Street Science:
The Fusing of Local and Professional Knowledge in Environmental Policy

by

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Submitted to the Department of Urban Studies and Planning in
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ABSTRACT

This dissertation analyzes how local knowledge improves environmental decisions. The premise is that controlling pollution and addressing public health disparities are not problems that professionals alone can solve. Concerned lay publics, especially low-income populations and people of color that experience the greatest environmental health risks, are demanding a greater role in describing, researching and prescribing solutions for the hazards they face. Seeking environmental justice, these communities are demanding to “speak for themselves,” often drawing on their first hand experience—here called local knowledge—to challenge expert-lay distinctions and how professionals define and prioritize which problems warrant attention. Community participation in environmental decisions is putting pressure on policy-makers to find new ways of fusing the expertise of professional scientists with insights from the local knowledge of communities. This dissertation asks how the local knowledge of community members can improve environmental decision-making? In answering this question, I explore the ways residents of the Greenpoint/Williamsburg neighborhood of Brooklyn, New York, are organizing and using their knowledge of local environmental and health hazards to both improve local conditions and influence the judgments of professionals. In particular, this study analyzes how local knowledge was fused with professional insight in four neighborhood environmental health problems: (1) risks from subsistence fish diets; (2) asthma afflicting the Latino population; (3) childhood lead poisoning; and, (4) the mapping of air pollution sources. Through these cases, I describe local knowledge, reveal how it differs from professional knowledge, show the different contributions it makes to environmental politics, and highlight some conditions that contribute to the successful professional uptake of local knowledge. Ultimately, I show that local knowledge can improve environmental policy making in at least four ways: a) epistemology – adding to the knowledge base of environmental policy; b) procedural democracy – including new and previously silenced voices; c) efficiency – providing low cost policy solutions; and, e) distributive justice – highlighting inequitable distributions of environmental burdens.

Dissertation Supervisor: Lawrence E. Susskind
Title: Ford Professor of Urban and Environmental Planning
THE MAYOR. As usual, you employ violent expressions in your report. You say, amongst other things, that what we offer visitors in our Baths is a permanent supply of poison.

DR. STOCKMANN. Well, can you describe it any other way, Peter? I tell you—whether you drink it or bathe in it—the water is poison! And this we offer to the poor sick folk who come here in good faith and pay us at an exorbitant rate expecting to be cured!

THE MAYOR. Believe me, the public has no need of new ideas; it's better off without them. The public is best served by the good, old established ideas it already has.

DR. STOCKMANN. This is too much! I, a doctor, a man of science, have no right to—!

THE MAYOR. But this is not purely a scientific matter; there are other questions involved—technical and economic questions.

DR. STOCKMANN. But the source is poisoned, man! Are you mad? Do you want the town to grow rich by selling filth and poison? The whole of our flourishing municipal life derives its sustenance from a lie!

THE MAYOR. That's worse than nonsense—it's downright libelous! The man who can throw out such offensive insinuations about his native town must be an enemy to our community.


I understand the vocation of the intellectual as trying to turn easy answers into critical questions and putting those critical questions to people with power. The quest for truth, the quest for the good, the quest for the beautiful all require us to let suffering speak, let victims be visible and let social misery be put on the agenda of those with power. So to me, pursuing the life of the mind is inextricably linked with the struggle of those who have been dehumanized on the margins of society.


Acknowledgements:
My warmest gratitude to my advisor Larry Susskind for keeping me afloat on this journey. Much thanks to John Forester for his attentive and stimulating ideas, enthusiasm and creativity. Sheila Jasanoff also offered invaluable insights and guidance. The project would not have been possible without the generosity and patience of El Puente staff, especially Analia, Cecilia, and John, as well as Robert Ledogar. Samara Swanston was also especially generous with time, stories and research materials. Namaste!
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Prologue:

A dust cloud from the rubble of the former World Trade Center in lower Manhattan was swirling overhead when I entered a public meeting about local air quality on October 5th, 2001. Entering the meeting, I overheard a middle-aged woman who lives in near-by Battery Park City ask her anxious-looking friend: “How can two 100 story buildings disintegrate into thin air – given all the things in those buildings that were never meant to disappear into the air – and that air be perfectly safe to breathe?” Almost on queue, Joel A. Miele, Sr., the city’s commissioner of environmental protection came over the microphone and insisted that the air quality, while it might cause nagging discomfort, “is not a health problem. It is human nature” he continued, “to be worried and skeptical, but you can rest assured there is no danger from breathing the air.”

