Addressing Diffuse Problems:
Fostering Communities of Interest

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Abstract

Diffuse problems are especially challenging to address because of fragmented governmental authorities and limited abilities to foster desired actions at multiple levels of government and among private entities. We consider how the fostering of communities of interest, comprised of sets of affected governmental and non-governmental entities, around a common purpose helps to overcome these obstacles. The case critical infrastructure protection in the United States serves as an example of a diffuse problem that is the focus of our study. It provides an empirical basis for studying the mobilization of private-sector partners and the fostering communities of interest around aspects of this diffuse problem. We highlight how the mobilization of attention and the fostering of communities of interests among diffuse stakeholders provide indirect approaches to "hidden hand" coordination. But as the case of critical infrastructure protection shows, it is not easy to mobilize or engage disinterested interests around issues that are perceived to be of little immediate consequence.
Introduction

The barriers imposed by boundaries—be they geographic, institutional, intergovernmental, or across sectors—have been widely recognized as important constraints on the ability to address diffuse problems. Contemporary problems such as climate change, immigration, ocean health, and terrorism spillover across different boundaries. Each spans multiple policy areas and necessitates actions by numerous public and private-sector entities among multiple levels of government. A fundamental challenge for such policy problems is addressing this diffuseness. Donald Kettl (2006, 12-13) aptly described the challenge in commenting that “the new challenges of 21st century life—from terrorism to pandemics and international trade to climate change—have undermined the ability of boundaries—any boundaries, drawn anywhere—to deal with truly important and inescapable issues.”

The difficulties of gaining agreement among diverse actors about the seriousness of a given problem and of gaining commitment to address the problem loom greatly for diffuse problems. These difficulties have been addressed by policy process scholars in studying agenda setting and policy implementation. The former literature underscores the multi-dimensional nature of such problems for which gaining attention to more-or-less agreed upon dimensions of a problem is a noteworthy hurdle. Jones and Baumgartner (2005: 208) suggest “attention allocation affects the choice of issues, the choice of issue characteristics, and the choice of solutions.” Implementation scholars have long studied how the lack of agreement about policy goals and divergence in commitments undermine policy implementation. Among other studies, Robert Stoker’s (1991) inquiry about “reluctant partners” shows how implementation gaps are magnified when diffuse partners are charged with carrying out policies with vague goals.

Mobilizing the efforts of diverse actors to pursue common goals in addressing diffuse problems is especially difficult. Mazmanian and Sabatier (1982: 41-42) have argued that the path to overcoming these difficulties lay in clarifying policies and in simplifying implementation structures. But, these remedies fail to confront the realities of American politics that lead to
vague goals, conflicting agendas, and different incentives to address a given problem. They also fail to appreciate the analytic difficulties of disentangling the roots of “wicked problems” that Rittel and Webber (1973) argue characterize many diffuse problems. As we elaborate, a promising route to addressing these challenges lay with fostering communities of interest that pursue common solutions to those problems.

With this contribution we address the challenges of mobilizing and creating communities of interest. We consider how the diffuseness of a problem and the presence of policies with vague goals exacerbate these efforts. Our discussion draws upon findings from the implementation literature as well as insights about collaborative governance as they concern complex problems (see Bardach 1998, Chisholm 1989, O’Toole 2003, Peters 1998). Unlike the dominant emphasis of these literatures on what Pierre and Peters (2005: 124) have labeled technical and managerial approaches to implementing policies that involve numerous actors, our research foci are broader in considering the engagement of multiple private and public sector entities in addressing diffuse problems.

We use the case of critical infrastructure protection (CIP) in the United States to both illustrate the implementation challenges for diffuse problems and as a basis for empirical study. The formal definition of critical infrastructure found in the USA PATRIOT Act (P.L. 107-56) portrays several hallmarks of a diffuse problem: “systems and assets, whether physical or virtual, so vital to the United States that their incapacity or destruction would have a debilitating impact on national security, national economic security, national public health or safety, or any combination of those matters” (2007: 1). The designs for CIP efforts are found in President Bush’s National Strategy for the Physical Protection of Critical Infrastructure and Key Assets (US Office of the President, 2003) and the Department of Homeland Security’s National Infrastructure Protection Plan (2006, updated 2009).

These documents identify 18 different sectors as critical infrastructure foci: Agriculture and Food; Banking and Finance; Chemical Facilities; Commercial Facilities; Communications;
Critical Manufacturing; Dams; Defense Industrial Base; Emergency Services; Energy; Government Facilities; Healthcare and Public Health; Information Technology; National Monuments and Icons; Nuclear Reactors, Materials, and Waste; Postal and Shipping; Transportations Systems; and, Water Systems. One key point is that each of these sectors is itself very diffuse. Recognizing this, the national plans for CIP call for actions by nine lead federal agencies as augmented by efforts of 36 federal agencies, by all states and most municipalities, and the concerted involvement of some 230 different professional associations and trade groups.

Our study considers the efforts to engage members within each of these sectors in addressing critical infrastructure protection as a broader example of efforts to mobilize subnational and private-sector efforts to address diffuse problems. We consider how vision statements serve as mechanisms to bind hitherto disparate interests, relative to CIP, to common goals. We also look to the impact of the makeup of membership in the different sector’s coordinating council work to hinder or foster broader communities of interest. We find that the extent of engagement of different interests and the resultant communities of interest for different sectors rest heavily on the business-related incentives to address critical infrastructure, the degree of engagement of federal partners, and the degree of engagement by prior constituted trade and professional associations.

