New Public Management and Crisis Mitigation: the 2007 *M/V Cosco Busan* Incident

By

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INTRODUCTION

Writing in the first part of the 20th century, classical public administration theorists provided a limited interpretation of public management. The organization setting consisted of a hierarchical bureaucracy, mechanistic or process driven operations, and a system that was closed; insulated from the external environment (Weber 1946, Taylor 1916, Burns and Stalker 1961). By the end of the 20th century this classical view of public management had become undone. Hierarchical bureaucracies had given way to decentralized organizational structures consisting of interdisciplinary teams. The closed system was found to be and became, out of necessity, much more open. Day-to-day operations, strategic planning and administration as the function of a single organization were replaced through inter-organizational networks. Inter-governmental agreements, outsourcing and public-private partnerships, became the new mantra of public management.

Identifying the benefits, opportunities, and drawbacks of public management as defined through this new inter-organizational setting is the focus of this analysis. Specifically, this study scrutinizes the inter-organizational networks developed to prevent and respond to vessel oil spills within U.S. territorial waters. Central in these networks is the U.S. Coast Guard acting in the capacity of Federal On-Scene Coordinator (FOSC). One of several inter-organizational risk management roles charged to today's Coast Guard. The study begins with a literature review of organizational networks as defined through the lenses of new public management. Following this is a discussion of Coast Guard FOSC headed inter-organizational roles and partnerships as defined through the Oil Pollution Act of 1990 (Public Law 101-480). The study is operationalized through the examination of the November 7, 2007 *M/V Cosco Busan* incident; a 58,000 gallon spill resulting from the freighter's allision with the San Francisco Bay Bridge.

This portion of the study draws from congressional hearings, Coast Guard and National Transportation Safety Board (NTSB) reports, State of California documentation, and newspaper accounts. Following this are final remarks and conclusions.

LITERATURE REVIEW

Organizations & New Public Management

Writing in 2000 E.S. Savas declared a tectonic shift in processes of governance. This shift was premised upon a broadening reliance on private institutions rather than government to satisfy societal needs. Savas (2000, p. 4) defined this shift as public-private partnerships; an arrangement between government and private sector organizations in which government provided activities are shifted to the private sphere. Such an observation was not singular. Rather Savas was tapping into a component of a broader trend; new public management. New public management (NPM) as it is commonly known in the United Kingdom, New Zealand and Australia has had a companion movement in the U.S. referred to as reinventing government (Osborne & Gaebler 1993; Gore 1993). The emerging movement challenged government agencies to be entrepreneurial, to discover new ways of achieving greater efficiency, to provide improved customer service. Public-private partnerships are but one alternative method for delivering services in accordance with these stipulations. Additional collaborative networks have come to the forefront. By the late 1990s, states and local governments were increasingly entering into cooperative agreements; joined-up arrangements with other units of government in service delivery. Such arrangements extended beyond a desired end of greater efficiency. They were recognition that no single institution had the resources or capacity to accomplish many public sector tasks alone (Melaville & Blank, 1993; Alford & Hughes, 2008; Bardach 1998).

Reflecting on this Agranoff and McGuire (2003) noted that public managers were now working in a world of networked organizations. This new world involves a process of governance defined through self-governing inter-organizational networks. Such networks may involve public-private partnerships as well as vertical and horizontal multi-agency alliances. These networks are linked together through interdependence in policy implementation and service delivery. They typically operate with significant autonomy from government officialdom red tape; relying upon trust based interactions as the path to outcome achievement (Rhodes 1997; Klijn 2005).

Networks and Oil Spill Preparedness

The collaborative arrangements of NPM have created opportunities and a number of operational challenges (Alford & Hughes 2008). For example, while we can speak about emergency preparedness as a discreet function limited to the internal workings of an organization, it is now acknowledged that the operation of today's critical infrastructure is not under the control of a single entity. Consider waste and water supply management, telecommunications, the financial services industry and electricity production. Much of the generation and supply of these critical operations occurs across organizations. The barrel of crude oil that eventually ends up in the gas tank of the average American's car must first be transported through a variety of processes and hands. Opportunities for error and system breakdown—sometimes devastating—exist at each step in the process (Roberts 1990). British Petroleum's 2005 Texas City refinery disaster and subsequent 2006 massive 267,000 gallon (6,357 barrels) oil pipeline leak on Alaska's North Slope are two recent examples (Loy 2006; Associated Press 2006; Mouwad 2006). Increasingly, we are obligated to speak of organizational networks as the landscape in which reliable performance and preparedness must operate. These networks are tasked with inculcating safety characteristics across organizations instead of within any one organization. This task is made increasingly difficult as networked operations become more complex (Kapucu & Van Wart 2006; Roe et. al. 2005; Shulman et. al. 2004; Perrow 1999; Chisholm 1992).