The woman next to me was not buying it: “I don’t trust them for a minute. We feel physically sick when we stay there, sore throats, burning eyes, rashes.” Mary Mears, a spokeswoman for the US EPA got up to clam the uneasiness in the crowd: “You can see the dust, you can taste the dust, you can smell the smoke,” she said. “I can understand why people are not convinced based on the evidence they see. By the time I get to work I feel like I was licking the sidewalk.”

The EPA and the City’s Department of Health had tested the air and tests revealed that only a few samples of heavy metals, asbestos, and other pollutants exceeded health safety levels; of 442 air samples the EPA analyzed for asbestos, only 27 exceeded safety levels. “The chances of being exposed now are miniscule,” noted commissioner Miele.

Waking out of the meeting, I caught-up with the woman who was sitting next to me. I asked whether the meeting had reassured her. “What did they tell us? Essentially, that after they studied the effects of the air on a variety of populations for the next few years they’d have lots of interesting data to report. They thoughtfully described their studies for us, although I noted the lack of research on immune system disorders, the type of problem I have. Their comments on stress and psychosomatic disorders alienated lots of people in the audience, and we let them know it. Since I didn't have high expectations for the meeting, I was not disappointed.”

She continued: “The most important information for me came from an environmental advocacy group up Broadway from me - they did a Freedom of Information filing with the EPA, NYS and NYC. Yesterday they got a huge file from the EPA that contains findings which appear to be wildly at variance with what they're putting out publicly. This group hasn't had time to go through the many inches of reports but it seems clear that there's lots of bad things going on down here - again no surprise, as is the fact the State denied them their records because it is a crime scene and NYC asked for 24 more days to respond. As expected, no one in the audience believed the experts - they believed in their noses, they believed in the fires. And they told the experts that they had to do better - which, being clueless academics, they won't be able to.”

Almost a month later, on November 1, 2001, the New York City Council held another hearing, which ended in plans for yet another. The same story line seemed to be emerging: while the smoke plume continued to rise, locals were getting sick but the air, according to the experts, was safe. The locals were skeptical of the experts and the experts, while sympathetic, largely dismissive that the dust cloud was causing any serious illness. Policy makers were left in a quandary over what to do.
1.a. Community Knowledge in Environmental Conflicts

Stories like these are not unique. Something unexpected happens, unexplained health problems arise and residents want some assurance that they are not in danger. While residents share stories, scientists and technicians attempt to show, using techniques such as risk assessment, that there aren’t strong causal connections between the dangers residents perceive and the health problems that worry them. Policy makers, administrators and city planners are often left to decide who to believe and what course of action to take.

Should community residents defer to professionals, trusting that their findings are accurate and that they are sharing all the information they have? Do professionals have an obligation to take account of community-generated information and to incorporate it, somehow, into their formal analyses? Are there ever instances in which local accounts of health risk ought to trump expert knowledge? Can we imagine a situation in which we would not want to put our lives and community well-being in the hands of technical experts? What are the drawbacks of entrusting professionals who might not really know a community or share certain life-experiences and are content to rely on secondary data and statistical manipulations that may be incorrect?

This dissertation explores these questions and the ways in which community-generated information can, in fact, be used to improve environmental decision-making. My premise is that decision-models that rely exclusively on professional scientists to define, analyze, and prescribe solutions for environmental health hazards can often lead to inadequate environmental and public health protection for some residents of some communities – particularly places where the poor and people of color reside. In
Chapter 1 – Local Knowledge in Environmental Health Policy

particular, this dissertation analyzes how community-generated knowledge can improve environmental decisions in order to better protect everyone, particularly disadvantaged populations. This dissertation investigates the ways in which citizens, acting as “street scientists,” can organize and use their knowledge of local environmental and health hazards to supplement what experts and policy-makers have to say. The underlying question that I seek to answer is: How can the local knowledge of community members improve environmental decision-making?

I begin my discussion from the assumption that pollution and public health problems are no longer viewed by planners and public policy-makers as purely technical problems that ought to be left exclusively to experts. Concerned lay publics, especially the most disadvantaged populations experiencing the greatest risks and health effects, are demanding a greater role in researching, describing and prescribing solutions. Citizens are questioning how experts create, define and prioritize ‘problems’ and which problems warrant attention. Seeking environmental justice, these communities are demanding to “speak for themselves,” often drawing on their first hand experience—here called local knowledge. The need to take account of local knowledge is putting pressure on environmental and public health professionals to find new ways of fusing the expertise of professional practitioners and scientists with the “contextual intelligence” that only local residents possess. My objectives are: (1) to take a realistic look at what local knowledge can contribute to the general knowledge base of policy-making; (2) highlight the ways local knowledge differs from professional knowledge and why local knowledge is a useful category at all; (3) provide cases of environmental health problem-solving where
attempts were made to fuse local and professional knowledge; and, (4) suggest reasons for the successful professional uptake of local knowledge.