Conceptual Underpinnings

Beginning with the contributions of Martha Derthick (1972) in studying the failures of federal efforts to create new towns in urban areas and of Pressman and Wildavsky (1973) in studying the failures of economic development programs in Oakland, California, scholars have long observed disjointed policy implementation for policies that are to be implemented by multiple sets of actors. A key contributor to such disjunctions is a divergence in goals among these actors (see Bardach 1977: 85-95) especially within the intergovernmental context (see Stoker 1991: 3-19). In short, implementation gaps arise when actors at multiple levels of
government as well as in both the private and public sectors do not agree about the seriousness of a given problem or have differing ideas about the purpose of the policy being implemented.

Several factors come into play in creating and exacerbating these gaps. One is diffuse problems that lead to differences in incentives to take action and in opinions about the most urgent aspect to be addressed. One notable category of diffuse problems are public risks, conceptualized by Peter Huber (1986: 90) as risks that "are centrally produced or mass-produced, broadly distributed, often temporally remote, and largely outside the individual risk bearer's direct understanding and control." Examples include earthquake risks, the threat of terrorism, and the subject of this research—major disruptions in critical infrastructures. Public risks present classic collective action problems for which there are limited incentives for private or group action in addressing the risks. Those affected by such risks have economic incentives to avert potential losses, but the calculus of decision-making is such that a host of perceptual factors alter economic rationality (see Camerer and Kunreuther 1989). These failures to take action combined with the likelihood of noteworthy disruptions and damage from a catastrophic event provide a rationale for governmental action in calling attention to the risks or otherwise mandating action (see May 1991).

The fact that diffuse problems typically require actions at multiple levels of government as well as by public and private-sector entities is a second complication. Because many policies establish overlapping authorities and responsibilities for implementation, “shared governance” is the norm rather than the exception. But, as studied by May and Williams for disaster policies (1986: 21-28), the nature of this sharing can be quite varied depending on the level of government that takes the lead and the respective levels of expertise (also see Elazar 1984). Robert Stoker (1991: 3-19) suggests this inherent feature of federalism provides the foundation for conflict when there is a divergence in policy goals among the different levels of government. Added to this mix is the extensive involvement of private sector entities in fostering diffuse problems and as key players in addressing them leading to what public management scholars have labeled
“dispersed collaborative authority” (Moynihan et al. 2011). For example, Moulton and Wise (2010) discuss how the blurred boundaries between public and private sectors contributed to the recent economic crisis and the complexities of resolving it. More generally, Linder (2000) discusses the varieties of forms of public and private partnerships and how they establish differing expectations and complications for policy implementation.

A third limiting factor for consistent policy implementation for diffuse problems is the fact that many policies aimed at addressing them contain vague and inconsistent goals. As noted by Schneider and Ingram (1997: 82-84), policy goals can be framed broadly or narrowly, be opaque, or may be largely symbolic or hortatory (also see Stone 1997: 37). The stated goals or intent of policies, as found in preambles to statutes, are often so vague as to provide little basis for guiding actions. Eugene Bardach suggests this leaves room for renegotiation of goals during implementation by diverse partners in one of several directions: “trimming them back, distorting or preventing them, or even adding to them in a manner that eventually leads to an unsupportable political burden” (1977: 85).

The case of critical infrastructure protection that we consider contains the exacerbating features of a diffuse problem along with dispersed collaborative authority and vague goals. As noted above, critical infrastructure is very diffuse in that it spans the country, entails many different sectors of activity, and includes many different types of infrastructures. Enhancing protection of infrastructure entails dispersed actions on the part of governmental entities at all levels of government with extensive involvement and commitments on the part of the private sectors. A recent National Research Council report (2011, 37) highlights the fact that much of the nations’ critical infrastructure is owned and managed by private entities, thereby necessitating “broad participation by private entities.” The fact that critical infrastructures broadly constitute a form of public risks further underscores the collective action problems for enhancing infrastructure protection.
Mobilizing Efforts

Mobilizing efforts in support of common goals is especially difficult given the presence of diffuse problems, policies that have vague goals, and the need for actions on the part of numerous public and private-sector actions among multiple levels of government. The traditional means for addressing policy problems consist of governmental action in funding programs, regulating activities, or providing services often in collaboration with other levels of government and the private sector (see Salamon 2002: 1-47). Examples of the use of such approaches for addressing diffuse public problems relating to public safety and security that are in some ways analogous to CIP include extensively funded and defined partnerships for emergency management and homeland security (see Chenoweth and Clarke 2009, Gerber et al. 2005, Kapucu, Augustin, and Garayev 2009).

But not all governmental actions in addressing diffuse problems are carried out with the extensive planning, funding, and direction that have gone into development of partnerships for emergency management and homeland security. Addressing critical infrastructure protection, as we elaborate below, comprises less direct involvement of the federal government, a less directed and monitored set of activities, and far fewer resources. The approach to it better fits what May and Williams (1986: 25-27) refer to as the “mobilization mode” of shared governance. For this, the federal role consists of convincing subnational governments and the private sector of the existence of a problem that they should address. This mode, as explained by May and Williams, rests on the assumption that subnational governments and the private sector have the predominant role in addressing a given diffuse problem, but “the national interest is such that the federal government has incentives to induce subnational efforts to address that problem” (1986, 25). The inducements may entail calling attention to the problem, provision of funds to establish programs to address the problem, technical assistance about best practices for addressing the problem, or some combination of these.
One set of notable examples of use of the mobilization mode in addressing diffuse problems consists of a range of programs and policies that employ public information campaigns. Janet Weiss (2002) discusses the use of this tool for information provision about harms and ways to address them (e.g. Smokey Bear campaign and wildfires, information about environmentally responsible recycling) or in establishing processes of information collection and dissemination that in turn seek to lessen harms (e.g. food and cigarette labeling). A good example of the latter is Title III of the Superfund Amendments and Reauthorization Act (SARA, PL 99-499) which creates state emergency response commissions and local emergency planning committees for the purpose of identifying facilities with hazardous substances, processing information related to this census, and distributing this information to local communities. The information is then intended to be used by the local planning committees to create emergency management and response plans in the case of catastrophic release of toxic materials, which in turn are to be coordinated with state plans.