Training and Trust

One primary ingredient of a well prepared—and well integrated—organizational network is an emphasis on training. Robust training is a valuable asset in networked organizations. Training through crisis simulations provides opportunities to practice emergency operation skills. The response patterns and tendencies learned through training reappear during atypical situations. Training provides a valuable alternative for the trial and error methods often utilized during emergencies and crises (Crichton et. al. 2005; Weik 1987, 113-114). Training provides opportunities for learning about the types of operational errors that may occur and the steps that can be taken to mitigate negative outcomes resulting from such errors. This in turn instills confidence among individuals. Perhaps, more importantly training is instrumental for instilling trust across organizational networks. Organizational networks are noteworthy for their divergence. Divergence of missions and goals, divergence of occupational specialties, conceptual skills and institutional memory all act to inhibit trust. Regular training across networks can act to break down the very diversity that inhibits trust. Training creates opportunities for face-to-face communication that otherwise may not occur. Such communication enhances bonds of trust across networks. These paths of communication can be reliably opened and utilized should a crisis situation come about (Weik 1987, 116-117; Roe et. al. 2005; Kapucu & Van Wart 2006; Alford & Hughes 2008).

Organizational Structure

Finally, the collaborative arrangements of NPM must wrestle with the matter of structure. No longer tied to the classical hierarchical template (Weber 1946), today's organizations have an array of structural models to choose from. Interorganizational processes coupled with the need to mobilize and quickly respond in the event of critical system failure places demands on safety and preparedness situations not confronted within many organizational structures. A team approach consisting of the actual service provider and representatives from other network stakeholders has emerged as the most appropriate structure (Crichton et. al. 2005). For example, the planning and management of wildland fire fighting involves the daily coordination of the land manager with a diverse array of federal and state agencies. Diversity of purpose and confusion is overcome through the formation of interagency teams. These teams operate within specific geographic regions preparing and coordinating efforts to combat out-of-control wildland fires (National Interagency Fire Center 2009). This team approach has been identified in such varied operations as large-scale regional water supply systems and electrical power distribution. Teams facilitate communication overcoming the barriers created through the use of professional jargon common to organizations. A team approach is also noteworthy for furthering bonds of trust between network participants (Roe et. al. 2005; Shulman et. al. 2004).

To be successful teams must be given the authority to do more than simply prepare. They must be allowed to act. To engage in the NPM mandate of decentralized decision making; in order to initiate a timely response (Osborne & Gaebler 1993; Gore 1993). Such active crisis response is best explained in terms of mobilization. Mobilization that will if successful contain the problem, limit the degree of impact, and ultimately cleanup the aftermath of a system failure. The 1986 Chernobyl nuclear power plant disaster provides an invaluable example of these three phases in action as well as the consequences of failed response.

If response is indeed the ability to mobilize in a timely fashion then what structural devices beyond teams is needed to facilitate this process? The 10.8 million gallon *Exxon Valdez* oil spill in Alaska's Prince William Sound provides a good example. The pre-1989 *Exxon Valdez* hierarchical spill preparedness and response structure was wholly inadequate to mobilization needs. Within a few days the structure experienced total system failure. Lines of communication, organizational leadership, and the mobilization of resources to contain and limit impact of the spill during the crucial post-impact phase collapsed. Many impacted stakeholders were temporarily forced to fend for themselves developing a number of ad-hoc structures in response to the spill (FOSC 1993; Alaska Oil Spill Commission 1990, 61-85; Kurtz 2003).

Emerging from these ad-hoc efforts was one promising inter-organizational structure that has had success in practice and is supported through scholarship. In practice this organizational arrangement is best epitomized through the Incident Command System (ICS). Originally designed to combat wildland fires, the ICS incorporates features of loose-tight properties. Loose-tight properties incorporate the centralized control of traditional hierarchies with maximum street-level autonomy. Leadership establishes a set of operational rules that all most obey. The leadership is charged with identifying goals, making strategic decisions, and establishing an effective team structure (Crichton et. al. 2005). Within this rigid framework staff are delegated the autonomy necessary to make street-level decisions that best fit the situation. Innovation and entrepreneurship are not just encouraged in loose-tight organizations, but rather expected as a component of field operations (Peters and Waterman 1982, 318-325).

