#### **Environmental Governance, Belief-Systems, and Perceived Policy Effectiveness**

**Abstract:** In this paper I combine two existing policy theories, institutional rational choice and the Advocacy Coalition Framework, to explain actor perceptions of the effectiveness of public policies targeting common-pool resource dilemmas in coastal watersheds. Survey data from estuaries with and without the USEPA's National Estuary Program provides evidence for two main hypotheses. First, perceived policy effectiveness is a function of "collective-action beliefs": beliefs about situational variables that determine the benefits and transaction costs of collective action within the estuary action arena. Second, the effects of policy-core beliefs and institutional structure on perceived policy effectiveness among political actors whose policy-core beliefs are congruent with the structure of the institution.

Why do political actors believe public policies are effective? *Perceived effectiveness* refers to a belief on the part of involved actors that public policies are achieving their set goals. This paper attempts to answer this question in the context of common-pool resource (CPR) dilemmas by synthesizing two existing theories of the public policy process, institutional rational choice and Sabatier and Jenkins-Smith's (1993) Advocacy Coalition Framework (Schlager and Blomquist 1995). Research in the institutional rational choice (IRC) tradition at least implicitly assumes perceived effectiveness is a function of explicit cost/benefit calculations based on objective information about the characteristics of the *action arena* in which collective action takes place (Ostrom 1990; Schlager and Blomquist 1995).<sup>1</sup> The Advocacy Coalition Framework (ACF), on the other hand, devotes considerable attention to "the inner world of individuals, to the structure and content of their belief systems"(Schlager and Blomquist 1995: 661). According to the ACF, policies are perceived as effective if they are consistent with the normative foundations of an actors' belief-system.

The main theoretical advance in this paper is to integrate the IRC and the ACF by taking seriously how the structure of belief-systems influences information processing, the subjective representation of the action arena, and subsequent evaluations of policy effectiveness. I focus on two central hypotheses.

First, instead of explicit benefit/cost calculations, perceived effectiveness is a function of what I call *collective-action beliefs*. Collective-action beliefs are derived from perceptions of critical parameters of the action arena that determine the benefits and transaction costs of collective action. The benefits of collective action result from mitigating the losses from overexploitation of CPR and reducing conflict between resource users (Libecap 1989). Transaction costs include searching for alternative policy solutions, bargaining over the resulting set of options, and then monitoring and enforcing the resulting

<sup>&</sup>lt;sup>1</sup> Ostrom's (1999:42) institutional analysis and development framework (IAD, a variant of IRC) defines the action arena as the "social space where individuals interact, exchange goods and services, solve problems, dominate one another, or fight." While the IAD certainly emphasizes the importance of understanding the information-processing capabilities of actors and generally assumes bounded rationality, the theoretical and empirical implications of bounded rationality have not been adequately developed.

political contract (Heckathorn and Maser 1987; Taylor and Singleton 1993). Collective-action beliefs positively related to the net benefits (i.e., benefits minus transaction costs) of collective action will increase perceived effectiveness, while those negatively related to the net benefits of collective action will reduce perceived effectiveness.

Second, belief-systems and institutions are interdependent: individuals will believe policies are effective only when the structure of the governance institution is congruent with that person's policy-core beliefs. *Governance institutions* consist of the collective-choice rules that are "used by appropriators, their officials, or external authorities in making the policies—the operational rules—about how CPR should be managed" (Ostrom 1990: 52). *Policy-core beliefs* consist of normative preferences regarding the appropriate means and ends of public policy, including preferences for different types of governance institutions (Sabatier and Jenkins-Smith 1999). The IRC implies that perceived effectiveness is unconditional on policy-core beliefs—institutions that reduce transaction costs will always be perceived as more effective. The ACF, in contrast, argues that policy-making takes place in complex environments where the relationship between institutions and transaction costs is difficult to decipher. In such uncertain environments, actors use their policy-core beliefs as heuristics to evaluate policy effectiveness.

To give my hypotheses a substantive setting, I examine collective-action problems involved with the governance of estuaries. Estuaries are coastal ecosystems where a fresh water source enters a saltwater body, creating a set of hydrological, chemical, and biological conditions that foster one of the most valuable types of ecosystems in the world (Costanza et al. 1997). I compare perceived effectiveness in estuaries governed mainly by traditional, *adversarial* governance institutions to estuaries featuring new institutions that emphasize cooperation, collaborative planning, and adaptive ecosystem management. According to the IRC perspective, these new *consensual* governance institutions reduce transaction costs because they are better suited to the attributes of estuary collective-action problems than adversarial institutions. Hence, consensual institutions should increase perceived effectiveness among estuary

"stakeholders".<sup>2</sup> However, as the data will demonstrate, the perceived effectiveness of consensual institutions is also influenced by the structure of belief-systems.

A combined mail/telephone survey of 1218 stakeholders from 20 estuaries involved in the US Environmental Protection Agency's National Estuary Program (NEP) and 10 estuaries not involved in the NEP provides the data for hypothesis testing. The NEP is one of the leading national examples of consensual institutions and thus the NEP/non-NEP comparison constitutes a quasi-experiment for testing the effects of different governance institutions on beliefs about policy effectiveness (Achen 1986).

In the next section I discuss how collective-action beliefs influence perceived effectiveness and provide a theoretical tool for synthesizing IRC and the ACF. I then compare NEP and non-NEP governance institutions in terms of the transaction costs of solving estuary dilemmas, and the interdependence between stakeholder belief-systems and governance institutions. Finally, I present empirical analyses that model perceived effectiveness as a function of stakeholder collective-action beliefs, policy-core beliefs about environmental policy, and the structure of estuary governance institutions.

#### **Governance Institutions, Belief-Systems and Perceived Policy Effectiveness**

Institutional rational choice (IRC), which is rooted in neoinstitutional political economy, assumes policy solutions to CPR dilemmas are the output of political contracting for property rights (Eggertsson 1990; Heckathorn and Maser 1987; Libecap 1989; North 1990; Ostrom 1990, 1999; Schlager and Blomquist 1995; Taylor and Singleton 1993; Weber 1998).<sup>3</sup> Rational actors will perceive the resulting

<sup>&</sup>lt;sup>2</sup> By stakeholders, I mean the broad range of governmental and non-governmental actors swept into the "whirlpools" of a particular policy subsystem or issue network (Heclo 1978). Democratic governance depends not only the support of the governed, but also the willingness of government officials to implement the rules in a consistent, credible, and efficient manner (Weimer 1997). A broad focus of this type is justified because all of the actors involved in a particular policy arena have a stake in the outcome—public policy affects political as well as economic welfare. Following the vocabulary used in policy analysis, I will continue to use the term "stakeholders" throughout my discussion.

<sup>&</sup>lt;sup>3</sup> In the context of CPR, political contracting for property rights "includes both private bargaining to assign or adjust informal ownership arrangements and lobby efforts among private claimants, politicians, and bureaucrats to define, administer, and modify more formal property institutions (Libecap 1989, 11)." The product of political contracting is a set of operational rules, which are the policies governing daily decisions about the use, allocation, and distribution of CPR. Schlager and Ostrom (1992, 250) note the reciprocal relationship between operational rules and property rights: "Clarity in analysis is enhanced by recognizing that 'rights' are the product of 'rules' and thus

policies as effective if the benefits outweigh the transaction costs of political contracting. Governance institutions receive particular emphasis because the structure of the governance institution in which political contracting takes places affects transaction costs. Thus, governance institutions that reduce transaction costs should produce more effective policies.