This chapter introduces the research objectives of the dissertation and the tension between professional and local knowledge. Section I argues that understanding local knowledge is important for both improving environmental health decision-making, especially for society’s least well-off, and for understanding how to enhance the democratic character of public decision making. In particular, I review some theories of policy making to reveal why lay or local knowledge is often ignored in public decision-making processes and how social scientists have responded to this ignorance of the local. Section II introduces the Greenpoint/Williamsburg neighborhood in Brooklyn, New York, where I have analyzed the efforts of residents as they research, advocate and resist local hazards and disease. Section III describes the research methods and the patterns I looked for in my cases which explain how local knowledge can influence and improve professional action. Four cases are also introduced: 1) An analysis of how residents gathered information on risks to anglers living off subsistence fish diets; 2) Description of a series of community health surveys which captured the cultural practices of neighborhood Latinos fighting alarmingly high rates of asthma; 3) How residents argued for a health risk assessment after lead paint chips were sandblasted off the Williamsburg Bridge; and, 4) How local students and residents characterized air pollution through map making. Section III introduces my research methods and how I have analyzed the four cases. The chapter closes with a brief outline of the entire dissertation.
1.b. Why Study Local Knowledge?

This dissertation explores how the knowledge and experience of community residents, especially those living with persistent hazards and chronic disease, can offer professionals new and more effective ways to address environmental exposure and disease disparities. I start from the premise that the information, knowledge and practices of local people can and do influence professional decision-making and I seek to reveal how and why this happens so that planners might be in a better position to analyze and address the most pressing concerns of communities suffering the greatest environmental and health burdens. I also posit that understanding local knowledge (and conversely ignorance) can help reveal how social inequalities are expressed and empirical study can reveal how power and inequality are experienced in day-to-day life.

Typically, research into environmental health decision-making asks how science influences policy. Science is seen as speaking truth to controversial environmental and human health risk decision-making (Polanyi 1962; Price 1965). In this view, politics is seen as a separate entity that is informed by science. Scientific knowledge is thus presumed to be shaped outside institutional, cultural and historical contexts—not something integral to and evolving with political decision-making (Price 1965). This dissertation begins by challenging these notions by first suggesting that science and politics are interdependent and second, and more to the point of this study, that the knowledge of everyday citizens, lay people, influences both science and political decision-making. I will explore these claims in more detail through case studies of community-based controversies over environmental health.
The dissertation engages several issues that remain largely unaddressed in the environmental policy and planning literature. First, increasing evidence suggests that local knowledge (LK) has contributed to the formulation of more sustainable resource management practices and development decisions, especially in the developing world (Brush 1980; Chambers 1997; Scott 1998). Yet, little work has been done on how this knowledge might improve environmental decisions in Western contexts. In developing countries, Andean potato farmers, Indian foresters and Nigerian medicinal-healers, have revealed how their ‘indigenous knowledge’ improved local environment, development, and human health conditions. (Van der Ploeg 1993; de Guchteneire et al 1999). Even the World Bank and other international agencies have acknowledged that local people have their own science and practices and that to assist them, professionals need to understand something about their knowledge and practices. For example, the World Development Report recently noted that “local knowledge, not capital, is the key to sustainable social and economic development and in reducing poverty” (World Bank 1999). Surprisingly, little work has been done to explore whether and how LK can be applied in American urban settings.

Second, a growing body of literature suggests that inequalities in environmental health, morbidity and mortality, result from a combination of poverty, discrimination, political disenfranchisement, socio-economic status and biologic agents (Berkman and Kawachi 2000; Evans et al 1994; Krieger 1999; Marmot and Wilkinson 1999; Sen 1999). The implication of this renewed interest in social epidemiology is that disease is less and less believed to be caused by a specific, identifiable biological agent and instead that a
host of social, economic, political and biologic agents contribute to well-being. Much of this work has recognized that “health” is not just the absence of disease, but the conditions and capabilities – physical, social and biological – that enable populations to make healthy lifestyles choices. In order to identify these conditions and capabilities, social epidemiologists have turned to populations suffering the most – such as African-Americans, impoverished populations, farm-workers – to understand how their daily experiences influence disease and access to health resources. While the knowledge of these disadvantaged populations has proved vital for identifying and describing the social factors that contribute to disease inequalities, these same populations have not been party to discussions over what to do about eliminating inequalities. I seek to extend the work of social epidemiologists by exploring how the local knowledge of disadvantaged populations can influence decision-making that might reverse health inequalities in American cities.