Recent scholarship on large scale water systems and electrical power generation reinforce the need for operational management teams to be given the type of flexibility found in loose-tight properties. Findings indicate that these teams are often called upon to make and implement a series of decisions within a very short time-frame (Roe et. al. 2005). Such compressed time frames often preclude the ability to secure approval through the traditional hierarchical chain-of-command. Nor can the standard written operation procedures that guide decision making in many organizations anticipate the array of dilemmas confronting complex operations. Instead leadership must trust that training, the networked composition of operational teams and the tight component of loose-tight properties provides staff with the tools necessary to make appropriate decisions.

OPA 90 AND NETWORKED ORGANIZATIONS

Provisions of the Oil Pollution Act of 1990 (OPA 90) were well suited to features of NPM. The adoption of numerous NPM components into OPA 90 was not happenstance. After all, OPA 90 was a law created from catastrophe. A common theme of the numerous government and scholarly reports concerning the *Exxon Valdez* disaster was the realization that the oil spill prevention, preparedness and response system for U.S. coastal waters was broken. Neither government nor industry plans individually or collectively were up to the task of controlling a spill of *Exxon Valdez* magnitude (National Response Team 1989; FOSC 1993; Kurtz 2004; Birkland 1997). Given such inadequacy government was called upon to develop a new set of strategies to combat spills. One key point raised in the federal National Response Team report (1989) was the realization that some oil spills may be inevitable. There is no fail-safe prevention, preparedness, or response system. The chances of accidents, however, could be greatly reduced. Furthermore, the potential impact from a spill could be limited through comprehensive preparedness and response planning.

Network Preparedness and Training

Realizing such goals requires the passage of comprehensive legislation. The creation of a mandate that differs substantially from prior policy; indeed this appears to be the direction OPA 90 took (Kurtz 2004; Prince William Sound Regional Citizens Advisory Council 1999). Although OPA 90 did not mention NPM, it is clear from the content of the law that NPM characteristics permeated the legislation. First is the matter of prevention. The OPA 90 stipulated implementation of a network designed to minimize near shore incidents; in particular when entering or leaving port. Significant among these was the mandate for a certified pilot on board for many high traffic or other hazardous ports. Another relevant stipulation was the installation and Coast Guard administration of Vessel Traffic Systems (VTS) for higher risk ports including San Francisco Bay. The Coast Guard VTS mission involves monitoring and assessing vessel movement within the VTS area. This includes providing safety and traffic flow advisories to vessel masters when warranted (Public Law 101-480; USCG 2009).

Beyond prevention is the issue of preparedness; the development of a set of mandates constituting a tight component. All shippers operating in U.S. waters are required to have Coast Guard approved contingency plans in place for responding to the “maximum extent practicable” to a worst case discharge. Tankers need to have their Coast Guard approved plans in place prior to being allowed to transport oil in U.S. waters (Bovet et. al. 1991, 696; Liability 1991; Hebert 1992; FOSC 1993). Contingency plans have typically been integrated consisting of overlapping cooperative relationships between the cargo owner, vessel owner, port facility operator, spill response contractors, and multiple levels of government (Jarashow 2006; Oil shipping 1994). This pattern is not surprising given the networked nature of the oil extraction and transportation system. Contingency spill plan holders were likewise required under OPA 90 to provide evidence of the NPM directive for on-going training. Training and contingency plan adequacy would be regularly tested through real-time spill drill simulations. Thereby developing appropriate skill competencies, communication systems and levels of trust within the network. Prior to OPA 90, contingency planning requirements were minimally enforced. Training and simulation drill participation was largely haphazard and voluntary. Such infrequency degrades the competencies required in an effective organizational network (Crichton et. al. 2005; Prince William Sound Regional Citizens Advisory Council 1999).

Network Structure

In fashioning OPA 90 Congress acknowledged that in order to be successful a timely response needed to be managed through an appropriate structural arrangement; a single spill requires a single response. More specifically this meant legitimizing a single unified command under the auspices of the Coast Guard Federal On-Scene Coordinator (FOSC) (Jarashow 2006; Petrae 1995; FOSC 1995; *Investigations of the Exxon Valdez oil spill* 1990). Questions over the FOSC's extent of authority to manage a spill compounded the initial command breakdown of the *Exxon Valdez* response (Kurtz 2003; Alaska Oil Spill Commission 1990; Oil shipping 1994).