As with the SARA Title III provisions, policy designs based on the mobilization model often establish processes that are entail intergovernmental and private sector production of plans for addressing a given diffuse problem. May and Williams (1986, 26) cite as a classic example the War on Poverty’s mandate that the federal Office of Economic Opportunity’s local Community Action Agencies adopt a planning and implementation process that would seek to “mobilize and coordinate relevant public and private resources” (quoting Sundquist and Davis 1969: 76, emphasis in the original). More generally, Michael Howlett (2000, 412) refers to such planning requirements as “procedural policy instruments” that are “essential features of modern governance” for indirectly steering social actors toward desired goals.

For these instruments to be effective relevant subnational and private-sector partners need to make good faith efforts to participate in such planning processes. There are obviously many hurdles to this that include the requisite commitment to undertake the plans, the necessary expertise and knowledge to develop the plans, and the ability to implement them. This is
especially challenging when private-sector entities are involved because they are “still
independent actors who generally cannot be compelled to work with one another” (National
Research Council 2011, 37). Yet, planning scholars well recognize that the planning process
itself is important in raising awareness of problems and engaging stakeholders (see Burby 2003).
From this perspective, a key indicator of the success of planning processes in mobilizing efforts to
address diffuse problems is the degree of engagement of relevant stakeholders in the planning
process.

**Fostering Communities of Interest**

The production of plans and the planning process are largely means of inducing action for
addressing a given problem. What sustains and strengthens those efforts? Much rests on the
networks of actors that are fostered and their willingness and ability to attend to relevant
dimensions of a given problem. In writing about the problems of interorganizational and
intergovernmental implementation, O’Toole comments that “generating successful policy
implementation means inducing cooperation, and perhaps even coordination, among
interdependent actors in the face of impediments” (2003, 237). Collaborative arrangements by
definition involve networks of organizations that differ in terms of the structure of the network
and the degree of formality that binds the organizations within the network.

Public administration scholars have paid increased attention in recent years to
foundations for effective collaboration in service delivery and for addressing public problems (see
argues that formal coordination mechanisms typically fall short unless there is sufficient basis for
collaboration. In particular, he argues “coordination is an activity that is understood to occur only
after sufficient *community of interest* develops among the relevant parties, forming a foundation
for later efforts” (1989, 33 emphasis added).

Like Chisholm, O’Toole (2003) argues that success comes from building “communities
of interest” that work toward common goals in addressing a problem. These are essential for
overcoming common implementation problems of goal deflection, diversion of resources for other organizational priorities, delay, and what Pressman and Wildavsky labeled as the “the slow dissolution of agreement” in intergovernmental policy implementation (1973: 92). From this perspective, *a key indicator of the sustainability of efforts to address diffuse problems is the degree to which meaningful community of interests are fostered.*

It makes little sense to think of a single “community of interest” for diffuse problems like critical infrastructure protection. Any effort to grapple with critical infrastructure protection must consider the diversity of affected sectors and their makeup. As we elaborate below, we focus on professional and trade association involvement for different sectors for critical infrastructure protection as key indicators of the ability to foster relevant communities of interest. The CIP partnership relies upon these actors in part as an organizational tool to create communities of interest where little may exist, but also to use existing established ties within sectors as a basis for garnering attention to the problems of protecting critical infrastructure.

**Our Study**

Attention to the security of the nation’s critical infrastructure has been dominated by presidential actions, beginning in 1996 with President Clinton’s appointment of the Commission on Critical Infrastructure Protection (Executive Order 13010). Critical infrastructure protection has been pursued in a similar ways by the Clinton administration and the two successive presidential administrations, each of which states a desire to secure physical and cyber assets from the risks posed by man-made and natural hazards (see Brown 2006). The impetus for the creation of CIP policy is a function of fears related to terrorism—first cyber, then physical—and one that faces problems related to a ubiquity of possible vectors of attack. Much of the action taken on the part of the federal government related to CIP is a function of committees and directives created exclusively at the executive level in part, no doubt, to overcome the collective action problems associated with public risks.
The definition of critical infrastructure is itself a notable issue. There simply is no available, criteria-driven defined universe, much less an agreed-upon list, of assets that are critical. The Department of Homeland Security initially attempted to create a list in the *National Asset Database*, but this was largely a failure (see Moteff 2010). The attempt to create the *National Asset Database* illustrates the difficulty that a diffuse problem has even in the identification stage. Some critical assets were not listed for security fears, others for fear of disseminating information that could be used against them in the market place or courtroom, while others simply were not sure if they were critical. Partners are defined by their connection to assets deemed “critical infrastructure,” but members of the CIP partnership use different criteria in choosing the criticality of their assets. A now revised system of asset identification spearheaded by the DHS Infrastructure Information Collection Division is viewed as less flawed, but is still dependent upon the voluntary identification with critical infrastructure as the *National Asset Database*. The diffuse problem cuts both ways in attempts to create a universe of critical infrastructure: it is difficult for DHS to identify partners because policy is unclear as to what critical infrastructure is, and it is difficult for would-be partners to self-identify as having relevance to the broader problem.