The rational actor model adopted by the IRC "places most of the explanatory weight on situational variables, rather than on assumptions made about the internal calculation process."(Ostrom 1990: 193). The ACF, on the other hand, assumes the proximate causes of behavior are contained in the internal world of the decision-maker and cannot be directly inferred by analyses of external constraints. The "internal world" consists of policy-oriented belief-systems, which are comprised of hierarchically organized sets of concrete and abstract idea elements (Hurwitz and Peffley 1987; Sabatier and Jenkins-Smith 1993, 1999). The lowest level of a belief-system is comprised of secondary beliefs, which are concrete beliefs about elements of the action arena, including the effectiveness of specific policies. At a higher and more abstract level are policy-core beliefs, which define fundamental normative preferences regarding the process and goals of policy-making within a broad policy subsystem such as environmental or health policy. Policy-core beliefs influence the formation of secondary beliefs because they act as cognitive filters, which affect information processing by causing people to resist (accept) information that is inconsistent (consistent) with their policy-core beliefs. The idea of policy-core beliefs represents a significant departure from IRC—perceived effectiveness is not just a function of objective costs and benefits, but also whether or not a particular public policy is embodies values consistent with the normative preferences defined by policy-core beliefs.

The remainder of this paper attempts to identify the causes of perceived effectiveness using theoretical tools that combine the IRC's focus on the objective characteristics of the action arena with the ACF's focus on the belief-systems of individuals. I turn first to the concept of *collective-action beliefs*.

not equivalent to rules. 'Rights' refer to particular actions that are authorized. 'Rules' refer to the prescriptions that create authorizations. A property right is the authority to undertake particular actions related to a specific domain. For every right an individual holds, rules exist that authorize or require particular actions in exercising that property right.''

#### **Collective-Action Beliefs and the Estuary Action Arena**

Collective-action beliefs are secondary beliefs about those critical parameters of the action arena that influence benefits and transaction costs. As such, collective-action beliefs essentially bridge the internal world of the decision-maker and the external characteristics of the action arena. This leads to my first hypothesis:

# Hypothesis 1: The greater the degree to which stakeholders subscribe to collectiveaction beliefs related to increasing *net benefits* (benefits minus transaction costs) of collective action, the higher the level of perceived policy effectiveness.

There is no guarantee that collective-action beliefs are accurate reflections of action arena characteristics at any given time. Boundedly rational stakeholders often misperceive information about the action arena due to limited cognitive capacity or form biased beliefs because policy-core beliefs act as cognitive filters. Especially when first encountering a new action arena, stakeholders may have incorrect beliefs (e.g., a person might think a particular industrial discharge has no effect on human health, when in fact it does). However, I argue that as people experience the wide range of collective dilemmas in society, they learn to use collective-action beliefs as decision-making heuristics (Scholz and Lubell 1998a, b). Over time, people learn to fine-tune their collective-action beliefs to be appropriate for different types of collective dilemmas, ranging from family conflict, to voting, to participation in CPR situations. By adapting to reflect the most critical aspects of any given collective dilemma, collective-action beliefs are instrumental heuristics that reduce the cognitive requirements of decision-making and become more accurate monitors of the net benefits of collective action as policy learning occurs. Hence, collective-action beliefs are the proximate causes of evaluations of policy effectiveness and subsequent collective-action behavior at any given moment. Even if they are initially incorrect, people have learned to rely on collective-action beliefs as adaptive heuristics.

The job of the theorist is to assert the connection between those critical parameters of the action arena and benefits/transaction costs. Demonstrating the expected empirical relationship between collective-action beliefs and perceived effectiveness provides evidence for the asserted theoretical

connections. The rest of this section describes the collective-action beliefs related to the three important characteristics of the action arena that Ostrom (1999) argues broadly define the benefits and transaction costs of collective action: characteristics of the environmental problems in estuaries, institutional processes, and characteristics of other stakeholders.

Beliefs about Problem Characteristics: Problem Severity, Problem Dispersion, and Scientific Knowledge

Beliefs about problem severity are a key question for perceived effectiveness. The property rights literature argues people will support the establishment of a new institution only when they perceive large losses from the degradation of CPR (Barzel 1997; Demsetz 1967; Libecap 1989). In some instances, stakeholders may optimistically believe a new policy is effective just because it exists to address an important CPR problem. This suggests the counterintuitive hypothesis that perceptions of greater problem severity are positively correlated with perceived effectiveness. Alternatively, problem severity might be negatively correlated with perceived effectiveness among more pessimistic stakeholders who support the implementation of a new policy because there is a problem, but may withhold their evaluation of effectiveness until they see actual environmental improvements.

One of the main assumptions of IRC is that transaction costs are rooted in uncertainty, which in turn is related to the costliness of obtaining information about the attributes of goods being exchanged and the performance of agents (Heckathorn and Maser 1987; North 1990). In the face of uncertainty about the causes and consequences of environmental problems in complex ecosystems, scientific research is a critical ingredient for successful policies. Hence, perceived effectiveness should be positively related to the extent to which stakeholders believe scientific knowledge about estuary problems is adequate (thus decreasing uncertainty).

The complexity and associated uncertainty regarding environmental problems is also related to the spatial dispersion of actors using estuary resources (Heckathorn and Maser 1987). Many estuary problems are the product of countless small decisions spread across a wide geographic area, and identifying the marginal contribution of any single source is exceedingly difficult. Spatial dispersion is a defining characteristic of non-point source pollution from agricultural and urban runoff, which are the

largest remaining quality problems in estuaries and other aquatic ecosystems (John 1994). Spatially dispersed problems affect transaction costs in ways similar to how mobile fish populations increase the difficulties of fisheries governance (Schlager, Blomquist, and Tang 1994).

However, proponents argue consensual institutions like the NEP enjoy a comparative advantage in crafting policies for controlling spatially dispersed problems. Hence, stakeholders who believe problems are dispersed will view the NEP as a positive supplement to existing, adversarial governance arrangements. Conversely, people who believe problems are not dispersed may prefer the traditional adversarial structure. For example, those stakeholders who believe that estuary problems are related mostly to point source discharges from sewage treatment plants and factories would be more likely to believe in the effectiveness of existing permit systems authorized by Federal legislation. This suggests an interaction between the institutional structure and beliefs about problem dispersion. Perceived effectiveness and the extent to which stakeholders believe estuary problems are spatially dispersed will be positively related in NEP estuaries, but negatively related in non-NEP estuaries. I will revisit the interdependence between the belief-systems and governance institutions when I consider the role of policy-core beliefs.

#### Beliefs about Institutional Processes: Conflict Resolution, Fairness, and Local Governance

Ostrom (1990) attributes the success of long-enduring CPR institutions to several design principles, all of which, I argue, affect the benefits and transaction costs of political contracting. One principle is the availability of low-cost, local conflict resolution mechanisms. Therefore, the extent to which stakeholders believe it is possible to resolve conflict within the context of existing estuary institutions instead of expanding the scope of conflict to alternative adversarial venues will positively influence perceived effectiveness.

Another principle for long-enduring CPR institutions is the recognition of the legitimacy of locally-crafted rules by external governance authorities. The transaction costs of governance are higher when stakeholders believe policy decisions relevant to the estuary are being made outside the estuary action arena. Local actors often believe they have superior knowledge about estuary problems in comparison to outsiders, and will resist outside decisions in which they do not participate.<sup>4</sup> Consequently, the extent to which stakeholders believe estuary decisions are made outside the local action arena will have a negative effect on perceived policy effectiveness.