Third, while environmental activists, agency staff, and intergovernmental institutions around the world have “re-discovered” the importance of LK in environmental and health research, along with this recognition has come a tendency to romanticize LK as always in harmony with natural and human systems and as superior to other ways of knowing (Agarwal 1995; Thrupp 1989; Warren et al. 1993). Compelling evidence shows that LK can sometimes lead to naïve or even detrimental environmental and developmental decisions (Agarwal 1995; Buege 1996; Milton 1996). While my

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1 This is what Dubos (1959) called the doctrine of specific etiology. This belief still dominates the biomedical model of population patterns of health (Pearce 1996).

2 The World Health Organization defines “health” as “a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity.” See: www.who.int/aboutwho/en/definition.html.
premise is that LK cannot be ignored, I seek to understand both its value and its limitations.

Fourth, one difficulty that local knowledge presents for policy making is that its insights are often very contextual, while policy making tends to make general rules. Much of the work on LK is ethnographic and deeply contextual. Few general patterns or lessons are offered. In other words, advocates of LK have been understandably hesitant to 'scale-up' or generalize their findings and insights – largely out of fear of inaccurate decontextualizations, over-simplifications and unjustified generalizations.\(^3\) One result is that professional decision-makers have not found ways to incorporate the important understandings from studies of LK into the more generalized practice of policy-making. I seek to walk a fine-line by offering general recommendations about how LK can be used to improve environmental decisions while maintaining a heightened sensitivity to the contextually specific qualities of this knowledge.

Finally, the field of urban planning has increasingly embraced the importance of "local," "public," and bottom-up, as opposed to top-down, approaches to community decision-making (Forester 1999; Hoch 1994; Healey 1997; Innes 1996; Reich 1988; Susskind et al 1999). One aim of these approaches is to enhance the democratic character of decisions by challenging the technocratic model of public decision-making. Advocates of these approaches reject the "deficit" model of citizen participation, which assumes that the public is largely ignorant and needs educating when it comes to environmental and scientific problem-solving, and instead embrace a "complementary" model. The complementary view assumes that what citizens have to offer is "political"

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\(^3\) I borrow the idea of "scaling-up" from the work of Martha Derthick, ed. (1999), Dilemmas of Scale in America's Federal Democracy, Cambridge University Press.
rather than "technical" insight, and citizens are asked to offer values while experts retain autonomy over technical issues. I think this misses what practitioners and analysts of LK have come to understand, namely that technical expertise is "co-produced" (Jasanoff and Wynne 1998; Susskind and Elliot 1983). Yet, the relationships involving the "co-production" of knowledge and decision-making have scarcely been examined.

This dissertation seeks to speak to planners by building on and extending the work of Schon (1983), particularly his call to planners to stop being so bureaucratic and to become 'reflective practitioners.' I also hope to further Forester's (1999) efforts to critically review 'deliberations' among practitioners and their public clients. Both Schon and Forester argue that professionals should learn how to view their practice in a more open-ended way. I will suggest that such engagement requires a special kind of interaction with community members, especially those bearing the brunt of society’s ills. As planners increasingly play a mediating role between experts, policymakers, and various publics, they are going to need to learn new ways of taking account of the local knowledge embedded in the communities within which they work.

1.c. The Trouble with Local Knowledge in Environmental Policy

Despite the "rediscovery" of local knowledge in some policy-making venues such as international development, the knowledge that lay publics hold is still largely ignored in public decision-making. I seek to explore how this knowledge might be "brought back into" policy. I should first mention that attempts to understand how local or more specifically lay public knowledge might be brought into democratic decision-making are

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4 Co-production is a term from the field of science and technology studies (S&TS) and claims that scientific knowledge and political order are interdependent and evolve jointly.
not new. For example, in his work *The Public and Its Problems* (1954), Dewey was concerned with how ordinary citizens could participate in political decision-making that was becoming increasingly dependent on the technical knowledge of an expert elite class? Dewey’s response to his “problem” was a division of labor; experts would analytically identify problems and citizens would set a democratic agenda for addressing them. The central challenge for Dewey was to devise methods and conditions of public debate, discussion and persuasion where experts and citizens could integrate their knowledge and understandings. He called for participatory processes to increase the democratic character of decisions, where experts were not asked to judge the efficacy of particular policies, but act as “interpreters and teachers” to help citizens debate in a way that would reflect the “public interest.”