OPA 90 legitimization of FOSC leadership did not signify the adoption of a rigid hierarchical structure. Rather the post-*Exxon Valdez* assessments recognized the value inherently gained through NPM loose-tight properties. For example, a 1990 Department of Interior post-spill report to Congress said that the non-fire use of the ICS proved to be "a significant step in giving quick and orderly response to initial threats to widespread resources at risk" (D. Gilman, personal communication, August 3, 1989; Alaska Oil Spill Commission 1990; *Investigations of the Exxon Valdez oil spill* 1990). By the time of the 2007 *Cosco Busan* spill this meant that the ICS team concept had become incorporated into the Coast Guard's response structure. In the event of a spill FOSC command leadership would assure the tight property; providing spill responders with an overarching strategic plan for combating the spill. Components of such planning typically focus on coordination of spill containment, protection of resources at risk, and effective cleanup operations; while adhering to appropriate safety protocol. ICS incorporation constituting the loose property would provide on-scene teams with the flexibility necessary to make tactical decisions (FOSC 1995, 26-29). Decisions that would be based upon shifting on-scene circumstances not anticipated in the strategic response plan.

***M/V COSCO BUSAN* SPILL OVERVIEW**

The Bay Bridge Allision

At 6:20 a.m. on the morning of November 7, 2007, the M/V *Cosco Busan* departed from the Port of Oakland bound for South Korea. The 901 foot freighter carried a cargo consisting of some 2,500 shippable containers. Navigating through heavy fog, common to San Francisco Bay, the freighter was about to pass beneath the Bay Bridge and into the Pacific Ocean when it struck the Delta buttress at 8:34 a.m.; a primary bridge structural support. The resulting allision—a glancing blow between a vessel and a fixed object—tore a deep 100 foot gash in the side of *Cosco Busan*. Initial Coast Guard estimates of a 140 gallon fuel oil spill were revised within hours to 58,000 gallons (National Transportation Safety Board 2008; *San Francisco Bay oil spill* 2007; Barringer 2007). Thickest closest to the spill, the heavy grade Number 6 fuel oil began to quickly disperse in the strong prevailing tidal currents of San Francisco Bay. Continued foggy weather prevented aerial observations of spilled fuel oil movement. However, National Oceanic and Atmospheric Administration (NOAA) trajectory projections suggested spilled fuel oil would inundate large areas of the bay and the adjacent Pacific coastline (*San Francisco Bay oil spill* 2007).

The shoreline areas lying within the spill trajectory zone included a mix of rocky headlands, sand covered beaches, and two off-shore national marine sanctuaries.   Intertidal zones within many of these areas contained a diverse array of biota; while countless near shore areas supported significant numbers of waterfowl. Concern further extended to impacts to the impending commercial Dungeness crab fishing season. The oyster season, already underway, was immediately cancelled. Also, at risk and inundated as a result of the spill were human built environs; the latter consisting of ports, marinas, and recreational areas. Equally threatened and impacted were several historic properties. Among these were the former Alcatraz Prison and Fort Point National Historic Site (National Transportation Safety Board 2008; *San Francisco Bay oil spill* 2007; National Park Service 2009).

Spill Response Mobilization

In total over 900 professional responders mobilized to combat the *Cosco Busan* spill. An estimated 1,300 volunteers were also trained and participated in tasks ranging from beach clean up to oiled waterfowl recovery.   A variety of government agencies and private sector organizations participated in the incident. Key among these was the Coast Guard, NOAA, California Departments of Fish and Game and Office of Emergency Services, and The O'Brien's Group; a spill response contractor operating in the U.S. as O'Brien's Oil Pollution Service Incorporated. A number of additional agencies and private organizations played more limited roles. Many of these participants were members of the San Francisco Bay Area Committee, a regional spill planning organization (O'Brien's Group 2009; *San Francisco Bay oil spill* 2007; Bailey 2007). Final costs have still not been realized, with much uncertainty linked to ongoing litigation. Costs have exceeded the federally mandated liability cap of $61 million. Estimates suggest total costs will exceed $100 million (Werner 2007).