Lastly, perceptions of policy effectiveness are related to stakeholders' perceptions of the procedural fairness, which refers to interest representation and control over the collective-choice process. Lind and Tyler (1988) and Tyler (1990) argue persuasively that perceptions of procedural fairness are critical for citizen cooperation with laws and broader support for social and political institutions. Stakeholders whose interests are not represented have a low probability of receiving the gains of political contracting, and may be forced to incur unwanted costs. Thus, the extent to which stakeholders believe the collective-choice process represents their interests and is not dominated by a particular interest group will have a positive effect on perceived effectiveness.

#### Beliefs about Other Stakeholders: Trust, Allies, and Public Entrepreneurs

Like all collective dilemmas, political contracting within CPR dilemmas entails risky exchange relationships because the benefits of collective action experienced by one actor depend on the choices of many others (Williamson 1996). In this context, stakeholders who trust others to fulfill commitments expect higher benefits from collective action, and thus should perceive policies as more effective. The focus on trust is rooted in the literature on social capital, which argues norms of reciprocity, networks of civic engagement, and trust between stakeholders is a critical resource for building cooperation (Coleman 1990; Putnam 1993).

<sup>&</sup>lt;sup>4</sup> Local actors not only include only producer groups like fishers and agriculture, but also local government officials, grassroots environmental groups, and personnel from state and Federal agencies assigned to a particular location.

Issue networks of public and private actors with some stake in estuary policy-making can also reduce the transaction costs of political contracting in several ways (Heclo 1978). First, issue networks create "shadow communities" of stakeholders with common goals that bridge administrative, geographic, and political boundaries (John 1994). Second, issue networks facilitate the transmission of information between these stakeholders, and are used instrumentally to solve problems and achieve goals (Coleman 1990; Lin 1982). Third, issue networks are mechanisms for generating trust, establishing expectations, and creating and enforcing norms (Granovetter 1985). Thus, stakeholders embedded in well-developed issue networks, who report interactions with a large number of "allies" sharing similar values and goals, should perceive policies as more effective.

Stakeholders who believe there is an effective public entrepreneur or leader in their estuary should believe policies are more effective. Public entrepreneurs can reduce the transaction costs of collective action by finding innovative policy tools to solve common problems and coordinating existing policy tools that are currently applied in a fragmented manner (Casson 1982; Kirzner 1985; Schneider and Teske 1995).

#### The Interdependence of Governance Institutions and Policy-Core Beliefs

The second tool I use to combine IRC and the ACF is to argue that policy-core beliefs and institutions have an interdependent effect on perceived effectiveness. While IRC emphasizes the relationship between the structure of governance institutions and transaction costs, the ACF stresses the relationship between the structure of the governance institution and policy-core beliefs. I start by elaborating on the IRC argument in the context of the Environmental Protection Agency's National Estuary Program, which provides the empirical focus for this research.<sup>5</sup>

<sup>&</sup>lt;sup>5</sup> For those estuaries that meet EPA criteria, the EPA signs an agreement with the nominating states 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 planning process that brings all these actors together to produce a Comprehensive Conservation Management Plan (CCMP), which delineates the rights and responsibilities for estuary management. The transaction cost perspective would view the CCMP as the final agreement that results from political contracting in the context of the Management Conference.

In the spirit of Williamson's (1986) argument that hierarchical organizations reduce the transaction costs of specific types of economic transactions while markets are appropriate for others, IRC maintains that institutions reduce transaction costs when the structure of the governance institution is well-suited to the characteristics of the action arena under consideration. I argue the NEP represents a new type of environmental governance institution, which I call a *consensual* institution.<sup>6</sup> Consensual institutions structure the political contracting process in a particular way: they feature inclusive stakeholder participation; produce policies specialized for a particular situation; and rely on voluntary compliance. In contrast, estuaries without the NEP are governed by a fragmented set of traditional *adversarial* institutions (often called command-and-control), which limit the scope of participation, produce standardized rules, and rely on coercive penalties for implementation (John 1994; Marsh and Lallas 1995; Weber 1998).

Proponents argue the structure of consensual institutions is better suited to the characteristics of estuary problems than adversarial institutions, and thus reduces the transaction costs of political contracting. Estuary and other ecosystem-scale problems span administrative/political boundaries, affect multiple environmental media (e.g., air, land, water), and have complex cause-effect relationships with often delayed/invisible environmental responses (John 1994; Marsh and Lallas 1995). The inclusive style of the NEP addresses boundary-spanning problems by reaching out to stakeholders previously confined to isolated subsystems, providing them the opportunity to interact, share information, pool resources, and integrate otherwise redundant or fragmented policies (Rabe 1986).<sup>7</sup> Specialized institutions recognize

<sup>&</sup>lt;sup>6</sup> The NEP is a watershed partnership, one of the most common types of consensual institutions in environmental policy. Kenney et al. (2000) define watershed partnerships as "a primarily self-directed and locally-focused collection of parties, usually featuring both private and intergovernmental representatives, organized to jointly address water-related issues at the watershed level or a similarly relevant physical scale, normally operating outside of traditional governmental processes or forums, typically reliant on collaborative mechanisms of group interaction characterized by open debate, creativity in problem and solution definition, consensus decision-making, and voluntary action."

<sup>&</sup>lt;sup>7</sup> One possible objection to this conjecture is that by including a broader range of stakeholders and addressing a more complex set of issues, the NEP actually raises transaction costs. This may be true in the short-term—many NEP participants complain about the extra time spent at meetings and the slow pace of consensus building. To counter this objection, proponents of consensual institutions argue the consensus process discovers previously unknown policy-solutions, increases the legitimacy of the resulting policy agreements, and creates a set of ongoing social relationships that reduces the costs of adjusting the policy contract to unforeseen contingencies.

the site-specific nature of estuary problems and thus take into account marginal differences between resource users in terms of environmental protection costs and effects on estuary health. Because there are no legal requirements for participation or implementation, the NEP implementation game depends on voluntary cooperation on the part of both government agencies and private interests. In theory, cooperation relies on self-enforcing norms of reciprocity and trust, which should reduce the monitoring and enforcement costs normally associated with environmental compliance (Axelrod 1984). The voluntary nature of the program also allows policy-makers to encourage sustainable behavior among actors who are outside the jurisdiction of existing regulations, like homeowners or landowners who cannot be forced by any existing adversarial policy to implement best management practices on private property. From the IRC perspective, NEP policies should be more perceived as more effective because the NEP reduces the transaction costs of political contracting.

The ACF, on the other hand, argues policy-core beliefs determine preferences over institutional structures. By institutional structure, I mean specifically how the institution is characterized in terms of inclusiveness, specialization, and coercion. From this perspective, consensual institutions are not universally preferred to adversarial institutions because they reduce transaction costs, as the IRC would predict. Rather, stakeholders enter a collective dilemma with pre-existing preferences about how policy-making should occur, and they will think policies are effective when the structure of the governance institution is congruent with their policy-core beliefs. If their policy-core beliefs are wrong by some objective criteria of efficiency, stakeholders may update their policy-core beliefs. However, the updating process is much slower than a rational actor model would suppose because people discount belief-inconsistent information. Furthermore, in uncertain situations where information about costs and benefits is difficult to acquire or process, stakeholders will use their existing policy-core beliefs as default criteria for evaluating policy effectiveness. This leads to the following *congruence* hypothesis about the interdependent relationship between policy-core beliefs and governance institutions:

# Hypothesis 2: A strong commitment to policy-core beliefs congruent with consensual institutions will positively influence perceived effectiveness among NEP