While Dewey’s analysis remains important for understanding the tensions between experts and ordinary citizens, his analysis did not fully anticipate the influence of the specialized analyst, operating largely removed from any public discourse, on public policy. Nor did Dewey find the information and knowledge that experts (or lay people for that matter) have problematic; science and expertise for Dewey offered a body of facts and methods, which only entered the rhythms and influences of politics at a later stage. Finally, Dewey focused on the optimal procedural conditions for reciprocal dialogue among scientists and lay people, but did not fully anticipate that the content of the scientist-lay conversation might be problematic; scientists not able to translate their information into the ordinary language of everyday practice and for publics to translate their knowledge into the specialized language of science. Thus, the rise of the professional analysts, or technocrat, and an uncritical faith in science as facts and truths,
Chapter 1 – Local Knowledge in Environmental Health Policy

act as starting points for trying to understand why local knowledge might be ignored in policy-making.

**Technocrats, Science and Expertise**

Skocpol (1999:495) notes that “today’s professionals see themselves as experts who can best contribute to national well being by working with other specialists to tackle complex technical and social problems.” Skocpol continues that these privileged professionals no longer see their role as “working closely with and for non-professional fellow citizens” or helping to lead “locally rooted” associations for problem solving. The view that public problems ought to be analyzed by a group of autonomous, highly trained and specialized professionals, who offer their dispassionate findings to decision-makers, is partially rooted in the belief that facts and values can be easily separated. While the fact-value distinction has been challenged on a number of fronts, the positivist view of neutral fact-finding as informing value-laden politics remains a powerful decision-making model in environmental politics (Fischer 2000; Habermas 1970; Krimsky 1984). Perhaps most influential in this view is that one form of rationality has come to dominate environmental politics – where science is the only legitimate form of expertise. Technocrats argue that experience in a given area and training in the specialized collection and systematic analysis of information, allow them as professionals to tackle issues with neutrality and dispassionate objectivity (Benveniste 1972). Additionally, excessive consultation over technical findings is unnecessary since any group of experts would eventually arrive at similar conclusions given the same range of evidence.

However, Ezrahi (1990) argues that notions of scientific legitimacy and neutrality have been used “as an alternative to, rather than a component of, elitist, bureaucratic or
other hierarchical structures of action” (1990:220). By appealing to scientific methods, technocrats retain power and legitimacy because they are seen as dispassionate and “technically disciplined,” an important counter to the undisciplined and biased ideas of ordinary people (Ezrahi 1990:69). An example of this view in environmental decision-making comes from Chief Justice Breyer who has called for an executive level super-agency of scientific and technical experts to make dispassionate, politically-neutral assessments of toxic hazards and environmental risks (Breyer 1993).

Importantly, the field of science and technology studies (S&TS) has helped reveal how science and “truth” statements are justified as authoritative bases for action or inaction. The field has highlighted that ideology, culture and values are part of generating all knowledge – whether labeled scientific or lay – in just the same way they are integral to any other social activity. Importantly for this discussion, S&TS suggests that many policy decisions, particularly over questions of technological risks, are “trans-science;” involving questions unanswerable by science alone (Weinberg 1972).

Furthermore, what constitutes legitimate knowledge may vary with social context (Irwin 1995; Scott 1998; Wynne 1989).

In building on contributions from S&TS and related fields, Jasanoff and Wynne (1998) refer to “co-production” to describe the interdependence of scientific knowledge and political order. As mentioned above, co-production understands scientific knowledge and social order as evolving jointly and knowledge is not self-contained. Science is understood as dependent on the natural world, as well as historical events, social practices, material resources and institutions that contribute to the construction, dissemination and use of scientific knowledge. Political decision-making, in the co-
production framework, does not take “scientific knowledge” as a given, but seeks to reveal how science is conducted, communicated and used. The co-production model problematizes knowledge and notions of expertise, challenging hard distinctions between expert-lay ways of knowing.

