

University of Delaware
Disaster Research Center

PRELIMINARY PAPER #355

THE WATERBORNE EVACUATION OF
LOWER MANHATTAN ON SEPTEMBER 11:
A CASE OF DISTRIBUTED SENSEMAKING

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2006

The Waterborne Evacuation of Lower Manhattan on September 11: A Case of Distributed Sensemaking

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Abstract

Sensemaking is the study of how individuals and organizations understand what is happening around them. The sensemaking paradigm provides a frame for understanding the gathering and comprehension of information throughout an organization and the capacities for action that are coupled, cause and effect, to that comprehension. Typically, researchers look at sensemaking in a single organization. Recently, interest has developed in distributed sensemaking, with multiple participants discovering meaning and capacities for action in their environment and in their emerging relationships. This paper examines a case of distributed sensemaking, the waterborne evacuation of Lower Manhattan on September 11, 2001 in which several hundred thousand commuters left the island in an improvised fleet of assorted harbor craft. Virtually no prior planning existed for this event; hence, the participants collectively derived norms and meaning from their circumstances. The paper relates accepted features of sensemaking to this event, showing how these features varied from their usually-understood forms in order to yield sensemaking that was distributed across geographic and organizational space.

Introduction

In a recent review of the status of sensemaking research, Weick et al (2005) pointed to several directions for inquiry that would advance sensemaking theory, including a richer development of theories of distributed sensemaking. They argue that understandings of distributed sensemaking would be furthered if research into such related areas as distributed cognition (as in Hutchins' (1995) work) "were focused less on the assembling and diffusing of pre-existing meaning and more on collective induction of new meaning." In Hutchins' research (1995), set aboard a naval vessel, distributed cognition refers to the process by which an organization processes information from individual members to arrive at useful knowledge. In that setting, the individuals were members of a navigation team, each providing discrete

pieces of information, which the team as a whole combined into valid knowledge: the ship's location at any instant. Based on this analogy, Weick et al (2005) are calling for study of how sense is made by individuals and groups who don't share an initial starting point of meaning. We undertake such an exploration in this paper, defining distributed sensemaking as the development of awareness of events, needs, and possible actions by individuals and organizations with little or no expectation of such development. Probably no single case can address all directions for studying sensemaking, but in the case of the waterborne evacuation of Lower Manhattan we find support for previous components of sensemaking as well as variations of these components that are involved in the distribution of sensemaking. Some of these characteristics are the same as we would see in "ordinary" sensemaking—that is, as portrayed within organizations. But some of them are variants. These include distributed compatible identities, an enhanced emphasis on prospect as well as on long-term retrospect, pre-existing shared and actively shared knowledge, and the importance of the physical environment as a tablet for storing and distributing an agent's sense to others. The case allows us to elaborate on the theme of distributed sensemaking and to elucidate some of the features that contribute to the ability of widely separated individuals and organizations to orient their actions toward the pursuit of a common goal. The theoretical relevance of the distributed sensemaking approach can be seen in these variants because they bring the concept of distributed sensemaking into range of other principles of collective action found in other disciplines or lines of inquiry. For example, the process of group emergence (Stallings and Quarantelli, 1985) evinces many aspects of collective sensemaking, which suggests that sensemaking may form the cognitive bridge from individual to collective action since emergent groups are those that recognize a need and organize to meet it.

The Evacuation

On September 11, 2001, an estimated 500,000 commuters were evacuated from Lower Manhattan by an ad hoc flotilla of ferries, tugs, workboats, dinner cruise boats and other assorted harbor craft. By all accounts, there were no significant accidents or personal injuries though people were often

embarking aboard vessels not designed for passengers, from waterfront locations not suited for transferring personnel, and under conditions of urgency and ambiguity. The boat-lift required varying degrees of self-organization, improvisation, and coordination, involving multiple government agencies, companies, and private individuals. It was, in other words, an example of individuals and organizations learning and acting under conditions of extreme environmental stress: forming new relationships, suspending existing procedures and developing new ones, and making decisions with shifting and ambiguous information.

The boat lift began before the collapse of the Twin Towers. Some ferry captains arriving in Manhattan turned around with their passengers rather than disembark them, while others picked up passengers who reached the docks early in the emergency. As the emergency developed, people evacuating from the World Trade Center area traveled on foot in all directions: a number of evacuees marched uptown, while others migrated eastward over the Brooklyn Bridge; and still others walked south and west, where they were brought up short at the waterfront and gathered at multiple locations around Lower Manhattan. Many of the evacuees were Manhattan commuters attempting to return home, while others were residents or employees of Lower Manhattan trying to flee the very hazardous conditions that had quickly manifested in this part of the city. In response to this emerging need for transportation, boats of all descriptions converged on Manhattan. Some acted independently; others sought permission from the Coast Guard, who initially instructed vessels first to stand by, then for vessels to position themselves in readiness before the Coast Guard issued its request for “all available boats” to participate in the evacuation. A variegated pattern of activities developed, with boat operators either proceeding according to their best judgment or acting under the guidance of Coast Guard personnel or harbor pilots. Essentially, as evacuees lined up ashore, boats stood offshore, negotiated with each other for access to whatever dock space was available (sometimes tying up to lamp-posts) and loaded passengers. Some boats displayed hand-made signs indicating their destinations, such as Hoboken, NJ across the Hudson River, so that evacuees would know where to stand in waiting. As multiple boat operators worked out the

details of picking up passengers, a landward support network developed, with waterfront workers and maritime personnel directing passengers to an appropriate area where they might find a boat to take them to a destination close to home or to where they might find other transport. For example, according to one participant, when some evacuees were unwilling to leave Manhattan only to be stranded across the river, the bus-company partners of a tour-boat operator shuttled passengers to other locations in New Jersey. Apart from the evacuation, a number of vessels remained in service for several days, providing hot meals, a place to rest, or shuttling supplies. In short, the situation was one of rapid change and urgent need for decision and action.

Extent of control

Ascertaining what was the extent of control over this event is an important preliminary step in exploring the waterborne evacuation as an instance of distributed sensemaking. If, for example, the operation was directed from above by a centralized control, the distributed aspects of sense would be more difficult to find because the controller might be more heavily involved in setting the parameters of sense, as in sensegiving (Gioia and Chittipeddi, 1991). This does not mean that distributed sensemaking does not occur. It would, though, require an analytical approach that considers how local-level decisions and actions affect remote comprehension and supervisory control. Much of the documentation for this event, found in secondary sources, asserts that the Coast Guard “directed” this event. Undoubtedly the Coast Guard played a major role in the management of traffic around Manhattan, in close association with harbor pilots. For example, the pilot boat *New York* was used as a traffic control facility after some rapid planning by Coast Guard officers and pilots.

By the time the second aircraft hit the WTC, the Coast Guard was in a crisis mode, knowing people had to get off of Manhattan Island, and that would require a massive evacuation. [Pilot Andrew] McGovern met with Lt. Mike Day, the Coast Guard's chief of the waterways oversight branch in New York, upon his arrival..... "We put together a quick plan but anticipated we would be shooting from the hip once we got there, so I placed a call to the Sandy Hook Pilot station asking for the pilot boat New York, designated as Pilot No.1, and anything else we had floating, McGovern said.