# stakeholders, but negatively influence perceived effectiveness among non-NEP stakeholders.

The congruence hypothesis suggests the possibility of interaction effects between governance institutions and policy-core beliefs with respect to how each influence perceived effectiveness. The interaction can be looked at in two ways. First, as stated in the congruence hypothesis, the effects of policy-core beliefs on perceived effectiveness will be conditional on institutional structure. Policy-core beliefs congruent with the NEP structure will have a positive effect on perceived effectiveness among NEP stakeholders, and a negative effect among non-NEP stakeholders. Second, the effect of the NEP on perceived effectiveness will be conditional on the policy-core beliefs of individual stakeholders. The NEP will increase perceived effectiveness among stakeholders strongly committed to policy-core beliefs congruent with consensual institutions, and decrease support among stakeholders whose beliefs are incongruent. Among more ambivalent stakeholders who are not strongly committed to a particular set of values, the effect of the NEP will be close to zero.<sup>8</sup> Institutions matter, but how they matter depends on the belief-systems of involved actors.<sup>9</sup>

I focus on three policy-core beliefs frequently mentioned by Sabatier and his colleagues as relevant to environmental policy. First, the most commonly analyzed scale is what Sabatier and Zafonte (1997) call the "neo-classical conservatism" scale, which focuses on the proper role of government regulation with respect to property rights and private natural resource-use decisions.<sup>10</sup> People who score

<sup>&</sup>lt;sup>8</sup> As I will show in the analysis, the effect of the NEP on perceived effectiveness is captured by the slope coefficient on a dummy variable coded as [0=non-NEP, 1= NEP]. The congruence hypothesis predicts there will also be a significant interaction between policy-core beliefs and the NEP. Thus, the *marginal effect* (i.e, the first derivative of the regression equation with respect to the NEP dummy) of the NEP will vary conditional on stakeholders' policycore beliefs. The marginal effect will be positive for stakeholders strongly committed to values congruent with consensual institutions, negative for stakeholders with incongruent beliefs, and closer to zero for stakeholders not strongly committed to a particular value system.

<sup>&</sup>lt;sup>9</sup> For the sake of brevity, the discussion below will focus on the first way of looking at the congruence hypothesis, where the influence of policy-core beliefs on perceived effectiveness is conditional on institutional context. However, the reader should keep in mind that the hypothesized interaction effect means the effect of the NEP on perceived effectiveness is a function of policy core beliefs.

perceived effectiveness is a function of policy-core beliefs. The data analysis will explore this issue in more detail. <sup>10</sup> Whether or not this belief is classified as a "deep core" or "policy-core" value depends on which writing the concept appears in. In older works like Sabatier and Jenkins-Smith (1993), neo-classical conservatism is a policycore belief associated with the proper role of governments versus markets in allocating natural resources. In more recent works, however, neo-classical conservatism is a more general deep-core belief that can span multiple policy areas (Sabatier and Zafonte 1997; Zafonte and Sabatier 1998). For my analysis, I will refer to "neo-classical conservatism" as a policy-core belief that applies more narrowly to the domain of environmental policy. This is

high on this scale believe resource decisions should be left to private actors. Most analyses argue the threat to property rights embodied in environmental policies should reduce perceived effectiveness among property-rights advocates. Indeed, I hypothesize that conservatives are less likely to support environmental policies in non-NEP estuaries. However, I expect a commitment to private property rights to increase perceived effectiveness in NEP estuaries because, compared to adversarial institutions, the voluntary, inclusive structure of the NEP is more congruent with conservative beliefs.

The second most commonly analyzed policy-core value is environmentalism. Sabatier and Zafonte (1997) find two measures of environmentalism are positively related to support for San Francisco Bay-Delta protection policies. However, many environmentalists dislike adversarial policies at the ecosystem level because the standardized, exclusive nature of decision-making fails to account for ecosystem idiosyncrasies and excludes important classes of stakeholders. Thus, I expect environmentalism to negatively affect perceived effectiveness within non-NEP estuaries, and have a positive influence within NEP estuaries. Notice how Hypothesis 2 modifies the general focus of the ACF on conflict, which predicts these two beliefs would influence perceived policy effectiveness in opposing directions. Instead, because the NEP is designed to build consensus and address the shortcomings of adversarial institutions for both environmental and property rights interests, environmentalism and conservatism may work in the same direction.

A third important belief concerns the role of public participation in the policy process, which is directly relevant to the inclusiveness of consensual institutions. Many scholars reject the "managerial discourse" of the Progressive Era, which argues technically complex policy decisions like those in environmental policy should be made by rational experts (Williams and Matheny 1995). These scholars argue the key to solving environmental problems is to merge the managerial discourse with a communitarian discourse focused on the importance of building support among citizens and other local actors. The inclusive nature of the NEP implicitly accepts the idea of community building as a necessary

especially justified because the survey questions I use to measure the belief are framed in terms of environmental policy.

component of estuary politics, because solving spatially dispersed environmental problems requires local participation. Hence, the extent to which a stakeholder is committed to inclusiveness has a positive effect on support for the governing institution among NEP stakeholders, but a negative effect among non-NEP stakeholders.

#### **Empirical Analysis of Estuary Stakeholder Beliefs**

The remainder of the paper is devoted to testing the propositions put forth above. In this section I will discuss the survey design, the measurement of the dependent and independent variables, and the statistical analyses.

#### **Survey Design**

My survey data come from respondents in 20 NEP estuaries and 10 non-NEP estuaries. 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. 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/telephone total of 906 NEP respondents (54% response rate from initial sample of 1668).<sup>11</sup> The non-NEP data consists of telephone interviews from a sample of 466 estuary stakeholders, which generated 312 usable responses (67% response rate). Thus, the combined NEP and non-NEP data consist of 1218 respondents from an initial sample of 2130 (57% response rate).<sup>12</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

<sup>&</sup>lt;sup>11</sup> 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. The one variable that did exhibit a problem is the *allies* network question; mail respondents were much more likely to mention allies than phone respondents. Perhaps phone respondents feel uncomfortable providing contact information via telephone. This problem throws some doubt on the validity of the hypothesis tests regarding policy networks.

<sup>&</sup>lt;sup>12</sup> There was some variance in response rates across the estuaries. For the NEP mail survey, the response rate ranged from 17% in Peconic Bays, NY to 41% in Narragansett Bay, RI. For the telephone survey, the response rate ranged from 42% to 73% in NEP estuaries and 46% to 87% in non-NEP estuaries. 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).

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 asking the original 340 contacts for more names. This generated 126 more potential respondents, for a total of 446 potential non-NEP respondents.

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>13</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 smaller 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

<sup>&</sup>lt;sup>13</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.

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 fact 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.

#### Variable Measurement and Hypotheses

I will estimate the following basic linear equation to test my hypotheses:

Perceived Effectiveness<sub>i</sub> = 
$$\hat{\mathbf{a}}'\mathbf{x}_i + d$$
 NEP Estuary<sub>i</sub> +  $\boldsymbol{e}_i$  (1)

The main dependent variable in the analysis is perceived policy effectiveness of estuary policies (See Appendix B for all question wording). The *perceived effectiveness* question focuses on the stakeholders perceptions of whether or not current estuary policies are likely to significantly improve environmental problems.<sup>14</sup>

The presence of the NEP is indicated by a dummy variable coded [0= Non-NEP respondent, 1= NEP respondent]. The sign and magnitude of slope coefficient for *NEP Estuary* ( $\delta$ ) addresses the question of "Do institutions matter?" IRC states that because the NEP reduces the transaction costs of estuary governance relative to adversarial institutions, the slope coefficient will be positive. However, Hypothesis 2 suggests the effect of the NEP on perceived effectiveness will depend on the policy-core beliefs of individual stakeholders, and thus the total marginal effect of the NEP will depend on the signs

<sup>&</sup>lt;sup>14</sup> One immediate criticism of my single-item measure of effectiveness is that it does not adequately capture the underlying concept of perceived effectiveness. While the costs of the telephone survey restricted the number of questions, the mail survey contained multiple measures of policy effectiveness, which allowed me to create reliable scales in a previous analysis. In addition to problem improvement, a 3-item effectiveness scale included questions about general policy satisfaction and likelihood of policy implementation (Cronbach's alpha=.82). Thus, the

and magnitudes of the slope coefficients for both the NEP dummy and the NEP x Policy-core belief interactions discussed below.