Clearly, the notion of co-production and its emphasis on mutually supporting forms of knowledge create room in policy-making discourse for lay or local knowledge. The idea also stresses the contingency and indeterminacy of knowledge, the multiplicity and non-linearity of causes, and the importance of the narrator’s or “claims-maker’s” social and cultural standpoint in presenting particular explanations as authoritative (Jasanoff 1996; Woolgar 1988). Thus, all actors have “partial knowledge” always carrying with them their own social commitments and assumptions, and decision-making requires a negotiation among these partial and plural positions (Haraway 1991; Harding 1991). Perhaps most importantly, the field of S&TS has destabilized the dominant view in science policy-making that science can be uncritically accepted as “fact” and “truth” and emphasized that all description is prescriptive.5 The destabilizing stories and emphasis on the need for “negotiating expertise,” suggest that a deliberative politics is what is needed for the consideration of lay or local knowledge in policy making (Fischer and Forester 1993).

1.d. The Utility of Lay Knowledge (or the impotence of professional knowledge)

If expertise and knowledge is culturally negotiated, as the co-production model suggests, and local knowledge can contribute to environmental problem-solving (as I have also suggested), then what is the role of lay knowledge? Alistar McIntyre

---

5 I draw this notion from Putnam (1995), who states that all description is interested in the sense that ‘facts’ are never divorced from perspective. Putnam stresses that we are never interested in collecting all possible ‘truths,’ but instead gather information to explain, predict, conserve, reveal beauty or elegance, etc.
(1971:238) once said that “what we have to learn from the social sciences as they now exist is how little understanding the social sciences can give us beyond the everyday understandings of social life that we already have anyway.” McIntyre’s comment suggests that social science inquiry by the “professions” (Abbott 1988) has largely failed to be relevant to the problems and understandings of everyday life – the stuff of policy making. The comment also suggests that “everyday understandings” should be the locus of social problem solving, not professional social science.

Lindblom and Cohen (1979) argue that not only has social policy-making relied too heavily on professionals, but that professional knowledge has not contributed any more than ordinary knowledge to social problem solving. In their strong claim, Lindblom and Cohen (1979) argue for *useable knowledge*, as opposed to the professional knowledge that dominates modern policy-making. The problem with professional knowledge is that it has not delivered on its promise of making better, more efficient, cheaper, more fair or just social decisions. Nor has the policy sciences contributed a great deal, they argue, to solving some of our most pressing social problems. Lindblom and Cohen (1979) argue for a reintegration of “ordinary knowledge” into policy-making in order to make it more responsive to the needs of the public and to remove the barriers between professional policy-makers and citizens.

Scott (1998) asks in *Seeing Like a State*, why have many state-centered planning projects intended to improve human conditions failed? After reviewing such failed grand schemes as centralized German forestry management, Julius Nyerere’s attempt at "villagizing" the people of Tanzania, and the centrally-planned city of Brasilia, Scott concludes that centralized planning has largely failed because it has not “seen” the value
of the practical, contextual and local knowledge in particular setting that makes policy work. For instance, in the Brasilia case, Scott critiques centralized, what he calls “high modernist,” urban planning for creating a largely uniform, stale, unlivable place. The “success” of Brasilia for Scott was the informal, largely unplanned, community created by the construction workers, who’s housing needs were not anticipated by bureaucratic planners. Scott argues that the bureaucratic planner equipped with only a map of a place does not know best, in part because they do not have the craft to understand the particulars of the situation and that any policy system must create and maintain a space for those on the spot to use their local, practical knowledge (1998:334).

Scott (1998) argues that how successful local knowledge is at addressing the problem at hand is the best measure of its utility, not whether or not it contributes to a wider body of knowledge. Scott uses the example of ship navigation to highlight the efficacy of local knowledge. He states that we would likely prefer a ship captain experienced with the swells of the high seas and gale forced winds to navigate a ship across the open sea. But, when the large ship comes into port, the captain turns over navigation within the inner harbor to a local pilot who brings the ship into its berth. The art of piloting, for Scott (1998:316-7) is an example of local knowledge and, importantly, both ship captain and pilot are equally expert at navigation – depending on the context.

In policy-making contexts, local knowledge is often cited as crucial for successful implementation. For example, Lipsky (1976) notes that implementation and ensuring compliance of hierarchical administrative policies is difficult if not impossible at the local level because enforcement for “street-level” bureaucrats is always negotiated (Lipsky 1976). Lipsky (1976) notes that negotiation makes sense for street-level bureaucrats
because they need to cultivate long-term working relationships. When administrative policies ignore local circumstances and "on the ground" knowledge, they will likely fail.

Yet, implementation is not the only aspect of policy made more difficult without considering local knowledge. The policy making literature acknowledges fairly well that problem solving entails identifying sets of selected interconnected causes and effects, referred to as framing (Dryzek 1990; Schon and Rein 1994). Frames have been described as tacit theories about what exists, what happens and what matters which are identified and articulated through selection, emphasis and presentation of certain ideas and knowledge (Schon and Rein 1994). In short, framing orders experience, eases confusion, and creates the possibility of control, largely through inclusion and exclusion. Since only some ideas, knowledge and information, etc., become part of any frame, other things are left out.