(Aichele, 2002)

However, other evidence clearly indicates that mariners and waterfront workers were registering the event as an evacuation scenario, requiring their involvement, before the Coast Guard issued its call for “all available boats” to assist. Audiotapes of radio transmissions clearly include vessels asking for permission to approach Manhattan. As noted earlier, some boats were already in transit. Operators of other vessels began to make preparations to assist, then actually did so upon hearing the Coast Guard request. These instances of simultaneous similar interpretations of unfolding activity constitute the elements of sensemaking.

Given the size and complexity of the operation, interpretations conflict regarding the amount of control, coordination, and independent action that was involved. As to the precise coordination of action, it seems likely that there was a varying, probably quite dynamic, mix of control, with some operators coordinating closely with pilots and others, and still other operators not coordinating at all.

As they [individual boats] individually responded they were asked to contact the pilot boat on channel 73, which they did. When they'd contact us we got their name of their boat, the size of their boat, the draft, how many people they thought they could fit on the boat, that kind of information. And then using that information we were able to disperse them throughout the lower part of Manhattan. (Jack Ackerman, Harbor Pilot. South Street Seaport Oral History)

“We moved about 30,000 people on our six boats,” says Peter Cavrell, senior vice president of sales and marketing for Circle Line. “It wasn’t any kind of coordinated effort. We just started doing it.” Continues Cavrell, “In its own small way, Circle Line is a symbol of New York. We just wanted to do our part.”

(Snyder, 2001)

Indeed, another participant reported no contact with anyone else: Alan Michael, a tour boat operator, said,

Nobody was directing us that day. We all knew where we had to go, so we worked it out amongst ourselves, all the captains, who would go into which berth first or second or what have you. (South Street Seaport Oral History)

From a different perspective, whether the Coast Guard or some other entity had “control” may not be a relevant consideration. There may be no reason to privilege the Coast Guard, or the pilots, as

anything but another organization involved in this event, bringing their experience, skill, and resources into the mix and thereby participating as another sensemaking entity.

The evacuation and other waterborne activity was a pastiche of coordinated, loosely-coordinated, and independent efforts which formed not so much a responsive *system* but rather a responsive *affiliation* that extended between individuals, groups, and organizations distributed over space—an affiliation that succeeded in moving heretofore unimagined quantities of people and supplies on short notice.

This operation was unplanned, though some of the participants such as the Coast Guard responded within the framework of their existing contingency plans. Most of the participants, however, not part of such contingency planning, experienced the evacuation and later boatlift as both new and largely or entirely undirected by any centralized control. We argue that the success of this endeavor stemmed from the distributed sensemaking of the boat operators and waterfront workers and the associated, collectively improvisational capabilities they demonstrated (Wachtendorf & Kendra, 2005).

In some sense, one could argue that the sight of the burning towers constituted an initial starting point of shared meaning. While the damaged towers were the focal point of the subsequent harbor activity, this argument ignores the fact that the initial meaning ascribed to the burning towers varied amongst participants. For example, some vessel operators first responded under the assumption that a small plane had struck the tower by accident, while others assumed that a terrorist attack was underway. Some vessel operators responded to a call for all available boats, but many others responded as evacuation support vessels either before the call was issued or did not hear the official call due to heavy radio traffic. Many were unaware of the degree of damage, not only to the towers but also to transportation infrastructure, and the extent to which security measures were in the process of being implemented. That an evacuation involving the participation of private boat operators was necessary should not be viewed as a taken-for-granted assumption. Together, dispersed across the New York Harbor as they were, harbor officials,

vessel operators, converging evacuees, and others enacted meaning on this turbulent environment as they simultaneously interacted with that environment and eventually with one another. What roles needed to be played, how they should be played, and who needed to play them were improvised by the harbor community alongside established plans that did not fully account for what was transpiring around them.

While most of the literature on coordination in disaster emphasizes the importance of shared knowledge and prior experience (Comfort, 1999; Weick, 1987; Weick et al, 1999), we examine in this paper how affiliations of participants, some with shared knowledge and experience and others without such, were able to develop a set of working relationships that was effective in meeting needs as they were defined. Our findings are preliminary but they suggest the importance of: 1) a shared knowledge base; 2) an ability to recognize the limits of knowledge among respective participants; and 3) norm manipulation, relaxing some and introducing others. The participants in the various interactions succeeded in creating an emergency response affiliation—an amalgam of interactions less than a complete, fully articulated system—that was effective in meeting overall needs.

Method

The method for this paper was a qualitative inductive analysis of interviews that the South Street Seaport Museum conducted with 19 persons involved in this event. Interviewees were boat operators and crew, waterfront and harbor workers, a Coast Guard officer, and an evacuee. These interviews were conducted by the documentarist David Tarnow about two months after the event. (Quotations from these interviews are presented in italics in this paper). These interviews focused on the participants' actions that day, the extent that the participants coordinated with or took direction from others and, in addition, asked the interviewee to reflect on prior skills or other experiences that proved useful in the waterborne operation under the crisis conditions of September 11. We augmented these views with oral histories of the event, conducted by Peter Capelotti, with Coast Guard officers who participated

(http://www.uscg.mil/hq/g-cp/history/WEBORALHISTORY/911_Oral_History_Index.html). While the evacuation was underreported in the news media, a number of articles appeared in the specialized maritime press, including an extended account by Aichele (2002) that was itself based on several interviews with waterfront personnel involved in the evacuation or in the subsequent boatlift of supplies. The interviews contain valuable information on the waterborne evacuation; however, these interviews were conducted in order to create an oral history of the event and thus have a disadvantage for present purposes: the oral historians who conducted the interviews were principally focused on documenting *what* happened during the response with less attention to *how* the social processes involved in facilitating or impeding the response were carried out. Nevertheless, the preliminary data analysis of these interviews, as well as secondary sources such as published articles, have not only provided a broad overview of the evacuation, but have also helped to guide initial theoretical understanding of the improvisation and sensemaking distributed throughout New York Harbor.¹

Discussion

Sensemaking

We begin our analysis by reviewing a number of generally recognized elements of sensemaking in order to set the stage for discussing how these manifest in a distributed sensemaking scenario. Sensemaking, meaning, “literally, the making of sense” (Weick, 1995: 4), is concerned with how people and organizations, constructing meaning in their environment, “construct what they construct, why, and with what effects” (1995: 4). Weick (1995) identifies seven components to the sensemaking process. The first is that it is “grounded in identity construction” (18). Actors first make sense of their identities, which provides patterns for interpreting events but can also be shaped by events.

“Once I know who I am then I know what is out there. But the direction of causality flows just as often from the situation to a definition of self as it does the other way. And this is why the establishment and maintenance of identity is a core preoccupation in sensemaking and why we place it first on our list.”

¹ A more in-depth study of these processes is currently being conducted by the authors with support from the National Science Foundation and the University of Delaware Research Foundation.