In equation (1),  $\mathbf{x}_i$  is the vector of independent variables measuring collective-action and policycore beliefs. During this discussion, I will indicate the hypothesized direction of influence of each independent variable in parentheses. Stakeholder beliefs about characteristics of estuary problems are measured by perceptions of problem *severity* (+), *spatial dispersion* (+ in NEP, - in non-NEP) in terms of the number of people who must change their behavior to improve estuary problem, and the perceived adequacy of *scientific knowledge* (+). Questions about institutional processes measure beliefs about the *conflict resolution* (+) capabilities of estuary governance institutions, the extent to which policy decisions are made *external* (-) to the estuary, the *procedural fairness* (+) of the collective-choice process (2-item scale; Cronbach's alpha= .76), and whether or not *administrative* (-) or *economic* (-) interests dominate the collective-choice process.

Beliefs about other actors are measured with a combination of attitudinal and social network questions. *Trust* (+) is measured by asking respondents whether or not they trust other stakeholders to fulfill their commitments made in the context of the management plan. In the network battery, respondents can report the presence of a political entrepreneur and a maximum of three "allies". *Entrepreneur* (+) is coded as a dummy variable equal to 1 if the stakeholder mentioned the presence of a stakeholder who is displaying effective leadership. *Allies* (+) is a raw count of the number of allies mentioned by a respondent, providing one indicator of the size of issue networks.

I measure three policy-core beliefs: *conservatism*, *environmentalism*, and *inclusiveness*. The congruence hypothesis argues each of these variables should positively influence perceived effectiveness in NEP estuaries, and negatively influence perceived effectiveness in non-NEP estuaries. To capture this interdependence, I include interaction terms that are the product of the NEP dummy and the policy-core

concept of policy effectiveness presented in this paper is related to a variety of positive evaluations of the outputs and outcomes of the political contracting process.

belief variables (e.g., NEP Estuary x Conservatism). An interaction term is also included for the spatial dispersion variable.

Lastly, given the number of government actors in the sample, I include a dummy variable to separate the effects for *government actors* (+). Government actors, especially administrative officials, may believe policies are more effective because they have a vested professional and political interest in keeping environmental issues on the policy agenda. Indeed, the NEP may have less of an effect on government officials if they think of it as one of many possible tools for securing budgetary resources. On the other hand, the NEP may have a larger effect on non-governmental actors because its inclusive governing style is designed to bring non-governmental actors into a collective-choice arena formerly dominated by administrative officials. The change in governing style might be more obvious to political actors who had been attempting to gain access to the estuary decision-making arena.

#### Methodology: Missing Data Imputation and Treatment Effects Model

Two important methodological issues might bias hypothesis testing. First, item non-response common in surveys produced missing data at an average rate of 4.4% for all variables. To avoid the "evils" of listwise deletion (King et al. 1999), I replaced the missing data using Schafer's (1999) NORM software for multiple imputation of missing data under a normal model. The multiple imputation procedure assumes all data in the imputation model is missing at random and jointly normally distributed. Based on these assumptions, the procedure uses iterative Markov Chain Monte Carlo procedures to produce multiple data sets, where missing data is replaced by simulated imputations. I included all attitudinal questions in the imputation model, which converged after 55 iterations and produced five imputed datasets. All statistical results reported in this paper combine the estimates from each of the imputed data sets into a single result using Rubin's (1987) rules for scalar estimands, which take uncertainty into account by using the variance both within and between imputed datasets to compute standard errors for the model coefficients.

Second, the non-random NEP designation process raises a causality question: Does the NEP facilitate collective action and policy success, or does collective action lead to the NEP designation?

Because the NEP designation requires a state-level nomination and federal approval, there is reason to believe the conditions for successful collective action, such as resources for overcoming transaction costs, are already in place before the NEP designation. On the other hand, the effects of non-random selection might be small because wide-scale collective action in estuaries does not develop until NEP activities begin, or because EPA's selection process responds to pork-barrel political considerations that have little to do with the ability of local stakeholders to overcome environmental collective action problems, like delivering tangible benefits to Congressional constituents.

If non-random selection were not an issue, I could estimate the influence of the NEP using straightforward OLS regression on equation (1) as discussed above. However, if perceived effectiveness were systematically higher in estuaries prior to their selection into the NEP, a positive slope coefficient for the NEP dummy would overestimate the influence of the NEP (Achen 1986). To control for the potential selection bias, I estimate a treatment effects regression model using Heckman's two-step procedure as described by Greene (2000, see also Maddala 1983), which models the NEP dummy variable as endogenous. The presence of the NEP is modeled as a probit selection equation, where the NEP is observed if some underlying latent variable representing the capacity for collective action  $(C_i)$  is greater than zero:

$$C_i^* = \tilde{\mathbf{a}}' \mathbf{w}_i + u_i$$

$$NEP_i = 1 \quad \text{if} \ C_i^* > 0, 0 \text{ otherwise}$$
(2)

When  $\varepsilon_i$  and  $u_i$  are correlated, there is a spurious relationship between perceived effectiveness and the NEP due to unmeasured factors that predict both perceived effectiveness and the presence of the NEP. To remedy the problem, the treatment effects model includes the appropriate selectivity correction ( $\lambda_i$ ) term for both NEP and non-NEP participants.

The results of the treatment effects model indicate non-random selection is not a significant problem in this sample (See Appendix A for a discussion of the procedure used to select estuaries and the results of the selection equation portion of the treatment effects model). While all of the independent variables in the selection equation are statistically significant, the estimated lambda coefficients are not significantly different from zero in any model. Even without selection bias effects, the treatment effects models are still the correct model specification because the NEP is an endogenous variable and I report the results of that estimation procedure.<sup>15</sup>

Table 2 presents the results of the treatment effects models. The second column in the table reports the full results including interactions between policy beliefs and the NEP, and the third column excludes the NEP x Policy-belief interactions. Unless otherwise noted, I will confine my discussion of the results to the models in Column 2, which include the NEP x Policy-belief interactions, because they represent direct tests of the congruence hypothesis (Hypothesis 2). All measures of beliefs and attitudes, including the dependent variables, are linearly transformed to the [0,1] range. Hence, when multiplied by 100, the coefficients for the belief variables in the outcome equation are interpreted as the change in the expected value (expressed as an absolute percentage of the range of the dependent variable in the sample) of perceived effectiveness moving across the entire range of the explanatory variable. For example, if the expected value of perceived effectiveness equals .10 when *trust* = 0 and the slope coefficient for trust equals .123, then *ceteris paribus* the expected value of perceived effectiveness when trust =1 will be .223 (.10 + .123=.223, or an absolute change of 12% points).