The CIP policy problem is diffuse not only in what it is, but in how it is addressed via a partnership model of implementation (see DHS 2006, 2009). The partnership planning model for CIP consists of lead federal agencies for each sector of CIP that are responsible for sector-specific planning efforts with the involvement of governmental coordinating committees (comprised of governmental actors) and sector coordinating committees (comprised of private sector and other non-governmental entities) for each sector. These activities are tracked with annual reports from the Critical Infrastructure Partnership Advisory Council (CIPAC), though it is important to recognize that there is no direct collaboration across the different sectors’ partnership planning. The advisory council acts as a bridge between the groups, comprised of members of the government and sector coordinating councils. The involvement of various subnational and
private sector partners on sector coordinating committees serves as the primary basis for mobilizing their engagement and for fostering communities of interest. The sector plans are intended to be revised on a three-year update cycle as a means of allowing plans to evolve to meet new threats and to stimulate expanded involvement of relevant partners. Given that the sector plans are fairly general and provide little specific guidance to individual partners, as with most planning processes, the planning partnership is likely more useful to partners than the plans that are produced.

**Our Approach**

Our analyses address three aspects of the CIP partnership and efforts to foster communities of interest. For each aspect, the basic unit of analysis is the CIP partnership sector. We analyze data for 16 of the 18 sectors. We exclude sectors that only have government coordinating committees (i.e. no private sector coordinating committees), which leaves out sectors concerning government facilities as well as national monuments and icons. For each analysis we consider both federal-level activities and those of the relevant sector partnerships. We emphasize the latter given our interest in characterizing the partnership engagement and communities of interest.

Our emphasis is on the planning partnership rather than the plans themselves. It would be useful to consider the quality of the plans as well; however, there are issues with consistency and availability of these documents over time. The Department of Homeland security has classified several of these plans as For Official Use Only (see Moteff 2010, 26) or published redacted versions of others. The Government Accountability Office has assessed these plans at periodic intervals, but typically with regard to specific features such as coordination efforts (GAO 2006, 2007) and cyber-security (GAO 2008). This lack of access is not only important from a research perspective, but also from the standpoint of implementation because the broader interests within a given sector (as opposed to participating partners) may be unaware of what the plan is because they cannot read it.
We first consider variation in visions for critical infrastructure protection among the different sectors. To get at these, we collected vision statements for each sector as published in the annual reports by the CIPAC from 2008 through 2010. Each CIPAC annual report is more representative of what partners in each sector establish as the vision rather than how partners are carrying out that vision.

Our main empirical foci are gauging the extent of involvement of different partners and the formation communities of interest for each CIP sector. To get at these, we collected data about the composition each sector’s governmental and sector coordinating councils and the engagement of respective member organizations in addressing CIP issues more broadly. The membership lists were obtained from the annual CIPAC reports for 2008 through 2010. The source of data for assessing engagement, as discussed below, consisted of searches or different organizations’ websites for attention to infrastructure protection issues.

**Measures**

Using the data sources noted above, we derive the following measures:

**Sector Vision.** We qualitatively assess differences in the visions among sectors with attention to their specificity. At issue is the extent to which the visions provide a focused or broader, and hence more vague, common purpose to the partnership planning efforts.

**Council Participation.** We consider participation of governmental and related entities in each sector’s governmental coordinating council and of relevant partners in each sector’s non-governmental, coordinating council. The most basic measure is the number of participants in each sector’s council. The more extensive measures entail coding of categories of participants as follows.

We categorize the government coordinating council into four kinds of members: federal agencies, non-federal governmental agencies, professional associations, and quasi-governmental entities. Each sector’s councils were coded by two researchers with an initial inter-coder agreement of 97 percent across 241 entities; discussion raised the agreement to 100 percent. We
use these codes to gain an impression of the heterogeneity of government representatives in a sector.

We categorize the sector coordinating council members for each sector into four different types of participants: business (trade) associations, individual firms, non-business associations, and non-business/non-governmental associations. Each sector’s council members were coded by two researchers with initial inter-coder agreement of 96 percent for 432 entities, and after discussion 100 percent agreement. We use these codes to calculate the percentage distribution of types of partnership members for each sector and the degree of dominance of particular categories of members in each sector.

**Communities of Interest.** We consider the degree of engagement of selected members in both the governmental and sector coordinating councils as indicators of the emergence of communities of interest. The basic strategy for assessing engagement is the same involving searches of websites for relevant entities and a coding of each entities’ recognition of critical infrastructure protection as a central issue.

For the government partners, we address the extent to which each agency or association attends to CIP. We looked to governing coordinating council member websites for sections related to major issues that the agency or association was following, such as: “issues of the day”, press releases, regulatory issues, etc. Each member was coded as either having a major focus on CIP issues (2), a minor or tangential focus on CIP issues (1), or no mention of CIP (0). Coding the 241 listed members of GCCs yielded 155 members that engaged CIP in some way. We exclude the 86 entities for which mentions of CIP could not be found.

For the sector partners, we address engagement for each sector’s business or other professional associations. We choose to focus on these as important “peak associations” for which engagement is far more critical than that of individual business or other individual entities. We define engagement as the degree of commitment to CIP issues as gauged by the extent to which relevant CIP issues appear on each entities’ website under “key issues,” as a key agenda
item at a recent annual meeting, or as part of a recent annual report for the organization. Each relevant entry was coded as showing CIP issues as having (1) no mention of CIP issues; (2) a lesser concern with passing mention in the relevant listing; (3) an intermediate concern as one of a half dozen to dozen issues or many agenda items; and (4) a central concern that shows up as a priority issue. The search entailed 256 associations for which no relevant listing of association agendas was identified for 24 entities (9 percent). We exclude these from our analyses. \(^1\) We use these codes to calculate mean ratings of engagement for each sector and to characterize the percentage of peak associations within each sector that have central or intermediate concern with CIP issues.

**Findings: Sowing Communities of Interest in Rocky Soil**

Our investigation seeks to determine how communities of interest are mobilized for the purpose of implementing a policy that addresses a diffuse problem: critical infrastructure protection. Our findings focus on variation in attempts to create a common focus across members of each sector, the types of actors involved in CIP partnerships, and the extent to which the partnership actors are engaged with CIP issues. We begin by examining sector-specific vision statements as potential sources of organizational glue in bringing actors together in implementing CIP policy.