As Jasanoff (1990; 1994; 1998; 2000) and others have pointed out, risk has been the dominant frame through which environmental policy is analyzed in the US. Risk and its correlate risk assessment, implies that a problem can be clearly defined, quantified, and therefore managed (Jasanoff 2000); "It is a relative concept that risks can always be offset against benefits, and risk-based laws often explicitly prescribe that the benefits of policy action (which are in turn, quantified) should outweigh the risks (Jasanoff 2000:72). The important implication here of the "risk frame" for environmental policy is that certain types of evidence and expertise are valued and other evidence and expertise is ignored. The risk frame tends to prefer formal and quantitative information and the participation of professionals. For example, Jasanoff (1990) has

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6 Jasanoff and others note that in Europe, the precautionary principle is another way to frame environmental problems. Tesh (2000) also notes that the discourse of risk in environmental health policy shifted the focus of regulation from eliminating harms to managing risks.
noted how expert advisors in policy-making are chosen based on their technical competence, ability to construct "objective science," and political independence and neutrality. As a result, risk-based problem framing and decision-making processes largely ignore evidence that is more informal, experiential, tacit, and explicitly value-laden (Wynne 1996; Irwin 1995). Lay publics, while often granted "entry" into policy-making through formalized public hearings, are required to offer evidence in a "voice" or language that mirrors that of experts. As a result, lay publics are at a disadvantage in their ability to influence decisions when compared to scientists and other professionals.

Additionally, the institutional organization of power affects the ways in which nongovernmental actors (or local people) fight for particular objectives. Jasanoff (2000) notes that in parliamentary democracies, citizens often attempt to influence government through electoral politics, citing the rise of the Green party in Europe as an example. In the US, however, local organizing has taken the place of party politics as a means of influencing environmental health decisions. Local organizing can be expressed through a variety of mechanisms, including mass protest, lawsuits, local referenda, and citizen advisory committees (CACs) (Faber 1998; Gibbs 1994; Hofrichter 1993). Yet, structural explanations of power are limited in their ability to account for modification and change in institutional configurations of power. For example, institutional explanations of power have not been able to account for the rise of and influence of social movements in environmental policy (Tesh 2000).

**Communicative planning and the utility of local knowledge**

According to Innes (1995:183), a new generation of planning theorists "see planning as an interactive, communicative activity and depict planners as embedded in
the fabric of community, politics, and public decision-making.” The underlying assumption in communicative planning is that lay people have something to offer the policy process and they ought to be present in deliberations with professionals in making the decisions that affect their lives (Healey 1999). The new institutionalists also emphasize the importance of institutions for embodying meaning, creating social relationships and symbolic orders and for encouraging (or stymieing) public dialogue (Powell and DiMaggio 1991).

Communicative planning begins from the premise that uncertainty is inherent in environmental policy-making and negotiations among key actors and institutions is necessary to make the judgments necessary for taking action in the face of uncertainty (Funtowitz and Ravetz 1993). Citizen participation is valued especially when finding an acceptable policy solution depends on appealing to and mobilizing citizens’ knowledge of local or regional conditions, when policy issues have a strong ethical component and where experts are strongly divided over an issue (Yearley 1999). The implication is that scientific knowledge can no longer be taken as unproblematic. Critical reflection on the practices and products of science need to become part of the policy process, subject to various forms of popular democratic control (Beck 1992; Sclove 1996; Wynne 1996).

Yet, deliberative forums, especially those involving environmental decisions, have not found a way to avoid granting science and technical expertise a privileged position in public discourse (Ozawa and Susskind 1985; Amy 1987). Even some of the most collaborative processes, such as joint-fact-finding advanced by advocates of consensus-building, have not found a way to place science and technical expertise on par with lay knowledge and instead recommend not pursuing joint fact-finding when
"significant power imbalances among the parties" in a policy dispute exist (Ehrmann and Stinson 1999). Technical language remains a prerequisite for most deliberative forums, often creating an intimidating and "disciplining" barrier for lay citizens seeking to express their disagreements in the language of everyday life (Foucault 1972). Speaking the language of science, as well as the jargon of a particular policy community, remains an essential, but often tacit, credential for participation in environmental politics — even in the new deliberative forums. The environmental policy making challenge seems to be how to interconnect and coordinate the different but inherently interdependent discourses of citizens and experts. As Forester (1999) has eloquently acknowledged, planners and others have much to learn about the "substance of argumentation" in planning processes, at all levels - structural, organizational, and interactive (face-to-face) - as well as the options open to planners immersed in these processes.