(Weick 1995: 20)

Sensemaking is “retrospective” (1995: 24), a concept that is also central to Weick’s understanding of improvisation (1998). Sensemaking and improvisation rely upon reflection on past events, since it is through such reflection that patterns and relationships are detected which allow actors to project an appropriate intersection between what has happened, what is going to happen, and what they can do to affect what is going to happen. Indeed, Weick emphasizes that the world is only known retrospectively: that that which people experience and think about is gone, existing only as a memory of less and less immediacy, so that understanding the world is really about understanding it as it was and understanding what it is likely to be next. Sensemaking is also “enactive of sensible environments” (Weick, 1995: 30). In this view, there is no fixed environment in which people act; rather, their actions continually shape or enact the environment in which they find themselves. Sensemaking is “social” (1995: 38), in that “[c]onduct is contingent on the conduct of others, whether those others are imagined or physically present” (1995: 39). In other words, to the extent that sensemaking requires action, those actions are affected by others’ actions as well, while at the same time individual thought is understood to be affected by social contact with others and organizations are understood to be social entities (5). Weick also emphasized that sensemaking is “ongoing” (1995: 43): never starting, but rather that people are always “in the middle” of “projects,” seeing the world with respect to those projects and deliberately segmenting time into sectors from which they draw the necessary information (1995: 43). Interruption of the flow of activity is crucial in Weick’s conception, since interruption causes emotional arousal which, “once ...perceived...is appraised, and people try to construct some link between the present situation and “relevant” prior situations to make sense of the arousal” (1995: 46).

Sensemaking is “focused on and by extracted cues” (1995: 49): searching for and responding to signals in the environment that indicate the nature of the environment and that suggest varying courses of action. And sensemaking is “driven by plausibility rather than accuracy” (1995: 55). With the diversity of cues, related contexts, and number of actors who are engaged in working with those cues, an “accurate”

representation may be impossible. Moreover, some information is always filtered out or unavailable; what is important is how the remainder is selected, interpreted, compared to experience and expectations, and used to form a coherent representation of a situation. Since these are general elements of sensemaking, it is reasonable to suppose that these features would be involved in distributed sensemaking as well. As we will discuss, our early study suggests that this expected outcome is indeed valid, but this analysis also suggests that these elements have different valences in a distributed sensemaking system, and thus yield a different sensemaking product.

Identity

Weick places identity first in his elaboration of sensemaking components, and so will we, since many of the participants referred, directly or indirectly, to their identities. But we emphasize that identity included more than merely who they were—it included what they were. It included their skill, experience, or occupational background. We infer from Grzyb (1990) that skill and occupational position can be a significant unifier; in his study of locomotive engineers he found that changes in skill could have a “decollectivizing” effect on locomotive engineers and weaken their position vis-à-vis management. As Weick (1993) found, tools—instruments of applying skill—were vital signifiers of individual identity which enabled group cohesion. Moreover, skill, knowledge, and philosophical outlook are used to distinguish who is *in* or *out* of a particular group. Miller (1998) found that some osteopathic physicians were critical of practitioners who did not subscribe to the osteopathic ethos and who simply wanted to practice medicine in an allopathic style. Thus we connect skill, profession, or occupation with identity. Skill, too, affects the kinds of cues that people extract from their environment, and helps to form the evolving awareness of events. In the waterborne evacuation, participants experienced several identities that shaped their responses: as New Yorkers, as Americans, and as skilled boat operators with capabilities that could be useful. Hence their understanding of unfolding events and their imagination of the role they could play was based on their multiple identities: identities which may actually be created contemporaneous with events, rather than merely pre-existing.

[I needed] to do something...the only thing I can do is the boat thing. I'm not very good at anything else so... It seemed John [manager at Pier 63] had done the work of orchestrating an evacuation from his pier at Pier 63 so it seemed the obvious thing to do was to put whatever boat I had whether it was the tug or this boat into service. And so I was able to do that and I'm really glad I was. We were a small help compared to the numbers of people that left that pier that day, which numbered almost 5,000 people I think. You know, our contribution was tiny but it gave me an opportunity to do something... maybe I provided help for other people. (Pamela Hepburn, boat operator. South Street Seaport Oral History)

This quotation demonstrates the participant's assessment of her individual skills and, also, her conclusion that only a certain range of her skills was applicable to this event. It's probably not true that "the only thing" she can do is operate a boat—much emergent activity involves people using fairly mundane skills. She could have passed water bottles around on the waterfront. But for her, and for others, the water aspect resonated with her primary identity as a mariner, in the same way that physicians volunteer to treat the injured, not serve sandwiches. Based on her assessment of the situation, her skills, and the knowledge of Pier 63 held in common with the manager there, she thereupon took her boat to her friend's pier and assisted in the evacuation.

...[O]n the morning of September 11th, I was about five miles west of the Hudson River right near Giants Stadium. ... I saw this smoke from the World Trade Center. I immediately went back to my shop, which is only another mile and a half away, grabbed my marine radio, life jacket, and headed straight for Lower Jersey City to hop on a ferry. I knew there was a fire; I knew that we had to do evacuation, we meaning the ferry company. I feel responsible for building the docks, therefore I felt very responsible for getting the people out of there safely. I knew at one point when I saw the intensity of the fire that there was a possibility that that ferry terminal at the World Trade Center might not be open. ...It is our busiest terminal moving around 20,000 passengers a day. I knew that I might need to communicate with ferryboats to bring boats in elsewhere. That is why I grabbed my radio, so I was in constant contact with the ferries no matter where I was on the shoreline (Paul Amico, Ironworker. South Street Seaport Oral History).

Many of the incidents that were recounted by people involved in this event evince several of the sensemaking attributes identified by Weick. Identity, of course, suffuses this passage, entraining an ethos of concern and responsibility; memory or retrospect blends in to illuminate certain environmental conditions as cues. Lots of people saw the same things, but Paul Amico, an ironworker, saw and

remembered ironworker things. He in turn built his sense of the situation on these and projected action accordingly.

A pre-existing, occupation-specific spirit of association is not a pre-requisite of convergence behavior, which is ubiquitous after disaster. Nevertheless, certain occupational groups are conspicuous among convergers, especially in the health care professions. Weick (1995) notes that a prime aspect of sensemaking—the ability to interpret changing conditions—is *identity construction*: people read events through their identities and imagine how they can interact with those events based on their sense of who they are. Disaster means injuries, which creates an existentially-grounded motivation for medical workers to rush to the scene. In the waterborne evacuation scenario, such an existential motivation existed with the evacuees queuing up in Lower Manhattan, and suffused with the national security dimensions. A number of the boat operators had some prior military experience, and though it is not specifically covered in the interviews, it is reasonable to infer that they interpreted this event in part through that background, which as Weick (1987) noted can be highly socializing and centralizing.

In the Mann Gulch incident, in which a number of firefighters perished because they did not abandon their heavy tools, the command to “drop your tools” generated an existential crisis of the organization, leading to a collapse of organizational sensemaking. In Weick’s analysis, though dropping their tools would have enabled the firefighters to run faster, they did not because it would have destabilized their identity. (“...[W]ho are [we]? Firefighters? With no tools?” (Weick, 1993: 635)). In the maritime community the imperative toward rescue is very strong; in fact, shipmasters are compelled to come to the aid of vessels in distress if they can do so without serious danger to their own vessels, which means a certain amount of risk-taking is *required* in this community when they interpret danger to which they might reasonably respond. In the waterborne evacuation, the imperative toward rescue created an existential *ignition* of collective sensemaking. The firefighters were ordered to drop their tools, but it would have weakened their identity; the mariners registered their identity and picked up their tools.