**Vague Visions**

We consider vision statements to be especially important when addressing diffuse problems because they provide a common purpose for those who address the problem. In this way, a vision statement can act as a bond, or glue, that adheres participants in identifying and addressing a common problem. Each sector has a vision statement that is reported annually in the CIPAC report (see DHS 2010) with little change across the three years of reports that we reviewed. Table 1 provides key excerpts of these statements as categorized into three broad categories of specificity.
Table 1. CIP Sector Vision Statements

<table>
<thead>
<tr>
<th>Sector</th>
<th>Vision Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional Focus</strong></td>
<td></td>
</tr>
<tr>
<td>Communications</td>
<td>Ensure that the Nation's communications networks and systems are secure, resilient, and rapidly restored in the event of disruption.</td>
</tr>
<tr>
<td>Dams</td>
<td>Protect assets from terrorist acts and enhance their capability to respond to and recover from attacks, natural disasters, or other emergencies.</td>
</tr>
<tr>
<td>Defense Industrial Base</td>
<td>Eliminate or mitigate unacceptable levels of risk to physical, human and cyber infrastructures, systems, and networks.</td>
</tr>
<tr>
<td>Emergency Services Information Technology</td>
<td>Achieve a sustained reduction in the impact of incidents on the sector's critical functions.</td>
</tr>
<tr>
<td>Nuclear</td>
<td>Enhance where necessary and reasonably achievable, existing high level of readiness to promote the protection and resilience of the Nuclear Sector in an all-hazards environment.</td>
</tr>
<tr>
<td><strong>Resilience Focus</strong></td>
<td></td>
</tr>
<tr>
<td>Critical Manufacturing Energy</td>
<td>Reduce risks to the Critical Manufacturing Sector through proactive prevention of, preparation for, and mitigation of natural and manmade threats.</td>
</tr>
<tr>
<td>Energy</td>
<td>A robust, resilient energy infrastructure.</td>
</tr>
<tr>
<td>Financial Services</td>
<td>To continue to improve the resilience and availability of financial services.</td>
</tr>
<tr>
<td>Food &amp; Agriculture Public Health</td>
<td>Ensure that the Nation’s food and agriculture networks and systems are secure, resilient, and rapidly restored after all-hazards incidents.</td>
</tr>
<tr>
<td>Transportation Systems</td>
<td>Achieve overall resilience against all hazards.</td>
</tr>
<tr>
<td>Water Systems</td>
<td>A secure and resilient transportation system</td>
</tr>
<tr>
<td><strong>Resilience and Competitiveness Foci</strong></td>
<td>A secure and resilient drinking water and wastewater infrastructure.</td>
</tr>
</tbody>
</table>

*Source:* Compiled by authors from the 2010 Critical Infrastructure Protection Advisory Council Annual Report.

*Notes:* The cell entries for vision statements are excerpts of longer statements. These are arrayed alphabetically within each category of statements.
Reading the vision statements for each sector finds a common set of language that has less to do with the sector and more to do with the vision and goals of the risk management framework as is spelled out in the National Infrastructure Protection Plan (DHS 2006, 2009). In this way, most of the vision statements are some combination of terms such as “secure,” “resilient,” “respond,” and “recover” to hazards through partnerships, while in some cases maintaining competitiveness. The statements found in Table 1 are representative excerpts of each sector’s vision statement reflecting either a focus on what actions a sector will take vis-à-vis different risks (function), an emphasis on the ability of the sector to withstand or quickly recover from damaging events (resilience), or the importance of the sector in maintaining its economic position (competitiveness). Functional statements are perhaps the most instructive in that they at least give a vague idea of of the desired result regarding the preparation for or response to damaging events. Vision statements that emphasize "resilience" sacrifice sector-specificity in including a concept that is particularly vague (see Klein, Nicholls, and Thomalla 2003). The last group of statements add an even more vague term in “competitiveness” that further confounds the sector’s vision.

These vision statements are unlikely to promote new behaviors on the parts of members of each sector's coordinating council. In other words, they do not offer a “vision” to mobilize future action. Indeed if one were to remove references to the sector name in the vision statement, it would be difficult to determine the sector that the statement applied. This “fortune cookie” approach to vision statements likely reflects the broad aspiration of the federal government for CIP that is itself quite vague and has been subject to variation over time (see Brown 2006). **Varied Involvement**

Tracking the sector vision statements helps to understand differences in the extent to which the membership of each sector coordinating council is, in principle at least, addressing critical infrastructure protection or a broader array of goals. The audience to which the vision applies, however, is more important in terms of fostering communities of interest for addressing
critical infrastructure protection. The foundation of the community of interest is a function of its members. Members of CIP sector coordinating councils are selected in a variety of ways – including self-nomination and identification by federal agencies, and for a variety of reasons such as their expertise, their representation of segments of the sector, and the financial impacts to them of harm to infrastructure. This varied selection leads to CIP partnerships in which sectors find different starting points from a membership perspective on the road to building communities of interest for infrastructure protection.

The extent of variation in the types of members found on sector coordinating councils is quite broad. Table 2 shows the results of our coding of each sector’s coordinating council members as a business, business association, non-business association, or other entity. We calculate a concentration index that shows, on a 0 to 1 scale, the extent to which a sector’s membership are spread across these categories or are concentrated in one of the categories. This is of interest because it provides an understanding of the breadth of representation of a given sector’s planning partnership.