By late December 2007 the spill response and clean up operations had largely terminated. A total of some 26 miles of coastline across a five county area was impacted through varying degrees of oiling. More than 400 oiled waterfowl were cleaned and released. The delayed Dungeness crab season was opened, allowing for a partial season. After cargo off-loading and emergency repairs at the Port of Berkeley the *Cosco Busan* was cleared for departure on December 20th. Necessary repairs to the Bay Bridge included replacement of protective fendering torn off during the allision. The bridge experienced no significant structural damage (National Transportation Safety Board 2008; Barringer 2007; Coast Guard 2008).

ASSESSMENT

A number of newspaper articles, first-hand accounts, industry and government reports, and congressional hearing records provide abundant documentation to judge whether the *Cosco Busan* response met the NPM characteristics incorporated in OPA 90. The assessment of these documents provides evidence of a number of operation failures. Failures that resulted from breakdowns in NPM inter-organizational network requisites. Prevention provides a useful starting point for assessing NPM short-comings embedded in OPA 90.

Allision Prevention

The OPA 90 mandate for a certified pilot in hazardous and heavily trafficked port vicinities was designed to prevent *Cosco Busan* type calamities. Rather than being a positive addition to the organizational network—a knowledgeable expert—the pilot contributed to network failure. Investigation records suggest the pilot was not adequately familiar with the freighter's navigation system. Nor did he carry a hand held GPS device. Such a device may have mitigated his confusion with the freighter's navigation system readings (National Transportation Safety Board 2008). Further confusion was caused through language miscommunication. This was a serious problem given the NPM emphasis upon effective communication. The *Cosco Busan's* master and crew were Chinese. The master spoke English; however, testimony indicates the pilot and master were often confused regarding specific navigation questions and answers. Accordingly, the freighter was plying San Francisco Bay on a southwesterly heading instead of northwest. Heavy fog prevented visual identification of landmarks that could have notified them of this plight. The pilot's decision to depart in heavy fog constituted an additional misjudgment. While *Cosco Busan* got underway to leave the Port of Oakland, several other freighters made the decision to wait for the heavy fog to lift. Why the pilot, with concurrence from the master, chose to depart at 6:20 a.m. is not certain. Some speculation has suggested the pilot, who had a history of medication overuse, may have been making "clouded" decisions (Report 2007; National Transportation Safety Board 2008; *San Francisco Bay oil spill* 2007).

The breakdown in the prevention component of the organizational networked extended beyond the pilot and master. Particularly important—and perhaps one of the most misunderstood contributors to the *Cosco Busan* allision—was the Coast Guard's VTS management role. There is a common misperception that the Coast Guard's vessel traffic management and advisory role functions just like the Federal Aviation Administration's (FAA) air traffic control mandate. This is incorrect. The FAA controls the use of air space exercising control over air traffic flow. The FAA has full authority to change flight orders and redirect traffic as needed (Federal Aviation Administration 2009). The Coast Guard does not routinely direct traffic in port or near shore channels. The Coast Guard does have authority to redirect vessels in order to prevent an imminent collision. But, ultimate responsibility and decision making resides with a vessel's master (Gordon and Parker 2007; Coast Guard 2009). Minutes before impact Coast Guard VTS personnel advised the *Cosco Busan* pilot and master that they were traveling on the wrong heading. The pilot made what he believed was appropriate course corrections. The corrections were insufficient to prevent an allision with the Bay Bridge's Delta buttress (National Transportation Safety Board 2008).

Clearly the prevention deficiencies contributing to the *Cosco Busan* – Bay Bridge allision were a breach of the envisioned strengths of NPM organizational networks. Communication gaps between the pilot and on-board navigational system, pilot, vessel master, and with the Coast Guard VTS personnel were evident. This created the type of confusion that is an anathema to effective organizational networks (Boyd 2009). Coupled with this was the structural problem regarding the chain-of-command. As noted, in the air traffic control system the FAA exercises ultimate decision making authority. Within this system of tight control pilots are allowed to make tactical decisions—the loose component—based upon the immediate circumstances at hand. The diversion and landing of U.S. Airways flight 1549 on the Hudson River in January 2009 is the perfect example of effective tight-loose structure. Air traffic controllers, in constant contact with the crippled airliner, deferred the emergency landing decision to the pilot (Levin 2009). Controllers demonstrated trust in the pilot's expertise. In contrast, post-*Cosco Busan* investigations evidenced confusion over who should have been in charge of decision making at a given point, mistrust between network participants, and accusations of incompetency in the spill's aftermath (Coast Guard 2008; National Transportation Safety Board 2008; *San Francisco Bay oil spill* 2007).