We argue that identity was key here, as it is in other sensemaking scenarios, but that it is both an igniter of sensemaking and can subsequently be actively chosen. It may, at first, seem somewhat tautological to assert that identity as boat operators was important in an operation involving boats. However, there surely were other capacities, other identities, that were available to these participants. For example, a *Harvey* crewmember who was also trained as a welder left the vessel at one point in order to cut bodies out of crushed vehicles. Thus he began an entirely different phase of involvement, shifting from one sensemaking milieu into another. Identity was important, but participants registered an available identity based on cues, retrospected patterns, and the possibility for action. A kind of dimensional analysis appears to be at work, where the manner in which the individual interacts with the environment is tied to the outcome of various elements matching up to yield a final sensemaking product. Pamela Hepburn can do more than “the boat thing,” but she chose it. That identity brings with it many elements of shared knowledge that can then be deployed, and a shared ethos toward particular kinds of action. Moreover, having people with congruent or compatible identities distributed throughout the area increased the chances of action-oriented connections between them, especially if that identity includes a shared knowledge base.

Shared knowledge base

Weick argued that sensemaking is social, tied to conceptions of the self in relation to others. Identity, self, and social connection were enabled via a shared knowledge base. An individual’s identity, skill, and knowledge are the apparatus for extracting cues from the environment. Others who are exposed to that environment, and holding similar identities, have a good chance of extracting the same cues. A shared identity, especially a shared skill-based identity, suggests shared knowledge. The participants’ identities were closely tied to bases of common knowledge. These mariners’ membership in a “community of practice” (Hutchins, 1994) provided an operational schema: the principles of practice that they recognized were the foundations of an “epistemic network” (Rochlin, 1989) where participants

could anticipate needs of those whom they hadn't met. Stated more formally, they had familiarity with the ambient environment, technical proficiency in the immediate task economy, and a culturally-transmitted set of behavioral norms that provided the social underpinnings for this remarkable event. Weick holds that sensemaking was social, "contingent" on others, whether those others were actual or imagined. Virtually by definition distributed sensemaking is social, but the sharing of identity, skill, and body of knowledge brings some organization to the contingencies for action.

Comfort argues that the following conditions are required for communities to develop a sense of shared risk and, therefore, to be able to act collectively to minimize it: "'discovery' of a common threat;" "common understanding among the affected group" of the problem;" "mechanisms of information exchange and feedback;" "means of integrating information;" and "means of evaluating performance and incorporating this information into a common knowledge base that informs the next decision in the evolving process" (1999: 31). She further argues that "[e]ach of these conditions, and the interaction among them, contributes to collective learning and creates shared knowledge, the basis for collective action" (1999: 32). In her view, information and communication provide the vital energy for coordinated action, and she is hopeful that developments in computing technologies, in particular if united with GIS, can facilitate the simultaneous sharing of information that can align or harmonize the actions of relevant participants. The problem, then, is developing a shared understanding of threat so that all participants—as the classical theorist Follett (1926) might see it—can arrive at the same "logic of the situation" and modulate their actions accordingly. Ready access to information and the ability to interpret it is essential. Identity is critical at this juncture: there were a lot of people, dispersed across geographic and organizational space, but sharing the same identity or at least enough of the same identity that they reached plausible, congruent conclusions about developing events.

Comfort (1999:23) emphasizes the importance of common knowledge, noting that "[a]mong professional emergency responders, this common knowledge base is achieved in large measure through training and experience." The boat operators and waterfront workers are not professional emergency

managers; nevertheless, many of the participants shared portions of the same knowledge base through their occupations as merchant mariners, harbor pilots, or Coast Guard personnel. Hence there was a pre-existing set of expectations about how the boats would be handled, how they would be loaded, capabilities of different vessels, application of maneuvering rules, and so on. A close corollary of shared knowledge, in this instance, is the development of a sense of *shared risk*, which Comfort (1999) emphasizes is important in fostering the ability of disparate groups to work together to meet common needs. Shared risk, however, depends on a sense of shared values or shared assets that are threatened. In an individualistic culture as in the US, we don't normally think of ourselves as sharing assets, except those we perceive to hold in trust as citizens. Hence a sense of shared identity would seem to be critical in the distribution of sense. Because the waterfront workers shared aspects of the same professional skill sets and also norms of behavior, they were able to interpret the emerging needs in similar ways.

Weick (1993) and Weick et al (1999) argued that people working within a complex and dynamic environment must be able to harmonize their actions toward organizational goals, and they must be able to do this while functioning with some degree of autonomy. Even though the volunteers who participated in the waterborne operation had not previously participated in a massive evacuation of Manhattan, there were a number of common points of reference that were available to help them achieve the necessary shared vision.

...[W]e all worked together. As I mentioned before, we're a small ... community, but we all know who knows what to do and who's better at it... I knew a lot of the other captains from being in New York Harbor for the last eighteen years working on the tugboats and small harbor tankers through the harbor, and cleaning oil spills. It's that small of a community. Everybody knows everybody. [Ken Peterson, tugboat company port captain. South Street Seaport Oral History]

The process is richly nuanced and the sensemaking elements mixed and overlapping. A single passage such as the preceding contains sentiments suggesting identity, social ties, and retrospection—including cues that are extracted retrospectively, providing an indication of future performance. Thus here we also see the importance of prospection, because these cues are carried forward into time. Past

performance becomes the cue for hypothesizing future performance (What sort of environment *might be* enacted, and is it desirable?). Knowing who is better at something implies looking ahead to events and conducting a rapid thought experiment. The projected results, based on retrospective data, are then applied now to determine who might be suitable for a particular job. Peterson, though, says “we all know,” a pronoun that indicates everyone in a particular sensemaking transaction was using the same sensemaking—or that it was distributed based on shared knowledge, including historical knowledge local to that community.

A principal product—perhaps the key outcome—of the development of a shared vision is self-organization.

Comfort (1999: 270) defines *self-organization* as

Spontaneous action based upon informed choice taken to achieve a collective goal. It exemplifies citizens acting together, voluntarily, to meet a common need. It represents the fullest type of adaptation in a complex system that engages participants in collective action to reduce risk.

She goes on to observe (1999: 271):

Sustaining the process of self-organization in a continuing way requires access to communication for all of the participants to support the exchange of information, stored memory for actions taken that allow reflection and redesign, and evaluation and feedback from the other participants in the group.

This process is also strongly improvisational; indeed, Weick argues that improvisation as well as sensemaking depends on retrospection (1995; 1998). When Ken Peterson, an official of a tugboat company, talked about knowing people and knowing the harbor, he was in actuality relying on a retrospective understanding of capabilities and resources and imagining their extension into the emergency response milieu on September 11.

Comfort (1999: 273) emphasizes the importance of information, noting that building a disaster response system

[i]s performed more effectively in rapidly changing disaster environments by a non-linear, dynamic system that is able to coordinate diverse resources, materials, and

personnel across previously established organizational and jurisdictional boundaries through means of information exchange guided by a clear “internal model” or goal for action and prompt feedback. Such a system uses processes of self-organization in which informed participants initiate action, but adjust their action to that of others operating toward the same goal to achieve a timely, efficient response. It is essentially an organizational system operating in parallel, supported by a strong, distributed information system.