Three things stand out in Table 2 about differences in the membership of the sector coordinating councils. One is the variation in the number of members, which ranges from a low of 4 entities (Postal and Shipping) to a high of 94 members (Information Technology and, closely behind, Healthcare and Public Health). The median number of members is 33. The membership numbers have been fairly steady over the 2008 through 2010 period with the largest growth in sectors addressing Emergency Services, Water Systems, and Healthcare and Public Health. The sectors with larger number of members likely reflect two kinds of considerations. One is the greater diffuseness of sectors in terms of the different kinds of suppliers, products, and services as with the healthcare and public health and food and agriculture sectors. The second is the greater sense of vulnerability, providing more of a private than public risks, to individual facilities—as with the Information Technology, Transportation, Energy, and Communications sectors.
Table 2. Participation in Sector Coordinating Councils

<table>
<thead>
<tr>
<th>CIP Sector b</th>
<th>Concentration Index c</th>
<th>Stakeholder Percentage Distribution a</th>
<th>N d</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Business</td>
<td>Business Association</td>
</tr>
<tr>
<td>Critical Manufacturing</td>
<td>1.00</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Postal &amp; Shipping</td>
<td>1.00</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Information Technology</td>
<td>0.79</td>
<td>88</td>
<td>9</td>
</tr>
<tr>
<td>Chemical Facilities</td>
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<td>17</td>
<td>83</td>
</tr>
<tr>
<td>Communications</td>
<td>0.62</td>
<td>74</td>
<td>26</td>
</tr>
<tr>
<td>Defense Industrial Base</td>
<td>0.62</td>
<td>77</td>
<td>6</td>
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<td>Food &amp; Agriculture</td>
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<td>28</td>
<td>70</td>
</tr>
<tr>
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<tr>
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<tr>
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<tr>
<td>Water Systems</td>
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<td>16</td>
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<tr>
<td>Healthcare &amp; Public Health</td>
<td>0.35</td>
<td>50</td>
<td>25</td>
</tr>
</tbody>
</table>

Notes:

a Rows show the percentage distribution across categories of coordinating council membership and sum to 100 percent. Businesses are individual firms or enterprises; business associations are industry or business associations; other associations are non-business related professional associations; other entities are non-business related entities such as research entities.
b Each row is one of the defined sectors for CIP, sorted by the index of concentration.
c Herfindahl index that measures the extent to which the distribution of stakeholders is concentrated in one category (score of 1) or across categories (lower scores).
d Number of organizational members in each CIP sector’s coordinating council.

The second noteworthy aspect is the variation in makeup of each sectors’ coordinating council membership. This is indicated by the dominance index. Two sectors—Critical Manufacturing and Postal and Shipping—are comprised solely of individual businesses (large manufacturers and shipping companies). At the other extreme, the Healthcare and Public Health
sector and Emergency Services sector are highly fractured across different categories of membership. The degree of concentration or fracturing is not as important as it what it means in terms of makeup: whether a sector is largely dominated by business interests (in order, Critical Manufacturing, Postal and Shipping, Information Technology, Defense Industrial Base, Communications) or by other interests as with the Emergency Services Sector. The former are presumably comprised of those interests who perceive a direct financial stake in enhancing the protection of their respective critical infrastructures.

The third aspect of interest is the role of business (trade) and other associations for which the latter category consists mainly of professional associations (e.g. American Medical Association, Association of State Dam Safety Officials, National Classification Management Society). We consider these to be important because they represent prior communities of interests, though not around critical infrastructure issues, that provide the essential foundation for building communities of interest for critical infrastructure. Here, one obvious difference is between sectors with business and industry dominated associations (Chemical Facilities, Food and Agriculture, Transportation Systems) and other types of professional associations (Emergency Services and to a lesser extent Dams and Healthcare sectors).

**Nascent Communities of Interest**

The influence of the latter set of business and professional associations as a foundation for communities of interest around critical infrastructure protection can be gauged by evaluating the extent to which each of the respective association treats CIP as central issue of concern—what we label “engagement”. As discussed above, we had research assistants search websites for 256 such associations in order to identify attention to CIP issues and as a basis for coding the degree of engagement. Table 3 shows the findings about the levels of engagement of different associations for each sector.
Table 3. Engagement of Business and Professional Associations

<table>
<thead>
<tr>
<th>CIP Sector a</th>
<th>Engagement Index b</th>
<th>Percent Engaged c</th>
<th>N d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information Technology</td>
<td>3.4</td>
<td>80</td>
<td>10</td>
</tr>
<tr>
<td>Water Systems</td>
<td>3.2</td>
<td>80</td>
<td>5</td>
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<td>Chemical Facilities</td>
<td>2.8</td>
<td>71</td>
<td>17</td>
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<td>Defense Industrial Base</td>
<td>2.5</td>
<td>50</td>
<td>4</td>
</tr>
<tr>
<td>Emergency Services</td>
<td>2.5</td>
<td>45</td>
<td>11</td>
</tr>
<tr>
<td>Food &amp; Agriculture</td>
<td>2.5</td>
<td>48</td>
<td>40</td>
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<tr>
<td>Nuclear</td>
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<td>50</td>
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<tr>
<td>Transportation</td>
<td>2.3</td>
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<tr>
<td>Energy</td>
<td>2.2</td>
<td>44</td>
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<tr>
<td>Financial Services</td>
<td>2.1</td>
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</tr>
<tr>
<td>Communications</td>
<td>2.0</td>
<td>33</td>
<td>12</td>
</tr>
<tr>
<td>Commercial Facilities</td>
<td>1.8</td>
<td>36</td>
<td>11</td>
</tr>
<tr>
<td>Dams</td>
<td>1.8</td>
<td>33</td>
<td>9</td>
</tr>
<tr>
<td>Healthcare &amp; Public Health</td>
<td>1.7</td>
<td>29</td>
<td>34</td>
</tr>
</tbody>
</table>

Notes:

a Each row is one of the defined sectors for CIP, sorted by the engagement index. The CIP sectors for critical manufacturing and postal and shipping are excluded because of the lack of participation of any business or other associations in their respective coordinating councils.

b Mean engagement score for business and other associations. Each entity is coded on a scale of 1 (no mention of CIP issues) to 4 (CIP as a central concern).

c Percentage of associations in each sector that were coded as having engagement scores of 3 (intermediate concern) or 4 (central concern).

d Number of business or other association stakeholders in each CIP sector’s coordinating council.