### [Table 2 about here]

#### The Effects of Collective Action Beliefs

Hypothesis 1, which focuses on the role of collective-action beliefs, receives support in both models. Two indicators of problem characteristics have a significant effect on perceived effectiveness. Moving across the range of the scientific knowledge variable leads to a 17% point increase in perceived effectiveness, reflecting the role of science in decreasing uncertainty and thus transaction costs. Perceptions of spatial dispersion have a significant influence on perceived effectiveness, but the <u>direction</u> of the influence of problem dispersion is different for NEP and non-NEP stakeholders. The significant NEP x Problem Dispersion interaction indicates that problem dispersion has a negative influence on

<sup>&</sup>lt;sup>15</sup> OLS regression estimates of the models in Table 2 are not significantly different from the treatment effects model.

effectiveness among non-NEP stakeholders, and a positive influence among NEP stakeholders. I will examine this conditional effect, which indicates the comparative advantage of consensual institutions for solving spatially dispersed problems, in more detail in the next section. Problem severity does not influence perceived effectiveness. This is probably due to the inability of the survey question to distinguish between optimistic stakeholders who are thinking about the baseline severity of estuary problem and pessimistic stakeholders thinking about whether or not the policies have actually solved the problems.

Taken as a group, beliefs about institutional processes have the most consistent influence on perceived effectiveness. Moving across the range of the conflict resolution scale increases effectiveness by 6% points, while moving across the range of the external decisions scale decreases effectiveness by 9% points. The perceived benefits of environmental policy are clearly linked to the capacity of the estuary institutions to resolve conflict and alleviate policy gridlock within the local action arena. Decisions made outside the estuary increase the transaction costs of solving specialized estuary problems, and also decrease cooperation among stakeholders, who might consider external decision-makers a threat to the credibility of local agreements. Perceptions of procedural fairness have the largest effect, increasing effectiveness by 24% points. Stakeholders obviously place a high value on the adequacy of their representation, because representation allows them to influence the distribution of the costs and benefits of collective action. Similarly, stakeholders who believe business dominates estuary decision-making believe policies are less effective, although the effect of business domination is much smaller (6.6% point decrease for effectiveness) than overall procedural fairness. Stakeholder beliefs about the operation of governance institutions directly influence their evaluations of the final public policies that are the product of political contracting.

With regard to beliefs about other stakeholders, only trust has a significant influence; moving across the range of the trust variable increases effectiveness 12% points. The number of allies mentioned

and the presence of a political entrepreneur have no effect on perceived effectiveness.<sup>16</sup> The strong effect of trust on perceived effectiveness reflects its theoretical importance as an attribute of other actors that decreases the transaction costs of collective action, and the ability of trust to adjust in response to the costs and benefits of collective action.

#### The Interdependence of Institutions and Policy Beliefs

Answering the question of "Do institutions matter?" requires inspecting the partial slope coefficient for the dummy variable indicating the presence of the NEP. IRC suggests the NEP should directly increase perceived effectiveness because consensual institutions reduce the transaction costs of estuary governance relative to adversarial institutions. The positive and significant coefficient on the NEP dummy variable reported in the <u>third</u> column of Table 2 (i.e., the models without the belief interactions) supports this hypothesis. However, the significant interaction with the government actor indicator shows the effect of the NEP is different for governmental and non-governmental actors. For non-governmental actors, the NEP increases perceived effectiveness by 6.5% points, while being a government actor moderates the effect of the NEP to .3% points. The larger influence on the NEP among non-governmental actors highlights how the inclusive nature of consensual institutions expands the boundaries of representation to include private interests. The NEP represents a slight improvement for government actors, but they probably make a smaller distinction between the NEP and the host of other environmental policies they are involved in as part of their overall job profiles.

However, the ACF and the congruence hypothesis (Hypotheses 2) suggest the influence of the NEP on perceived effectiveness is conditional on stakeholders' policy beliefs, and conversely the effects of policy beliefs are conditional on institutional structure. Hence, because government actors also have policy beliefs, the story in the previous paragraph is too simple.

The coefficient estimates for the interaction terms in the effectiveness model (Table 2, column 2) provide strong support for the congruence and problem dispersion hypotheses. The interaction terms for

<sup>&</sup>lt;sup>16</sup> Previous analysis found a significant positive effect of number of allies on attitudinal support when looking only at the NEP mail respondents.

environmentalism, inclusiveness, and problem dispersion are all positive and significant.<sup>17</sup> As mentioned earlier and demonstrated by the positive slope coefficient for the NEP x Problem Dispersion interaction, the effect of the NEP on perceived effectiveness becomes more positive among stakeholders who believe estuary problems are spatially dispersed. This finding reflects the comparative advantage of the NEP over adversarial institutions for dealing with the complex problems of ecosystem governance. As predicted by the congruence hypothesis, the effect of the NEP on perceived effectiveness is more positive among environmentalists and stakeholders who support inclusive environmental decision-making. The continued insignificance of the conservatism variable and interaction suggests some ambivalence about the NEP with respect to the role of government. For example, property rights advocates who prefer zero government intrusion on natural resource decisions may not distinguish much between the NEP and non-NEP because they are both examples of unwanted government policies regardless of their governing style.

To better understand the interdependence between institutions and policy beliefs suggested by the congruence hypothesis, Figure 2 shows how the influence of the NEP depends on the structure of belief systems. Figure 2 graphs the marginal effect of the NEP on perceived effectiveness as a function of environmentalism, inclusiveness, and problem diffusion.<sup>18</sup> The positive slopes of all three lines moving from the minimum to the maximum of the policy-belief scales (x-axis) demonstrate that the effect of the NEP increases as the commitment to congruent policy beliefs increases. Moving across the range of the problem dispersion scale increases the marginal effect of the NEP from –14% to 12% points. Among stakeholders who believe estuary problems are caused by almost everybody in the estuary, the NEP has a positive effect. Among stakeholders who believe only a small number of actors deserve responsibility for

<sup>&</sup>lt;sup>17</sup> As a methodological aside, it is interesting to note that the partial slope coefficients for policy-core beliefs are almost zero in the model without the interactions. The mathematical explanation for this is that the positive and negative effects of the policy-core beliefs seen in the interactive model cancel each other out in the non-interactive model. Substantively, it is clear that the influence of policy-core beliefs cannot be understood without reference to institutional context, and vice versa.

<sup>&</sup>lt;sup>18</sup> I calculated the marginal effects of the NEP by differentiating the regression equations with respect to the NEP, and then computing the actual marginal effect for different levels of policy beliefs. While examining each individual policy belief, I hold the values of all other policy beliefs at their mean and average across governmental/non-governmental stakeholders.

estuary problems, the NEP actually decreases perceived effectiveness. The same type of pattern holds for environmentalism and inclusiveness. Moving across the range of environmentalism increases the effect of the NEP from –6% to 7%, while inclusiveness changes the effect from -5% to 12%.

#### [Figure 2 about here]

Assuming all policy beliefs are free to vary, the NEP has the largest positive effect (24% points) when environmentalism, problem dispersion, and inclusiveness are at their maximums. Conversely, the largest negative effect (-33% points) occurs among those stakeholders whose policy beliefs are not congruent with the NEP: non-environmentalists who believe problems are caused by a small number of actors and environmental decision-making should be exclusive.<sup>19</sup> The effect of the NEP only becomes positive among stakeholders who reach a certain level of commitment to congruent policy beliefs: .53 on the policy dispersion scale, .46 on the environmentalism scale, and .29 on the inclusiveness scale (holding the other policy-beliefs at their means). In other words, the NEP only increases perceived effectiveness among those stakeholders whose policy beliefs are most congruent with the governing style of the NEP, and decreases perceived effectiveness among stakeholders with incongruent beliefs. The NEP makes zero difference among those stakeholders not strongly committed to a particular mixture of policy beliefs. The effects of institutions depend on the structure of stakeholder belief-systems.

