NEP as a Function of Conservatism

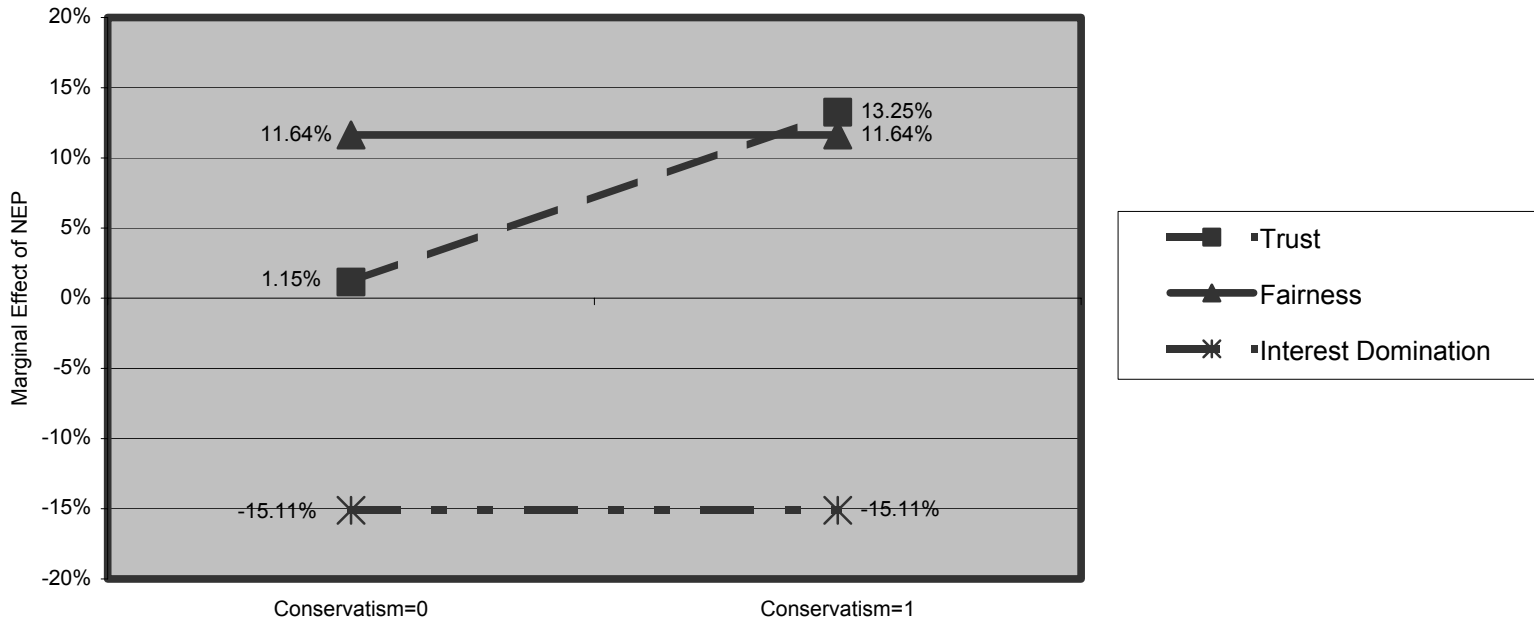
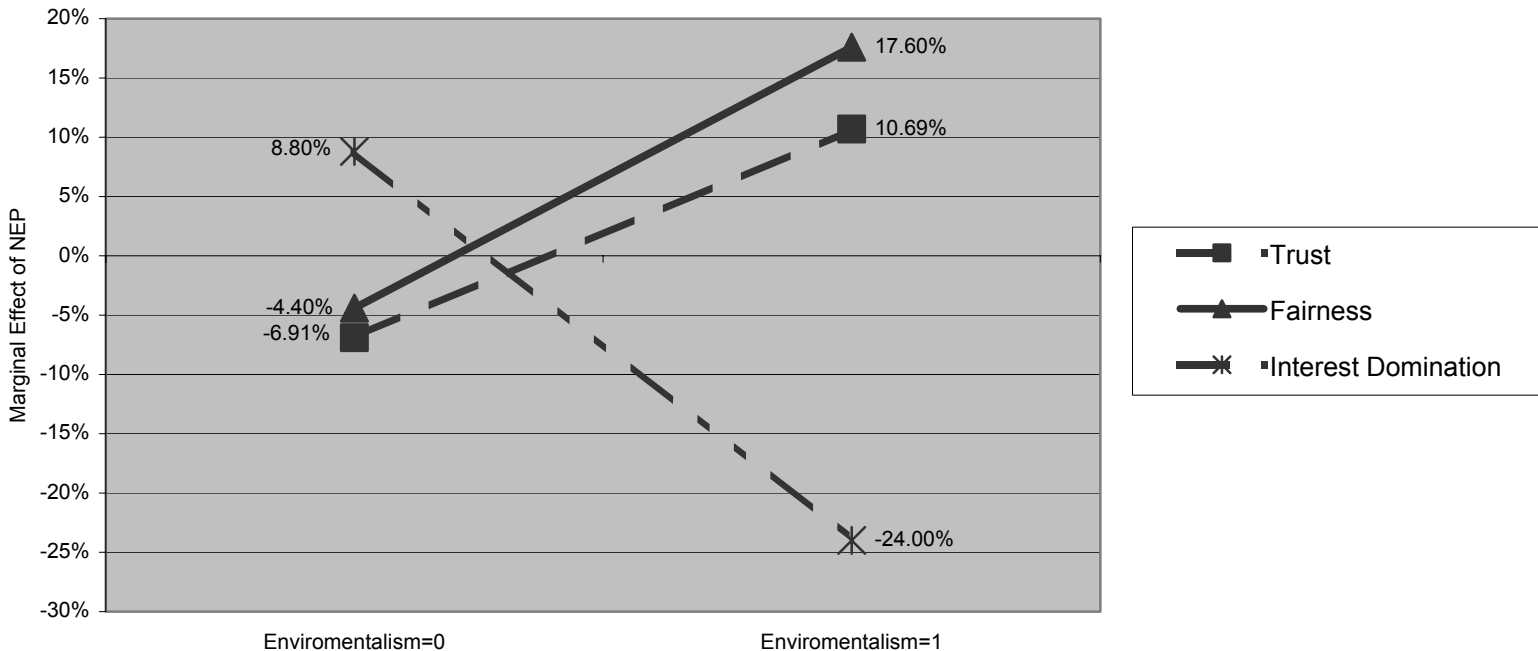