Similar to variation in sector coordinating council membership, there is variation in the extent to which associations are actually attending to, writing documents about, and informing their association membership or customers of in the need to address critical infrastructure protection. There are no sectors that achieve 100 percent engagement by such associations, but many are highly engaged. This is indicated in two ways. One is the engagement index, which is the mean of the scores of associations in each sector on a scale of 1 (no mention of CIP issues) to
4 (CIP issues are a central concern). The second is the percentage of associations in each sector with engagement scores of 3 (intermediate concern) or 4 (central concern).

Three sectors stand out in terms of relevant association engagement—Information Technology, Water Systems, and Chemical Facilities. Each makes sense given the existence of strong association members (e.g., American Chemistry Council, American Waterworks Association) and evident vulnerability of relevant infrastructure (e.g., cyber attacks on information technology). The Water Systems sector is a bit of an anomaly, however, given the low number of relevant associations. The remaining sectors have less engagement of relevant business and professional associations with the lowest ratings for healthcare, dams, and commercial facilities. The association between the number of associations in a given sector’s coordinating council and the degree of engagement is -.30. This further reflects the fragmented nature of the sectors with larger number of participants in the sector coordinating councils.

In short, these findings suggest at best nascent communities of interest among business and professional associations for enhancing critical infrastructure protection. At worst, the results indicate a fragmented environment for sectors in which there are few involved professional associations and little goal commonality with CIP. Critical infrastructure protection, like any diffuse problem, however, must foster communities of interest in all partners—not just those that have professional and trade associations that can offer organizational assistance. One step in the mobilization process, then, is for the government to lead by example in engaging a diffuse problem.

**Fostering Communities of Interest**

Communities of interest are formed through commitment to a common vision, encouragement and direction from higher levels (absent direct funding and technical assistance), and the existence of a base community in the form of business or professional associations. However, these conditions are not present in all cases that we study. For sectors that have little in common with CIP or few trade associations to crystallize the issue in ways that fall into an
incentive structure that a partner can understand, we find considerably lower engagement. Let us consider how these forces play out in fostering communities of interest.

We showed above how the vision statements for different sectors are variable in specificity but generally quite vague overall. Given this, it is not surprising that the statements provide little in the way of a shared sense of purpose. Indeed, the statements seem more like boilerplate that follows a template than a basis for binding commitments. Though there is variation in specificity of the vision statements, we fail to detect any substantively or statistically meaningful difference in the mean engagement scores for the three levels that we classify vision statements. This further underscores the vagueness of the statements.

The extent of encouragement and direction from higher levels is not easily measured, though one approximation is the extent to which relevant federal agencies for each sector are themselves engaged in highlighting issues relevant to critical infrastructure protection. We find a notable association between the degree of engagement of members of government coordinating councils and the respective engagement of association members of their private-sector counterparts ($r = .52, p=.06$). If we exclude the Defense Industrial Base and Emergency Services sectors, which have governmental members that are especially strongly engaged in CIP in comparison to their private-sector counterparts, the correlation is even stronger ($r = .68, p = .02$).

We suggest above that a critical aspect in the formation of communities of interest is the existence of a prior community among relevant entities that can from as a basis for engagement around a new diffuse issue of concern to that community—in this case critical infrastructure protection. Our analyses above show variation in both the extent of existence of relevant business and professional associations and for their engagement across CIP sectors. Figure 1 shows the relationship between these two factors and identifies different clusters of communities of interest for critical infrastructure protection.
Note: This figure shows the distribution of stakeholders for CIP sector coordinating councils with the degree of concentration of different types of stakeholders (concentration index) on the X axis and the degree of engagement in CIP issues for stakeholder associations on the Y axis. The symbols indicate different clusters of stakeholder communities with similar attributes.

**Figure 1. CIP Communities of Interest**

As shown in Figure 1, there is a clear, positive ($r=.54$, p<0.05) relationship between how concentrated the different interests are in a sector and the extent to which each sector’s business and professional associations are engaged in considering critical infrastructure protection issues. In general, the sectors with the most heterogeneous membership are the least engaged (Public
Health, Commercial Facilities, and Dam sectors) while the sectors with the most homogenous sector membership (Information Technology and Chemical Facilities sectors) are the most engaged.

The different clusters of sectors in Figure 1, denoted by separate symbols for each cluster, hint at the interplay of different forces and generally fit together in terms of the types of interests in each sector. The lower-left cluster of Public Health, Commercial Facility, and Dam sectors comprises some of the most diverse sector membership. Excepting the Dam sector, these are sectors that clearly have a broad array of issues of concern for which gaining attention to infrastructure protection is challenging. The Financial Services and Communications sectors are also very diverse with strong business entity involvement and lesser association involvement, reflecting the type of private-risk factors we consider below. The Transportation Systems and Energy sectors are marked by strong trade associations while the Emergency Services sector is marked by strong professional associations. Their higher levels of engagement reflect the more direct connection of threats to their functions by disruptions to critical infrastructure. The Nuclear and Defense Industrial Base sectors are similar in terms of concentrated industry involvement in each sector with direct stakes in addressing critical infrastructure. The Food and Agriculture sector is an anomaly in that cluster as it is a much more heterogeneous sector in terms of issues of concern.