Figure 2 suggests two other important substantive points. First, environmentalists are not unwavering supporters of the NEP. The NEP actually decreases perceived effectiveness among environmentalists who believe public participation should be minimized and problems are concentrated among a few actors. Environmentalists of this type may equate consensus building with compromise to economic development interests, and prefer tougher implementation of existing environmental laws through the adversarial process. Second, the interaction effect is largest for problem dispersion (26% points), followed closely by inclusiveness (17%), and smaller for environmentalism (13%). Hence, the most important effect is related to the comparative advantage of the NEP for reducing the transaction

<sup>&</sup>lt;sup>19</sup> As before, the two preceding percentages are averaged across non-governmental and governmental stakeholders, holding conservatism at the mean value.

costs of governing spatially dispersed ecosystem problems, while the congruence between the inclusiveness of the NEP and policy-core beliefs is more important than a general environmental orientation.

#### [Figure 3 about here]

Figure 3 presents the interaction effects from the reverse perspective, and graphs the marginal effects of policy beliefs and actor type conditional on institutional context. As can be clearly seen, the relationship between policy beliefs and perceived effectiveness changes drastically in different institutional contexts, reinforcing the congruence hypothesis. In non-NEP estuaries, moving across the range of inclusiveness, environmentalism, and problem dispersion has a negative effect on perceived effectiveness. Environmentalists who are worried about ecosystem-scale problems and believe in inclusive decision-making are dissatisfied with the existing policies of adversarial institutions. On the other hand, these same values lead to increasing levels of perceived effectiveness in the context of the NEP. The effects of stakeholders' beliefs on perceived effectiveness depend on the governing style of the institution they are being asked to evaluate—belief-systems and institutional context are interdependent. Furthermore, the difference between governmental and non-governmental actors is reduced within the NEP. This is a sign that the consensus building process is bridging differences between governmental and non-governmental actors in terms of their belief-systems, which is exactly what proponents of the NEP claim should happen.

#### Conclusion

The findings in this paper advance the study of collective action and governance in two ways. First, I demonstrate the utility of combining the institutional rational choice approach to governance with the Advocacy Coalition Framework by showing how policy beliefs related to the benefits and transaction costs of collective action affect beliefs about policy effectiveness. Several beliefs about the estuary action arena have an important influence on perceived effectiveness. Stakeholders who believe scientific knowledge about estuary problems is adequate also think policies are effective. Within the context of the NEP, stakeholders who believe estuary problems are spatially dispersed are more likely to think policies

are effective. In contrast, stakeholders in non-NEP estuaries who believe estuary problems are dispersed think policies are ineffective. This difference reflects the comparative advantage of consensual governance institutions for reducing the transaction costs of political contracting for specific types of problems. The policy implication of this finding is that no magic bullets exist for all types of collective dilemmas. Policies are only effective when there is a good fit between institutional structure and action arena characteristics.

Beliefs about institutional processes and other actors are also critical. Stakeholder conflict is an important source of inefficiency in CPR dilemmas. Hence, institutions that successfully resolve conflict within the context of the local collective-choice process improve beliefs about policy effectiveness. Stakeholders who believe their interests are fairly represented and trust other stakeholders to fulfill the terms of the political contract also believe policies are more effective. Both fairness and trust increase the probability of receiving the benefits of collective action, while reducing the probability of being exploited and experiencing unwanted transaction costs. These findings emphasize the political aspects of consensual institutions. Consensual policy-making within the NEP is not just about changing the technical and scientific basis for policy decisions, it is about changing the structure of governance institutions to be more inclusive, voluntary, and specialized.

Second, I show how the effects of consensual institutions like the NEP are conditional on the basic policy-core beliefs of stakeholders. The NEP has a positive effect on stakeholders whose policy-core beliefs are congruent with the governing style of consensual institutions and the environmental goals of the NEP, but has a negative effect on those stakeholders who prefer the governance style of adversarial institutions. From the reverse perspective, the relationship between the policy-core and secondary elements of stakeholders' beliefs systems is conditional on the structure of the governance institution in which they participate.

The theoretical framework applied here is not limited to CPR institutions, and thus it should provide a building block for more general theories of collective action and policy-making. The importance of the belief system/institution interactions points to the utility of merging the IRC focus on

"objective" characteristics of economic and political situations with a focus on political actors' subjective representation of the task environment and the structure of belief systems. Due to bounded rationality, people's belief systems do not always correspond in obvious ways to political and economic analyses of the structure of the policy environment. However, people's beliefs about the task environment are the proximate causes of political behavior. At the very least, this discrepancy increases the noisiness of empirical models based on the rational actor assumption, and in some cases leads to political behavior that appears irrational from the analyst's perspective. Hence, further studies should explore the relationships between the structural aspects of a political action arena and the belief-systems of political actors to discover how policy-learning affects how people translate information from the environment into specific attitudes and behaviors.

#### Appendix A: Selection of Estuaries and Selection Equation Results

The quasi-experimental design in this paper compares 20 estuaries with the NEP to 10 without the NEP. For the NEP estuaries, I attempted to include all 28 estuaries that are currently in the program, 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 the NEP estuaries. Matching on regions increased the likelihood the estuaries would face a similar variety of environmental problems and somewhat comparable political cultures. For example, Northwest Pacific 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.

#### [Table A.1. about here]

Table A.1 compares the NEP and non-NEP estuaries by region and by the geographic, demographic, and political independent variables used in the selection equation portion of the treatment effects model. The independent variables are similar to those found by previous studies to predict the emergence of watershed partnerships: 1990 population density (1000ppl/per miles<sup>2</sup>), total estuary area (1000 miles<sup>2</sup>), percent of urban land-use, environmental problem severity measured on a [0=no problem, 1= severe problem] scale, proportion black population, ratio of rural farm residents/non-farm residents, median income (\$1000), and average proportion of votes cast for the Republican candidate in the 1988 and 1992 Presidential elections. As can be seen, NEP estuaries are generally larger, more densely populated, richer, and have more environmental problems, more urban land-use, and less agriculture than non-NEP estuaries. This is consistent with the hypothesis that EPA's selection process is picking estuaries where population pressure is threatening the environmental and economic values of the ecosystem. In terms of matching, there are few geographically proximate non-NEP estuaries that have a similar level of human settlement. For example, in the Mid Atlantic virtually all of the highly developed estuaries are part of the NEP or the Chesapeake Bay Program. In the Gulf of Mexico, the most developed estuaries are already in the NEP program, leaving only some of the less-developed areas for comparison. The geographic distribution of NEP estuaries makes it difficult to find matching non-NEP estuaries with directly comparable levels of development within the same region. Unfortunately, picking estuaries from different regions with very similar population densities would sacrifice other regional similarities.

The treatment effects model provides some purchase on this problem. As I discussed in the body of the paper, one hypothesis is that developed estuaries have more severe environmental problems and more resources for collective-action, which leads these areas to seek the NEP designation. The treatment effects model controls for this possibility by directly entering these estuary characteristics as independent variables in the selection equation. While the survey data comes from only 20 estuaries, the probit selection equation takes advantage of data available for all 108 major estuaries in NOAA's Coastal Assessment and Data Synthesis System. The variables in the selection equation are measured at the estuary level, and each survey respondent is assigned the data from the estuary in which they are located. Hence, the probit selection equation is run simultaneously on the 1198 individual survey respondents from 30 estuaries, plus 78 estuaries without survey respondents. To avoid giving too much weight to the information provided by an individual survey respondent in the estuary). Following Heckman's two-step procedure as implemented by LIMDEP, the estimated inverse Mill's ratio from the selection equation is then included in the regression outcome equation for only the survey respondents (Achen 1986; Greene 2000; Maddala 1983). The standard errors are also corrected as suggested by Greene (2000). Because

Heckman's procedure is not fully efficient, there is a greater chance of making a Type II (beta) error in testing the hypothesis that the regression coefficients are greater than zero. Hence, conclusions based on standard definitions of statistical significance are conservative.