Spill Preparedness and Response

The spill response network was better prepared evidencing fewer of the problems plaguing prevention. The freighter owner Regal Star Limited of Hong Kong did have a spill response plan on file as required under federal law. Likewise, vessel operator Fleet Management Ltd of Hong Kong had a pre-contract agreement with O'Brien's Group (Coast Guard 2008; National Transportation Safety Board 2008; *San Francisco Bay oil spill* 2007; O'Brien's Group 2009). These response components were part of a larger network known as the San Francisco Bay Area Committee. Primary members of the Coast Guard headed committee included federal stakeholder agencies, state agencies, local governments, spill response contractors, and environmental organizations. In 2006 the committee had revised and updated the San Francisco Bay area plan. Plan revisions were based in-part upon a response to a *Cosco Busan* size freighter spill incident.

In written testimony spill response contractor Marine Spill Response Corporation (MSRC) stated that it was immediately mobilized as a first responder. This was in accordance with the San Francisco Bay area plan. MRSC testified that some initial confusion occurred when the vessel operator, in accordance with the vessel spill response plan, mobilized the O'Brien's Group as first responder and lead contractor. Confusion which O'Brien's on-scene leadership team said never occurred. This alleged confusion, according to MRSC, was soon sorted. By mid-day November 7th a Unified Command post had been established. The leadership team consisted of the Coast Guard FOSC, representatives from the California Office of Spill Prevention and Response, and the O'Brien's Group acting on behalf of the spiller. A number of additional stakeholders some 40 in all ranging from the National Park Service, to local governments, to the California Coast Keeper Alliance participated in the Unified Command operations (Coast Guard 2008; National Transportation Safety Board 2008; *San Francisco Bay oil spill* 2007; O'Brien's Group 2009; SIGCO 2009).

Operational Shortcomings

Coordination among the Unified Command members ascribed with many of the NPM components of a well integrated organizational network. For example, strategic planning evidenced well orchestrated tight control contributing to effective oil recovery and clean up. By the end of week two the spill response network had successfully deployed 28,000 feet of oil deflection and capture boom, recovered 12,000 gallons of fuel oil and 1,200 cubic yards of oily waste, cleaned and reopened 10 beaches (*San Francisco Bay oil spill* 2007; Coast Guard 2008; O'Brien's Group 2009).

Although laudable, these numbers do not suggest that the spill response coordination was problem free. A critical private sector stakeholder left out of the pre-spill planning network was commercial fishermen. One lesson from the 1989 *Exxon Valdez* spill was the need to utilize local expertise in combating spill events. With their intimate knowledge of local waters, expert seamanship skills, and fleet of available boats commercial fishermen became an acknowledge component of effective spill response. Spill response plans and drills included the active participation of local fishermen. By 2007, spill preparedness drills in San Francisco Bay region became far less numerous and no longer included commercial fishermen. This decision was largely driven through the post-September 11, 2001 Coast Guard mission shift. Agency security roles—as a component of the new Department of Homeland Security—eclipsed the traditional Coast Guard mission. Budget allocations reflected this change shifting away from navigation safety and spill response preparedness (*San Francisco Bay oil spill* 2007; Lindlaw 2007; Bailey, Sahgun & Reiterman 2007). To their credit the Coast Guard in coordination with private contractors worked aggressively and did successfully incorporate commercial fishermen into the *Cosco Busan* response network. Appropriate and ongoing network training as called for in the

NPM literature would have identified and mitigated this problem prior to the *Cosco Busan* incident.

The failure to engage in the ongoing NPM training mandate had a second repercussion. Specifically, the gross underestimation the Coast Guard made in initially estimating the quantity of spilled fuel oil leaking from the stricken freighter. Post-spill congressional hearings (*San Francisco Bay oil* spill 20007) suggest estimates of a 140 gallon spill instead of the actual 58,000 gallons was directly related to inadequate training. Coast Guard spill response expertise had eroded to the point, whereby 2007, key personnel no longer had the skill set necessary to estimate spill quantities. Fortunately, private response spill contractors on-scene quickly realized that the Coast Guard had grossly underestimated the size of the spill. Exercising what can be described as a best example of loose control, the contractors made the independent decision to mobilize additional spill equipment on-scene. This allowed for timely capture of spilled fuel oil and the placement of deflective boom; thereby protecting critical resources (Coast Guard 2008; O'Brien's Group 2009; *San Francisco Bay oil spill* 2007). Had the spill response structure been organized in a classical top-down hierarchical structure such timely action would not have occurred.