The engagement of the Chemical Facilities and Information Technology sectors as outliers with CIP issues and, to a lesser extent, that of the Communications and Financial Services sectors likely have stronger business-related incentives for addressing critical infrastructure. This underscores the role that individual incentives in combination with strong trade associations play in motivating attention on the parts of sector members. While fostering a community of interest is important for the purposes of mobilization in the implementation of any plan, some communities are more easily mobilized because of a greater sense of goal agreement or potential benefit from a policy’s implementation.
Such is certainly the case for the Information Technology sector for which the majority of the members of the sector are individual businesses, nearly all of which profit from a greater emphasis on critical infrastructure protection. The historical focus on cyber-infrastructure remains the strongest component of CIP today. Firms that are potentially hurt by cyber attacks have individual incentives to address this risk, as do firms that provide protective cyber services. This shifts the risk involved from that of a public risk to that of a private risk (see May 1991). A similar description accompanies the Water Systems sector, another notable outlier. The Water Systems sector is amongst the most engaged and the most heterogeneous in membership; however, the outlier in this case proves the rule in the sense that each of the members of the water sector are more primed to be motivated than other sectors. Nearly all the sector members are utilities or wastewater treatment plants which are more likely to respond to voluntary government programs. Moreover, the Water Systems sector has one of the narrower sets of tasks and clearest visions in terms of what it will address than most other sectors.

Conclusions

With this contribution, we have provided a different perspective about efforts to address diffuse problems. Such problems span governmental, geographic, and sector boundaries leading to impacts on diverse and large numbers of stakeholders. Moreover, efforts to address diffuse problems necessarily entail actions on the part of these entities. The traditional governmental levers of mandates or regulations as accompanied by funding, education, or other assistance can be employed as part of policy designs for addressing diffuse problems. But, these approaches and tools are often insufficient in themselves or too costly to deploy.

We consider a different approach for addressing diffuse problems, either in concert with the traditional approaches or on its own, that comprises less direct involvement of the federal government, a less directed and monitored set of activities, and far fewer resources. The mobilization approach (see May and Williams 1986: 25-27) that we examine here entails a federal role of convincing subnational governments and the private sector of the existence of a
problem that they should address. This rests on the assumption that subnational governments and the private sector have the predominant role in addressing a given diffuse problem for which encouragement is necessary for them to take action. The obvious issues are what types of encouragement are necessary and whether those are sufficient to motivate action.

We have examined the case of critical infrastructure protection as an example of a diffuse problem and of the use of the mobilization mode for fostering communities of interest among groups of subnational and private-sector partners. Indeed, the federal government's approach to CIP is based almost entirely on mobilizing attention and fostering communities of interest among "partners" for different sectors of activity. Absent these efforts, the federal government has very few formal tools at its disposal to more energetically force action at subnational levels and among the private sector.

The structure of the CIP partnership provides a foundation for efforts to foster communities of interest among the 18 designated sectors that have some commonalities with regard to function and members. Each of these sectors can be viewed as semi-autonomous communities for attending to and engaging the issue of critical infrastructure protection. The vision statements for each sector fail to provide much of a bond between partners because they are too broad to provide a meaningful shared sense of purpose. Nonetheless, we find federal government entities do play a positive role in stimulating private-sector involvement in leading by example: sectors with greater governmental engagement in addressing CIP are associated with greater private sector engagement in the corresponding private-sector coordinating councils. In large part, the engagement of members of different sectors in critical infrastructure protection is a function of extant factors or motivations within each sector's membership. We find greater engagement in sectors for which their members have specific interests related to CIP in that they have hitherto been attending to it or stand to gain from it. The foundations for stronger communities of interest are found in sectors with strong trade associations that can act as
knowledge brokers to frame CIP efforts in ways that are more meaningful than broad vision statements.

Though the case of critical infrastructure protection is a fairly arcane one that does not garner much scholarly attention, we argue it provides a very good example of both the challenges of addressing diffuse problems and the difficulties of fostering communities of interest among affected private interests. As we note at the outset of this contribution, many contemporary problems span geographic, institutional, intergovernmental, and sectoral boundaries. Because of this, they are inherently diffuse and starkly resistant to efforts to orchestrate coordinated approaches for addressing them involving structural reorganizations or managerial innovations. We highlight how the mobilization of attention and the fostering of communities of interests among diffuse stakeholders provide more indirect approaches to "hidden hand" coordination. But as the case of critical infrastructure protection shows, it is not easy to mobilize or engage disinterested interests around issues that are perceived to be of little immediate consequence.
Notes

i Given the difficulty of this coding, each entity was coded by two coders with discussion of differences in codes and eventual resolution of the codes. The agreement rate for a sample of 50 of these after coder discussion was 83 percent with eventual resolution of all but two disagreements (96 percent agreement).

ii The values of the Herfindahl index are computed for each sector by summing across all categories of sector coordinating council members the squared proportion of members that fall within each category.

iii Not surprisingly, these two measures are highly correlated (r=.96, p<.01). We present both for ease of interpretation.

iv This the correlation between the number of associations in each sector and the percentage engaged. The wide scatter in this is visually evident as indicated by a p-value of .29. We consider the correlation relevant to report because our data do not constitute a sample. The results for the association with the engagement index and number of associations is similar.

v The mean engagement scores and standard errors are 2.44 (.23), 2.34 (.20). and 2.32 (.50) respectively for the three categories of specificity (more specific to less specific) with a p-value for a One-way Analysis of Variance of .94.

vi The clusters were identified employing hierarchical clustering with between-groups clustering based on squared Euclidian distances using the engagement and concentration measures as indicators. The categorization of clusters is based on visual inspection of the resulting dendrogram using clusters with the minimum distances between them.
REFERENCES