# [Table A.2. about here]

Table A.2 presents the results of the selection equations for the treatment effects models presented in Table 2 of the text. As can be seen, all of the independent variables are significant and make substantive sense (with the exception of population density, which generally has unstable regression coefficients due to multicollinearity), indicating the selection equation does an adequate job of predicting the presence or absence of the NEP. More importantly, the estimated lambda coefficients are not significantly different from zero in any model. This indicates that selection bias is not a problem, and the effects of the NEP on perceived effectiveness can safely be attributed to the difference in institutional structures.

#### **Appendix B: 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. I display both NEP and non-NEP wording for the dependent variables to give a basic idea of the difference, but for brevity all other variables are reported with NEP wording. Specific wording for all questions is available from the author.

#### Dependent Variable: Perceived Policy Effectiveness

NEP: Are the proposed or agreed upon management actions considered by the partnership very likely to significantly improve the problem, very unlikely to significantly improve the problem, or somewhere in between? 0= Very unlikely to improve, 10= Very likely to improve

Non-NEP: How likely are current government policies to significantly improve the problems of your estuary? 0= Very unlikely to improve, 10= Very likely to improve

Independent Variables: Beliefs about Problem Characteristics

#### 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.

#### 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.

#### 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.

Independent Variables: Beliefs about Institutional Processes

# 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= Shift disputes outside partnership; 10= Resolve conflict inside partnership.

#### External Decisions

Almost all major decisions affecting estuary issues are made outside the partnership. Disagree/Agree.

#### 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.

#### Expert Domination

The partnership is dominated by experts and administrators. Disagree/Agree.

Independent Variables: Beliefs about Other Stakeholders

#### Number of Allies

Think about three people or organizations on which you have relied most heavily in dealing with estuary issues during the past year. Consider the full range of stakeholders, including government agencies, interest groups, and local officials. Please write the full name of the individual and/or organization in the space below. Again, all information will be held in confidence. Variable constructed by summing the number of mentions, with a maximum value of three allies.

#### Entrepreneur

Sometimes, a single individual can make a big difference in watershed partnerships, helping to call attention to an issue or getting people to cooperate when they might not otherwise have been able to work together. Is there a stakeholder in your estuary who is critical in maintaining or energizing the partnership? 0 = No, 1 = Yes.

#### <u>Trust</u>

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.

Independent Variables: 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.

# Conservatism (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.

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			Stakehold	ler Type		
Federal Level	Government	<b>Environmental</b>	Business	Research and	Other	<u>Total</u>
		Group	Group	Education		
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%)
Other	<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>
Total	643 (56.8%)	140 (12.1%)	110 (9.5%)	78 (6.8%)	181 (15.7%)	1152 (100%)

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

Independent Variables	With Policy Belief Interactions	Without Policy Belief Interactions
Problem Characteristics		
Problem Severity	.003 (.030)	.018 (.031)
Problem Dispersion	180 (.044)**	.002 (.025)
Scientific Knowledge	.169 (.029)**	.169 (.029)**
Institutional Processes		
Conflict Resolution	.058 (.023)**	.059 (.023)*
External Decisions	093 (.021)**	080 (.021)**
Procedural Fairness	.244 (.037)**	.256 (.038)**
<b>Business Domination</b>	066 (.023)**	081 (.023)**
Expert Domination	.012 (.024)	.015 (.025)
Beliefs about Other Actors		
Trust	.123 (.033)**	.126 (.033)**
Number of Allies	.005 (.005)	.006 (.005)
Entrepreneur	007 (.012)	007 (.012)
Policy-core Beliefs		
Conservatism	.003 (.052)	.002 (.030)
Environmentalism	098 (.058)^	.005 (.029)
Inclusiveness	115 (.050)*	004 (.028)
Institutional Factors		
NEP Estuary	294 (.083)**	.103 (.033)**
Government Actor	.075 (.022)**	.065 (.023)**
NEP Estuary x Government	073 (.026)**	062 (.027)*
Actor		
Policy Belief Interactions		
NEP x Problem Dispersion	.261 (.053)**	
NEP x Conservatism	.001 (.062)	
NEP x Environmentalism	.132 (.066)*	
NEP x Inclusiveness	.170 (.060)**	
Constant	.524 (.075)**	.233 (.052)**
Diag	nostic Statistics for Non-Random Se	election
Lambda (λ)	002 (.015)	003 (.015)
Notes: Entries in cells are coefficient	ent estimates from maximum likelih	nood treatment effects models.
Standard arrors in paranthasas U	mothesis tests of coefficient-0 An-	10  *n < 05  **n < 01  N = 1173  for

Table 2: Treatment Effects Regression Models for Perceived Estuary Policy Effect
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\_ Standard errors in parentheses. Hypothesis tests of coefficient=0, p<.10, p<.05, p<.01. N= 1173 for both models.



Figure 2: Marginal Effect of NEP as a Function of Policy Beliefs



Table A.1. Comparison of NET and Non-NET E	A.1. Comparison of NET and Non-NET Estuaries			
	NEP Estuaries	Non-NEP Estuaries		
Geographic Factors				
Problem Severity	.643 (.223)	.482 (.195)		
Estuary Area (1000 mi <sup>2</sup> )	11.444 (8.577)	9.605 (6.380)		
Population Density 1990 (1000/mi <sup>2</sup> )	.407(.443)	.151 (.408)		
% Urban Land	16.632 (11.631)	6.819 (9.447)		
Demographic Factors				
Proportion African-American	.108 (.095)	.136 (.125)		
Farm/Non-Farm Ratio	.007 (.010)	.012 (.011)		
Median Income (\$1000)	30.021 (6.11)	25.593 (4.54)		
Political Factors				
Proportion Republican Presidential Votes	.470 (.067)	.477 (.090)		
Notes: Data extracted from NOAA's Coastal Asses	ssment and Data Synthesis Sy	stem (http://cads.nos.noaa.gov/)		
and Congressional Quarterly Index (for political da	ta). Contact authors for more	details. Cells contain mean values		

# Table A.1. Comparison of NEP and Non-NEP Estuaries

and Congressional Quarterly Index (for political data). Contact authors for more details. Cells contain mean val in each estuary, with standard deviations in parentheses. T-tests of differences in means = 0 are statistically significant at the .05 level for all variables, unequal variances assumed.

	Perceived Policy Effectiveness		
	With Policy Belief Interactions	Without Policy Belief	
		Interactions	
Geographic Factors			
Problem Severity	.533 (.177)**	.533 (.177)**	
Estuary Area (1000 mi <sup>2</sup> )	.023 (.005)**	.023 (.005)**	
Population Density 1990 (1000/mi <sup>2</sup> )	752 (.093)**	752 (.093)**	
% Urban Land	.042 (.006)**	.042 (.006)**	
Demographic Factors			
% African-American	020 (.398)**	020 (.398)	
Farm/Non-Farm Ratio	-20.955 (3.712)**	-20.955 (3.712)**	
Median Income (\$1000)	.040 (.008)**	.040 (.008)**	
Political Factors			
% Republican Presidential Votes	-3.131 (.642)**	-3.131 (.642)**	
Constant	819 (.355)	819 (.355)*	
	Diagnostic Statistics for Non-Random Selection		
Lambda (λ)	002 (.015)	003 (.015)	

# Table A.2. Probit Selection Equation Results for Treatment Effects Models

Entries in cells are parameter estimates from the probit selection equations of the treatment effects models. Standard errors in parentheses. Hypothesis tests of coefficient=0, ^p< .10, \*p< .05, \*\*p< .01. N= 1173 for all models.