Comfort argues that information is critical in the evolution of an adaptive system functioning under crisis. Free information flow, with plentiful mechanisms for feedback amongst the various agents in a system, is necessary for maintaining a shared vision of shifting needs and the harmonized modulation of individual action. Plentiful information was available to the participants in the waterborne operation. VHF Channel 13 and 16—the marine “calling” and emergency frequencies, respectively—were open to anyone with a marine radio: private and commercial users, Coast Guard and other military units, police and fire craft all have such radios, which solves part of the interoperability issue on the waterways. Everyone can communicate—indeed, excess chatter is often a problem and occasionally stymied communication on September 11, so that the boat operators resorted to shouting or simply watching to interpret other vessels’ movements.² While these radios have a comparatively short range, it was enough in this circumstance. Ships and boats are comparatively independent entities, self contained in their systems, and relating to each other through a set of practices and norms that are codified in regulations and imparted as a legacy of tradition: in this case in particular, the duty to rescue or to render assistance. At the same time, many of the participants were able to see a broad expanse of the operational area—though smoke and dust obscured events for some operators—which is rare in complex distributed-decision making situations. John Krevey, who operated Pier 63, said:

[W]e were here at Pier 63 and we went down and watched the World Trade Centers fall—it was a pretty dramatic day for us—from a small boat. And after seeing all this we got back to the Pier and we realized the gravity of the situation immediately. And we then anticipated that there [would] be difficulties in people getting off the island, so we

² Their experiences with radio communications have relevance for emergency management in general. There is considerable concern about interoperability between responding units from different agencies or different organizations; in the waterborne operation, VHF radios provided superb interoperability, so much so that everyone could communicate with everyone else and hence they jammed each other out.

immediately began to make preparations with boats to do that... So we get back and we see these thousands of people walking north. ...There was a boat that ... was scheduled to be here at two o'clock. So, the first thing I did was call them on the telephone and we were talking and they decided to come anyway. I talked to them about possibly being involved in a relief effort to get some of the people out, because I saw all these thousands of people and there just didn't seem to be any other way off the island. ... So that was just kind of unplanned and so they pulled in and we started forming lines. ... Everybody [in the crowd] had the same question. They wanted to go to particular places in New Jersey, they wanted to go to Hoboken. ...I would never answer individuals' questions, I'd always get on the megaphone because I could answer a thousand people who also always had the same questions (John Krevey, Pier Operator. South Street Seaport Oral History.

Krevey was therefore able to help orchestrate the evacuation from his facility in several ways. He had the ability to share information with boats and, moreover, by using the megaphone, he was able to provide information to a large number of people at once. Thus his sense became manifest as action, in the arrangement of people in queues at his facility.

In one way, all sensemaking in organizations is distributed if more than one person is involved, but Weick et al are careful to clarify that distributed sensemaking is a collective process. Moreover, part of the sense that is made is in meaning that is newly created by the participants, rather than meaning that is delivered to them, where goals are coded in pre-existed relationships and procedures. The data that are available suggest that identity was a pivotal feature in directing other sensemaking attributes, as in other sensemaking situations. But identity provided more than an interpretive referent for understanding events; it also brought with it skills and capabilities for acting in the environment in certain ways and for understanding how others would act. We would also note the importance of environment in distributed sensemaking. In *choosing* identity, they also chose the associated environment. The participants did not act in an environment that existed a priori. Weick has argued that sensemaking is enacted: that people draw on environmental cues, with actions and responses viewed retrospectively. Common knowledge provided the participants with an initial common environment of water, boats, and docks. In some settings this might well be an organizational or operational environment, but here the physical environment was important as well. If sensemaking is important to organization, then environment too must be important to organization, given the linkages between sensemaking, action, and environment.

Much of the shared knowledge was environmental knowledge. In some settings, written documentation provides guides to action. In this case, many of the participants shared geographic knowledge—cartographic knowledge, in fact, which is written down in the form of charts and navigational publications but also contained in the heads of the participants as part of an accumulated operational lore of various aspects of the waterway. By virtue of their participation in waterway traffic on a regular basis, all the participants had access to this knowledge. Name of vessels, companies, and people took on significance with respect to how boat operators interpreted, but also in turn became a way of seeing opportunities for action, ways of assembling these pieces of information in new ways. Sensemaking is individually constituted but also collectively shared and distributed.

Retrospect and Prospect

We should not ignore, too, the extent to which certain norms are inscribed over the palimpsest of the popular culture of maritime disaster. We watched a sequence of video footage, taken aboard a launch engaged in evacuation, in which a mate or deckhand, probably recollecting the *Titanic*, shouted “Women and children first [pause] and the injured!” We can, of course, only speculate as to his motives, but the “women and children first” admonition is not invoked in modern marine evacuation scenarios. Clearly, the boatman’s desire to separate based on sex sprang from an inherited, popular-culture, pseudohistoric sense of how evacuations are to be conducted. The inclusion of the injured—in retrospect, a humorous afterthought—shows that he processed his inherited sense of evacuation/rescue decorum with respect to modern sensibilities. These norms are meta-norms: large-scale overlearned guides with a strong cultural, moral, or ethical foundation. Other norms of behavior are more operationally-based. Because these are rooted in a concept of operations that refers to “normal” times, improvising in crisis may require that these norms be reconsidered, relaxed, or suspended, or that new ones be developed. In this instance, Weick’s conception of retrospection should be extended in elucidating the proper temporal scale in which people’s thoughts operate in crisis. In other work, especially that on improvisation, he has stressed this concept: that improvisation depends on detecting patterns retrospectively. Weick and others, such as

Comfort, have argued that a common culture, or some other socialization, is needed for harmonious action. In the development of culture, however, not only at the organizational level but at the societal level, there is a strong historical component, a scale of retrospection spanning not days or months but possibly many years, contained in the stories and lore that Weick has emphasized as important transmitters of information. The stories within an organization are what enable retrospection, since someone who wasn't present will have no capacity to reflect on events that they did not experience, and hence no capacity for extending their sense forward.

Researchers on organizational adaptation to crisis generally emphasize information flow and the development of decentralized decision making patterns. Weick (1987) argued that decentralization requires having a common understanding of the organization's goals, and he also argued that previous training or experiences such as military service is required for effective yet decentralized decision making. But volunteers generally have little such prior shared experience. Preliminary interpretation of this data, however, suggests that participants *created* their own centralization or socialization contemporaneous with a developing situation by mutually defining the situation as that requiring a waterborne rescue effort. Later, as more organization developed, the operation turned into a supply boat lift, or other kinds of support activities. The idea of centralization or a centralizing influence as a fixed thing is valid only to the extent that the environment is fixed, because centralization must be referenced to some ambient features. In work on sensemaking, Weick (1995) argues that environment is not fixed, but enacted. It follows then that the people who are enacting it must also be creating or recreating that which centralizes them as well: that is, their ongoing shared vision, which doesn't exist a priori, but which is developed or negotiated along with changing events. Even though the volunteers who participated in the waterborne operation had not before participated in a massive evacuation of Manhattan, there were a number of common points of reference that were available to help them either achieve the necessary shared vision, or to help them achieve the operational equivalent of a shared vision, which in sensemaking vernacular would be understood as mutually plausible interpretations.