Figure 3: Marginal Effect of the NEP as a Function of Environmentalism



<sup>i</sup> This assumes a close correspondence between beliefs and behavior for political elites, a proposition with substantial supporting evidence (Mazmanian and Sabatier, 1980; Azjen and Fishbein, 1980; Poole and Daniels, 1985).

<sup>ii</sup> Established under Section 320 of the 1987 Clean Water Act Amendments, the NEP is a model for watershed partnerships. States nominate estuaries for inclusion into the NEP; there are currently 28 NEP estuaries around the country. For those estuaries that meet EPA criteria, the EPA signs an agreement with the nominating state(s) that authorizes the formation of a Management Conference consisting of private and public stakeholders from all levels of the federal system. The Management Conference is a collaborative 3-5 year planning process that brings all these actors together to produce a Comprehensive Conservation Management Plan (CCMP). The CCMP identifies estuary problems, the policy actions needed to address those problems, and in many cases the public and private stakeholders who are expected to implement the policies. There is usually an extensive period of fact-finding involving factors of concern to different stakeholders. The decision rules tend to be relatively consensual. Face-to-face negotiations normally take several years to negotiate the overall plan. But implementation of specific aspects of the CCMP is normally left to specific member agencies.

**SOMEBODY FIX THIS MICROSOFT SUCKS ERROR**

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<sup>v</sup> Ostrom (1999, 42) defines the action arena as “the social space where individuals interact, exchange goods and services, solve problems, dominate one another, or fight (among the many things that individuals do in an action arena).” Action arenas are further subdivided into action situations and actors. Taken together, I argue the characteristics of the action arena determine the benefits and transaction costs of collective action. For the purposes of watershed management, the watershed and its associated ecological characteristics, institutions, and multiple stakeholders constitute the action arena.

<sup>vi</sup> Of course, it is clearly important to understand the causal processes involved as completely as possible, and I am not trying to evade the issue. In reality, I believe the NEP plays both an indirect and direct role in the evolution of cooperation within estuaries. The indirect role is providing an incentive to cooperate in order to pursue a successful NEP nomination. But once the Management Conference is in place, the resulting money, studies, meetings, and policies most likely accelerate the evolution of cooperation to an even greater degree. Completely establishing every step of the causal process is beyond the scope of this paper, and maybe even beyond the scope of our research design.

<sup>vii</sup> Ecological economists identify two types of resources in estuaries (and ecosystems in general) that affect human welfare: natural capital and ecosystem services (Constanza et al. 1997). Natural capital is the stock of natural processes in the estuary such as hydrological dynamics, wildlife habitat, and energy exchange systems. Ecosystem services are the flows of resource units produced by natural capital, such as drinking water or fish, which people consume.