Communication and Trust

The inaccurate estimation of spilled fuel oil alluded to another shortcoming in the organizational network, namely the matters of communication and trust. In stressing the need for developing and maintaining effective communication channels the NPM literature identifies one of the major challenges of interorganizational networks. Breakdowns in communication protocols, lack of familiarity with the use of a common jargon, and communication equipment shortcomings become obvious during a crisis situation (Boyd 2009). In addition, communication breakdowns have negative implications for maintaining trust (Vaughan 1996; Garrett 2004). Take for example the Coast Guard's underestimation of spilled fuel oil. In the ensuing twelve hours after the spill the Coast Guard sent out revised estimates of spill size. These estimates were not fully communicated to all stakeholders, particularly state and local government. At a major press conference which included federal, state, and local elected officials San Francisco Mayor Gavey Newsomb complained that he heard about the revised estimates on the radio, not from the Coast Guard (*San Francisco Bay oil spill* 2007; Lindlaw 2007).

Such mistakes spurred mistrust among Unified Command stakeholders. It also created perceptions of Coast Guard incompetence. These perceptions became further magnified through a final operational shortcoming. The failure of the Unified Command to anticipate and plan for the incorporation of citizen volunteers within the spill response network. Within hours of the spill the Unified Command received an overwhelming outpouring of citizens wishing to participate in the spill response. Citizen calls included everything from volunteering for beach clean up to oiled waterfowl recovery. Citizen volunteer response became so large that the state maintained call center was overwhelmed resulting in system failure. The state website provides some indication of the level of citizen mobilization; topping more than 30,000 hits on a single day (Coast Guard 2008; *San Francisco Bay oil spill* 2007; State of California 2009).

Citizen frustration over communication system failure was heightened because of a failure to pre-identify roles and tasks for volunteers. Post-spill analysis suggests that robust spill simulations and training would have identified the citizen volunteer gap in the area plan (*San Francisco Bay oil spill* 2007; Bailey, Sahagun & Reiterman 2007; Arnoldy 2007; Thompson 2007). Opportunities to partner with citizen based organizations; address matters of volunteer training, outfitting, and safety could have all been addressed in advance. Instead, a vital stakeholder was left out of the network. The result was a significant political backlash. Citizen distrust of agency personnel and perceptions of incompetence fed outcries for elected officials to take action. The California congressional delegation, the Governor, and local officials mobilized a series of press conferences and on-site investigations. Pressure became so great that the first Coast Guard FOSC coordinator was relieved of duty. Coast Guard Rear Admiral Craig Bone then personally assumed the FOSC role (Dibenedetto 2008; *San Francisco Bay oil spill* 2007).

CONCLUSION

Ultimately, the citizen volunteer shortcoming was remedied. Volunteers were outfitted with protective equipment, received training, and participated in clean up and oiled waterfowl recovery. This shortcoming, however, taken in conjunction with other problems identified in this analysis identify some of the challenges for NPM when applied to interorganizational networks. First, is recognition that an efficient and effective network requires an ongoing commitment to training. The dilution of this component because of mission or policy shifts, budgetary challenges as well as politics may have serious repercussions for crisis management. Participant expertise, trust building, and maintaining effective channels of communication fall victim. Likewise, there is recognition that the addition of multiple stake holders can impact the efficient implementation of a network command structure. Roles and protocols must be clearly defined and periodically reassessed. The tight structure component needs to be clearly explained and understood. With respect to vessel operations in near shore waters this is particularly relevant to the relationship between vessel master, pilot, and Coast Guard VTS operators. Stakeholders who should be included or perhaps removed from the network structure need to be identified. The exclusion of critical stakeholders—as in the case of commercial fishermen and volunteer organizations—can have significant negative repercussions for the network.

Finally, it is clear that the number of networked operations, be it in the financial sector, power generation and delivery, or emergency and crisis response will continue to expand. The fashioning of OPA 90, with its emphasis upon cooperative networks as a means to spill mitigation was an acknowledgement of this reality. OPA 90 provided the opportunity for the application of NPM theoretical components to a real world public management challenge. Whether NPM—in its present or a modified version—is the appropriate model for organizing and implementing a networked spill mitigation system is not a certainty. Further analysis may suggest other models as the path to successful crisis management outcomes.

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