Participants in the water operation brought no single common background to the tasks: some had prior military service; some worked their way up through the ranks of the merchant marine; some were harbor pilots; some were in the Coast Guard; and some were private boat operators who used their vessels for recreational use. One interviewee specifically stressed the importance of the waterfront community. There was an existing sociocultural framework in which the participants in this event were able to fit their definitions of needs and appropriate actions. There was, in other words, a range of backgrounds, with no single experience shared in its totality to provide the prior socialization of which Weick spoke. The necessary alignment of intent occurred not through their occupations (the *Harvey's* owners were hobbyists), but through a correspondence of skill, interests, and geographic foci.

Retrospection so far has held a privileged place in writing on organizational change, especially in sensemaking and the closely allied area of improvisation. Weick (1995) devoted a section to retrospection, but little to prospection. Weick et al (2005) addressed this matter in their recent review, highlighting as well the importance of prospection, in particular the need for balance between retrospection and prospection. In this case, the participants prospected or projected as much as they retrospected. The entire purpose of their sensemaking transactions was to take action. Retrospection held its usual importance in sensemaking, but it extended over minutes, days, and years, providing the rescuers with comprehension of the environment at present and with data on what might be the probable outcome of future relationships or future strategies. And it helped to provide a historical continuity of identity fixed in recollection of comparable events. No one in the transcripts mentioned Dunkirk, but some may have thought of it, providing an additional benchmark. But retrospection immediately feeds prospection. No one takes action in anticipation of failing; people take action with hope of success, projecting the action's effect. Everyone who "knew the harbor" "knew" it retrospectively, but used that knowledge prospectively.

The idea of distributed cognition is that organizational systems think, analyze, err, and correct based on the inputs of individuals in the system. Hutchins' case was the navigation function aboard a

naval vessel which, unlike in the merchant marine, is performed by a number of individuals performing specialized tasks that first creates disparate particles of information that is then integrated into organizational knowledge—an accurate navigational fix. Unlike in sensemaking, plausibility is less satisfactory than accuracy. But the cognitive system involves gathering, testing, questioning, erring, and correcting. There however, participants are linked, by phone, by voice, and by a militarized structure in the confines of a limited operational setting—the bridge and control stations of a single vessel. In the waterborne evacuation, sensemaking was distributed across substantial geographic and organizational space. The linkages themselves were made by people’s sense—who to call for certain resources, for example—held in memory (retrospect) but reassembled with a view to current and future needs (prospect and improvisation), and dovetailed either directly (John Krevey) or indirectly (divers) with others also making plausible if not identical sense.

Ability to recognize the limits of knowledge

In many instances knowledge that a particular participant possessed and would act on was not shared; that is, not shared in the sense that people necessarily held a common knowledge set prior to this event and which was then available to help them anticipate and respond to the need for evacuation. Rather, an individual sometimes had knowledge that someone lacked, and was then able to *actively* share it, either through communications or through action (See Weick, 1995: 180) for a discussion of the possible multiple meanings of “shared”). Often, the knowledge that someone had that was to be shared was geographic in nature.

A Coast Guard officer said:

I think the thing that prepared us for this evolution is just how often and how much we do in New York Harbor. We’re so familiar with it. Almost every day we’re going out. We know the area, we know landmarks, we’ve worked with many of the pilots and boats and tugs and run into them everyday. And we generally go out and do a hard day’s physical labor ...We’re constantly adapting to whatever the situation is and this was just another adaptation to a particular situation (South Street Seaport Oral History).

A number of those who were involved in this event were local harbor pilots. The pilots who participated are, indeed, local experts with an encyclopedic knowledge of the harbor developed over

years of apprenticeship and professional service. Some of this knowledge intersects with that of boat operators but some doesn't because it is highly specialized. Because the ship-to-ship radios were not affected, this local knowledge became available to support the operation, and the pilot boat *New York* became a kind of traffic control center with both harbor pilots and Coast Guard personnel aboard.

Ironically, one of the pilots offered a contradictory view of the knowledge of pilots versus Coast Guard officers while at the same time reinforcing the importance of the local knowledge that they were able to provide other participants.

One of the advantages that the maritime industry people have over the Coast Guard is that we know most of the vessels that work in the harbor because we've been here for our life. We kind of know the size of the vessels, we know the capabilities of the vessels, we can understand where they can fit and where they can't fit. So having the pilots out there was really a distinct advantage for this particular instance. We were able to deploy these people in a pretty efficient fashion. It worked out well. You knew ... the height of the tug, how high the deck was, what wall he could get alongside, and people could step into the boat rather than ... have to climb down or climb up into a boat. That worked out well. (Jack Ackerman, Harbor Pilot. South Street Seaport Oral History)

Participants knew the harbor, and in many cases they knew some of the other boat operators who were involved in this event and the nature of their particular operations. Knowing the features of the harbor allowed them to understand the challenges that boat operators and others would be facing and to take action to mitigate those challenges even before other people thought of them. Paul Amico, an ironworker, said:

I took oxygen acetylene torches out and I was able to cut the fences down, so we could get the ferries in tight to the wall without having people climb over the fences... At that time, I did not think twice about cutting the fence down. ... The safest thing to do for these people and the quickest thing was to cut the fences down. ... Pier 26 Downtown Boathouse was the most logical place at the time. I knew that harbor was clear, the channel was clear. I know we had at least nine feet of water...so that was a very safe area to work out of at the time...As I was walking up to Pier 26, I knew the fences, I knew we had torches there. I knew it would be easier to get people on the boat if I was able to cut the fences down. (South Street Seaport Oral History).

Comfort has emphasized the importance of a shared vision amongst those who would collectively respond to a crisis situation. Our interpretation of this important concept, however, is that a shared vision

does not exist as something that participants discover or that they “have,” but rather that it is both enacted and potentially disproportionate amongst the full range of relevant agents. Stated differently, the sharing is active, negotiated, and sometimes even unbeknownst to the viewer.

Other participants were able to anticipate certain exigencies that might confront boat operators who were focused on maneuvering their vessels and embarking passengers. A writer who reported on these events for a mariners’ magazine observed:

“Among the maritime community’s members, no potential problem seems to have been overlooked as individuals came forward to use their skills and company assets. Kurt Erlandson ...anticipated the possibility of lines fouling propellers with so many boats operating in close quarters. One ... dive crew had been working in the anchorage south of the Verrazano Narrows Bridge when the first plane hit the WTC. “I pulled them out of there and dispatched them to assist the evacuation. Then the rest of the crew and I arrived in New York ... with a complete diving spread about 1130, after we got clearance to go to the Battery,” said Erlandson. ...[T]he divers averaged six jobs a day clearing cables and hawsers from the response boats and tugboats. In their free time, they assisted coordinating the supply operations. “It was just another layer of a safety net that just happened,” Miller said. “But for the vessel operators, it was so valuable knowing a commercial diver was there.”
(Aichele, 2002: online document.)

In that instance, there was an overarching shared vision or a broad definable goal shared by the divers and the boat operators, but not everyone was sharing the same conception of the full range of operational needs. The divers thus anticipated that boat operators might not look ahead to the possibility of tangled lines and ask for someone to stand by.