<sup>viii</sup> Note that I am assuming beliefs about problem severity are related to the collective outcomes that would occur in the absence of successful policies. If stakeholders view problem severity as an indicator of institutional performance, then watershed partnerships that make people think problems are worse would actually decrease cooperation.

In fact, results from a previous analysis showed problem severity did not have a significant effect on attitudinal support in either direction. It is probably the case that questions about problem severity elicit thoughts about the baseline problem among some stakeholders, and thoughts about institutional performance among others. Hence, there would be a tendency for these two types of question answers to cancel each other out on average. Given the centrality of the problem severity concept in many theoretical frameworks, further research should disentangle these two possibilities.

<sup>8</sup> In fact, all collective-action beliefs are reflections of self-interest because they act as heuristics for tracking the benefits and transaction costs of collective action. I assume people will only engage in collective action when the feel benefits outweigh costs. However, it is not always the case that a particular stakeholder’s collective-action beliefs are always accurate monitors of watershed characteristics. Collective-action beliefs are subject to persuasion and mistakes, and influenced by stakeholders’ basic ideological viewpoints. However, the process of policy-learning would assume that as stakeholders gain more experience in a particular collective-action arena, their beliefs would become more accurate monitors of benefits and transaction costs.

<sup>xi</sup> In a sense, this idea is similar to the idea that the strength of democracy is not its ability to make all think the same thing. Rather, the strength of democracy is that people agree on the legitimacy of a set of processes for resolving differences in opinion. For example, after the resolution of a court case, the plaintiff and the defendant probably still do not agree on who is right and who is wrong, but both are willing to accept the judge’s decision. Similarly, after the 2000 Presidential elections, most Democrats probably do not agree that George W. Bush is the best choice. However, they are still willing to accept the outcome of the election as legitimate, even despite the Florida fiasco.

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xii The combination of mail and telephone surveys raises the possibility of instrumentation bias. Fortunately, the differences in means between telephone and survey respondents are not significant for most of the variables, so there is little evidence of instrumentation bias.

<sup>xiii</sup> Overall, the response rate compares favorably to surveys of watershed partnerships conducted by other researchers: 51% by Wooley and McGinnis (1999), 41% by Johnson and Cambell (1999), and 42% by Cook (2000).

<sup>xiv</sup> The budget for the telephone survey required me to collapse the number of categories used to identify stakeholder types and position within the federal system. Results from the NEP mail survey present a more detailed picture: 60% government officials (mostly from administrative agencies), 11% environmental groups, 7% marine recreation/fisheries/forestry/agriculture, 5% business and real estate, 9.5% university/education, and 7.5% other. For levels of the federal system, there were 17% national, 10% subnational, 28% state, 17% substate, and 28% local (county, municipality, special district). Similarly, there is little variation in response rate across stakeholder type, with the exception of environmental groups, who are slightly more likely to respond. Overall, the more detailed data confirms my evaluation that the sample population is a good representation of the stakeholders active in estuary policy-making. Whether or not the representation of actor types is “fair” from a normative standpoint is beyond the scope of this paper, although the approximately equal balance of environmental groups and business groups seems promising.

<sup>xv</sup> For those readers not familiar with regression analysis, the precise numerical interpretation of the regression coefficient is not essential. Regression coefficients merely symbolize the causal relationship between two variables, which could be positive, negative, or non-existent. A positive regression coefficient means that as the independent variable increases in value, the dependent variable will also increase in value. A negative coefficient means that as the independent variable increases in value, the dependent variable decreases in value. If a regression coefficient is statistically significant, that means we can be confident the causal relationship exists for all estuary stakeholders. Hence, to assess the validity of my hypotheses, the more casual reader need only examine the sign and significance of each regression coefficient.

<sup>xvi</sup> The largest weakness of these models is the low goodness of fit ( $R^2$ ). Clearly, collective-action beliefs are not only a function of institutional structure and policy-core values. A variety of experiences within a particular watershed management institution, such as the behavior of other stakeholders, also will affect collective-action beliefs. Unfortunately, measuring some of these factors is extremely difficult without direct observational data of many interactions in each estuary, which was beyond the scope of this project. More complete models of collective-action beliefs await further innovations in measurement.

<sup>xvii</sup> There is certainly a case to be made for reciprocal causation here. Stakeholders may believe public participation should be broad because problems are diffuse and serious. If problems were not diffuse and serious, maybe they could be handled quickly by a small group of experts. I do not currently have the data required to examine the dynamics of this relationship in more detail.

<sup>xviii</sup> The interaction terms are the product of the NEP dummy times the relevant policy-core belief scale.