Shared knowledge is thus the result of active processes of sharing, and being able to project the potential limits of participants’ awareness allows other participants to be part of the process of enacting a changing environment. It is possible for knowledge or awareness to be shared in an implicit way, coded in the changed environment for later sensemakers to find and to make use of it in their own navigation through problems and choices. Amico couples retrospect and prospect. He retrospectively holds in his mind a cartographic view of the harbor; he prospectively relates that view to needs, based on cues he

extracts from his environment. In cutting the fences down, he then enacts a new environment, one from which newcomers to the scene can extract their own cues.

As a crisis develops, not everyone who is involved or who will be a participant will have either all the required information or the same situation awareness: the comprehension of events, needs, and actions that are ongoing and that will ramify throughout and organizational/environmental system. Yet shared knowledge is important for modulated action. We identified numerous instances of sense-lending: information and knowledge passed between individuals and across organizations. Thus we interpret the “shared” in shared knowledge as an active process of sharing, a sharing that helps to enact the environment and which may, or may not, be recognized by all who share in it because they register it as a *feature* of the environment rather than as transmitted data. Some years ago the “landscape as text” approach swept through the field of geography, and scholars interpreted landscapes as artifacts social and cultural interchanges, particularly power relations of class or gender. We suggest that organizational sense is lent, too, through transformation of the environment, an actual physical enactment of environment which parallels the cognitive environment of actors. The ironworker did not necessarily share all of the knowledge of the boat operators and others who were involved, just portions of that knowledge. However, based on his geographic knowledge of the harbor and the waterfront infrastructure and his anticipation of future needs, he was both able to make sense of the evolving situation and, moreover, *lend his sense* to the participants via the change he made in the physical environment. Evacuees who found their path to the boats facilitated by the absence of fences had the benefit of the ironworker’s sensemaking processes even though they were not involved in that process. Put differently, his improvisation used the physical environment as a medium for “integrating information” (Comfort, 1999), and made sense (in the active sense of creating) for the evacuees in their new surroundings. And here is something interesting: *fences were cut down wholesale along the waterfront.*

We nosed in at the New York Waterway landing site there, but it was kind of shallow water, it would draw ten feet, so we were starting to hit bottom, we couldn’t get in there. We had to back out and go maybe fifty yards south to another pier which is an all wooden pier which is probably condemned. There was nobody on it, there wasn’t any

cleats or anything to tie to it to, just a lot of broken wood, and at the land end of the pier there was a chain linked fence and another wooden fence blocking anybody's entrance to the pier, you know because of safety reasons. But it was a construction site there as well, so we pulled in there and the police saw what we were doing, so the Police were trying to get into the construction site. We had to break a fence down and they were trying to get out to us, we're trying to get to them, we're trying to secure the boat, there's more boats pulling in behind us, the injured people, we had about 150 people on the boat, so the able bodied people were helping the injured people off. We had a lot of people on the pier trying to get everybody off in one location so we could get out of there, but I realized there was no way off the pier because there was a chain linked fence and another wooden fence, so Gomar Parga and I took some forcible entry tools. I had a gas powered demolition saw, I went up and cut the chain linked fence, a section of it down, pulled that out of the way, went into the next fence, cut this wooden fence down, broke it down with sledgehammers and axes to make a big hole so the ambulance crews can get through, the police crews can get through, so we get this big hole open in the fence, get everybody through. (Firefighter Tom Sullivan. South Street Seaport Oral History)

And then as people were coming over [the sea wall] there was kind of an ornamental, maybe a three-foot fence along the whole way. And as more and more people came we watched them climbing over that fence and trying to get on. And we had some Park Service folks onboard up on the bridge at the time. After watching about ten or twenty people struggling getting over this fence nearly falling and I said, "Can we cut it?" And she looked at me and said, "I don't think anybody would care right now." So we got out our torch and cut out a section out of the fence. And so we had our brow right on from our buoy deck up to this cut out section on the west Battery Park wall and it made it nice for people to be able to come right on board easily.... (Lieutenant Steven Whittrack, Coast Guard officer in command of a buoy tender. South Street Seaport Oral History.)

By cutting away that section of fence, combined with the maneuvering capability of his vessel, which enabled it to press close to the seawall, Whittrack was able to make a stable platform for the embarkation of passengers. As Weick (1995) did with *shared vision*, we can look at the phrase *distributed sensemaking* and consider both words to form a noun—sensemaking that has the characteristic of being distributed, in other words, sense that emerges in a variety of locations but without involving contact of agents in those locations. But we can also see distributed as the past tense of a verb, the action of someone who has spread sense. Amico distributes an interpretation of the situation, but the evacuees reinterpret that with respect to their own needs. Similarly, both Sullivan and Whittrack in their interpretation of events work changes in the environment that subsequent evacuees can take advantage of.

In another situation we see that sense is traded, where each piece of a conversation is reprocessed and reproduced.

there was a boat that every Tuesday there's a jazz thing called CD101, and the Horizon, 600 passenger charter boat was scheduled to be here at two o'clock. So, the first thing I did was call them on the telephone and we were talking and they decided to come anyway. I talked to them about possibly being involved in a relief effort to get some of the people out, because I saw all these thousands of people and there just didn't seem to be any other way off the island. So, they agreed to come in and see if they could facilitate taking people off the island by boat. (John Krevey, operator of Pier 63. South Street Seaport Oral History).

We also see evidence of the *sense giving* that Gioia and Chittipeddi (1991) discussed in their paper on change in a university setting. Here, however, sense is shared or distributed to people who are not part of an organization. And thus, sensegiving is a way of distributing sense to people outside an organization. They are not obliged to accept that sense, but they do, because they are able to read it through their identities and the set of cues they themselves have extracted.

I had a megaphone, and I would say the most beneficial instrument of that day that kept people organized was using that megaphone. People were confused, it was difficult to communicate with people about anything; nobody really knew anything, but by the use of that megaphone, constantly talking to people, calming them, telling them they were in the right place...[John Krevey. South Street Seaport Oral History].

Manipulating Norms

Through their membership in a waterfront or waterborne community (though often a competitive community), participants recognized and validated a set of behavioral norms that impelled them to take part in the operation. At the same time - either through professional training or licensing, or by subscribing to the principles associated with the art and occupation of seafaring - participants were able to coordinate with each other by understanding respective operational needs. Not all norms were allowed to persist, however, and those which were suspended were those which the participants understood might impede the superseding goal of moving people from Manhattan. In other work (Kendra and Wachtendorf, 2003) we discussed certain norms or protocols that were set aside as part of the evacuation process. For

example, vessels that were not passenger vessels, such as tug boats, carried evacuees. Other vessels exceeded their certified capacity.

[The captain] was sticking his head out the window of the bridge and he was saying, 'Cut it [the passenger loading] off at about 300.' He knew that he was going to break the law, but nobody was going to [criticize him]. So about 300 people were put on board. (Patrick Harris, charter boat operator. South Street Seaport Oral History).

To return to a previous example, everyone around the harbor was both seeing and experiencing fences as obstacles, as they are meant to be in ordinary circumstances. Liberated by the demands of supervening need—that of evacuation—people eliminated fences wherever they felt they had to.

People outside the ambit of an established organization also have access to the stories that are the carrier wave for retrospective capacity, through history, folklore, and the legends of particular disciplines. These stories or legends, critically, affect the way people construct their identity by affecting how they see their present environment; they “read” their present environment with the lenses of their passed-down knowledge. And accordingly, they adjust their actions commensurate with current circumstances read through existing professional, cultural, or folkloric texts. In other cases, “norms” that were usually maladaptive were overturned.

Captains were giving way to other vessels in a way I felt that was new and which should be all the time. No arguing. People were patient docking and undocking, staying out of the way of others. Yielding in situations on the water where another time you might have just said “I’m not gonna budge. I’m gonna go this route and that’s it.” But people had more goodwill for other people on the water... (Alan Michael, tour boat captain. South Street Seaport Oral History).

The environment they enacted was the New York City maritime environment. Norms associated both with identity (rescue) and the environment (navigation rules) provided direction for action, but norms were also overturned as needed to preserve a satisfactory operational environment, and knowledge was actively shared to extend the capabilities of the participants, who could feed that into their own sensemaking and return more sense to the system

Importance of Improvisation

Much research on disaster has emphasized the need for improvisation (Kreps; Kreps and Bosworth; Mendonca et al 2001; Kendra and Wachtendorf, 2003; Wachtendorf, 2004, Wachtendorf and Kendra, 2005). Tierney (2002) explicitly defines a disaster by the appearance of improvisation, arguing that if an event can be handled by routine protocols and procedures then it probably isn't a disaster. Improvisation at individual, group, and organizational levels is not merely a feature or characteristic of disaster, however. It is a principal skill or attribute in responding to the effects of disaster. In a noteworthy example of improvisation, the retired fireboat *John J. Harvey*, owned by a group of aficionados, pumped seawater ashore to supply fire hoses when the water mains serving the Trade Center were destroyed. Some research, such as Weick (1993) has explicitly tied improvisational skills to sensemaking, which he defines literally as making sense of a situation. The waterborne evacuation was a milieu of improvisation and sensemaking, but these acts were spread out over the expanse of New York Harbor, and involved participants from multiple organizations across the public and private sectors. Comfort (1999) has emphasized the importance of feedback in a response system. Thus improvisation is a key facet of organizational sensemaking in disaster (Weick, 1993). If sensemaking is enacted, but if an existing or known set of actions are not appropriate to a given set of conditions (or don't exist at all) improvisation is required to connect that which is understood retrospectively and that which is emerging. It is possible, though, to extend the idea further. If environments are enacted, they depend on sequences of improvisation. Participants in the evacuation enacted their environment both organizationally and geographically, demarking space and creating places that hadn't existed before, combining what they knew existed geographically with what they wanted both organizationally and operationally, and making places (such as embarkation points) to match the need which they held in distributed organizational thought, or sensemaking. Behavioral features that are commonly discussed within the context of an existing organization occur outside an established organization as well: these can become the catalyst for the development of an organization, a responsive affiliation, or an emergent group as is commonly

recognized in the disaster literature (Stallings and Quarantelli, 1985). In other words, collective sensemaking, spurred by and enabling creativity and improvisation, occurs outside of organizations, too, where ambient needs are both defined and met through the available skills and heuristics of people exposed to the same evolving conditions.

Conclusion

In this paper we have argued that the waterborne evacuation was a case of distributed sensemaking. It had the attributes of “normal” sensemaking, but certain of these differed in some of their features. For example, identities were not just changed, created, or chosen, as suggested by Weick (1995), but rather multiple identities were distributed throughout the burgeoning system. These identities could be actively held and acted upon based on cues. As a result, identity and environment were resonant and iterative. The environment, including the physical environment, is chosen and created along with the identity. Retrospection extends over a much longer span than normally construed, and points directly to prospection. Moreover, the environment itself, either as seen or as remembered, became a medium for communication and information transfer.

In a distributed sensemaking system, the properties of sense can themselves be distributed—every agent in the system does not need all seven properties—they are, rather, divisible amongst participants. The divers’ prospection was available to boat operators whether or not the boat operators were thinking ahead to that need. While keeping lines free of propellers is always an important consideration when bringing a vessel alongside the dock, an accident might not be something they would look ahead to (a driver of a car tries to avoid accidents, but doesn’t alert a tow-truck when leaving for work). Paul Amico’s prospection was available to evacuees who would never have to retrospect on fences or obstructions. Pilots, for example, based on their detailed local knowledge, are able to extract cues that may not be noticed by other vessel operators. In this way, there is an aspect of distributed cognition: the pilots have certain information that they share with others. This distributed cognition, however, was actualized through the condition of distributed sensemaking. Boat operators knew a waterborne evacuation was needed and wanted to be part of it; pilots supplied them with information to help them dock their vessels safely. While Weick et al. (2005) presented distributed sensemaking as

something to be understood as an extension or evolution of work on distributed cognition, there would seem to be more of an iterative relationship, perhaps as mutually interacting subroutines or modules. “Collective induction of new meaning” (Weick et al 2005) occurred as participants interpreted the evacuation scenario; distributed cognition enabled the actions needed to satisfy the sensemaking property of “enacting sensible environments.” People, everywhere, derived new meaning: it was an attack of great magnitude that created a desperate situation. People set aside norms (passenger limits, cutting down fences) and saw the need for the evacuation. It is worth noting that distributed cognition has been studied in highly socialized, organized environments such as naval ships. In this case, the participants began as disaggregated elements, but their sense was kindled by an extraction of cues read through a set of possible identities. Collectively, they inducted new meaning, re-defining their identities and their roles. They became not just tugboat captains, yacht owners, or waterfront workers, but emergency responders, shifting from their private and individualized capacities to public functions.

The central challenge in understanding distributed sensemaking is for researchers themselves to make sense of how connections are reestablished. We might make use here of a metaphor from electricity, that there is a sensemaking potential or voltage, and that certain nodes of a sensemaking grid light up. Potential sensemakers have access to a veritable infinity of identities or retrospections, much as improvisers or bricoleurs have access to materials or methods which do not exist in an organized form until acted upon. That act of acting depends on and fosters sensemaking. Sensemakers have elements at their disposal but, as in other complex systems, the initial conditions bear much on what will be the final sensemaking form. In this case, skills, norms, community, folklore, ethos, and geographically-referenced knowledge acted as the carrier wave, while identity provided the signal—the spark or ignition of both sense and action.

Acknowledgements: Funds for portions of this research were provided by Multidisciplinary Center for Earthquake and Engineering Research (MCEER) New Technologies in Emergency Management, No. 00-10-81 and Measure of Resilience No. 99-32-01; the National Science Foundation; the Public Entity Risk Institute No. 2001-70 (Kathleen Tierney, Principal Investigator), National Science Foundation No.

0603561 and 0510188 (James Kendra and Tricia Wachtendorf, Principal Investigators) and the University of Delaware Research Foundation (Tricia Wachtendorf, Principal Investigator). We are grateful to the South Street Seaport Museum (Mr. Jeffrey Remling, Collections Director) for access to interviews with participants in the waterborne operations. Funding to the museum for these interviews was provided by the National Endowment for the Humanities, and the interviews were conducted by David Tarnow. We are also grateful to Karl Weick for comments provided on an earlier draft of this paper. The views expressed in this paper are those of the authors.

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