Thus far I have suggested that lay knowledge has been ignored in public decision-making largely because political institutions have evolved to reflect the disinterested, neutral knowledge production paradigm advanced by the natural sciences. Out of this political arrangement grew the "professions" or the elitist bureaucratic technicians that were supposed to fulfill the liberal-democratic mission of neutral and disinterested problem analysis and decision-making. Professionals were seen as legitimate in part

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7 An important exception to this claim is environmental mediation. In environmental mediation, a neutral facilitator has the explicit role of helping lay people understand technical jargon and expressing their points of view in a way that is understandable for experts (Susskind et al 1999).

8 Despite the provocative contributions of critical theory and concepts of communicative action to planning over the past decade, along with a more nascent literature on planning-as-storytelling, planning research has generally eschewed the task of examining culture and power in face-to-face communication. More specifically, planning researchers have treated those topics mainly as theoretical abstractions, not as concrete problems and opportunities for the planners involved. In a sense, this is not surprising, since much work on communicative action, wherein power issues are central, continues to treat human communication as a conceptual domain, not as social material in need of detailed, firsthand investigation or in-the-moment response (Forester 1999).
because of their supposed commitment to neutrality and disinterestedness, but as importantly, because of their use of analytic techniques that could be made publicly visible, much like the visible and seemingly verifiable scientific experiment. One result was the increasing profile of cost-benefit analysis and risk assessment to frame environmental policy making, both of which are intended to act as highly “scientific” and publicly visible techniques to justify political action (or inaction). However, the notion of “co-production” has challenged the neutrality and disinterestedness of science-based policy by highlighting the notions of social control embedded in claims of scientific authority. The idea of co-production emphasizes the “bounded rationality” of scientific knowledge and highlights the social and cultural attributes of all types of knowledge. 9

1.e. Practice and Local Knowledge

I have studied the practices local people engaged in to organize, mobilize and disseminate their understanding of environmental health hazards. In short, I have studied practice, but what does practice entail? While traditional policy making focuses on “problems” and “decisions,” deliberative policy science has emphasized practices as its unit of analysis (Fischer and Forester 1993). Practice is admittedly, a difficult concept. The concept of practice is an attempt to develop a unified account of knowing and doing (Dewey 1938). Practice emphasizes that knowledge, knowledge application, and knowledge creation cannot be separated from action; that knowing and doing are intimately related (Putnam 1995).

9 According to Simon (1976:80-1), “objective rationality” would imply that the subject molds their behavior into an integrated pattern by (a) viewing all the behavior alternatives prior to decision-making, (b) considering all the possible consequences that would follow from each choice, and (c) singling out one alternative that optimizes one’s a priori preferences. In contrast, “bounded rationality” implies that we do not always know a priori what we want, we don’t have complete information about alternatives, and we can never fully know our future values or decision consequences. For Simon, bounded rationality means that we “satisfice,” because we don’t have the ability to maximize.
It would be wrong to see the concept of practice merely as a synonym for action. Practice integrates the actor, her resources and her external environment in one “activity system,” in which social, individual and material aspects are interdependent (Callon 1986; Latour 1993). The focus in such activity systems is on the way the different elements relate to each other rather than on the elements themselves. For example, contrary to much contemporary thinking in institutional theory, the relation between context and actor in practice theory is not seen as deterministic. Context is not a pre-existent, immovable container, “untouched by human action” that determines how the actors inside perceive the world (Healey 1999). Instead the relation between actor and context has a strong generative quality. Actors do not just apply knowledge, but adapt whatever knowledge they have to what the situation demands. Action is aimed at the future. It relates the known to the unknown and the unpredictable. As Keller & Keller (1993: 127) put it:

[A]n individual’s knowledge is simultaneously to be regarded as representational and emergent, prepatterned and aimed at coming to terms with actions and products that go beyond the already known. Action has an emergent quality, which results from the continual feedback from external events to internal representations and from the internal representations back to enactment.

Practice in this view acknowledges that the world in which we operate is always to a large extent provisional and improvisational. Action is never completely controlled by the actor, but is influenced by the contingencies of the physical and social world (Putnam 1995).

Practice focuses on action as a central strategy through which the individual gains knowledge about the world. People negotiate the world (both social and physical) by acting upon it. Practice therefore implies a particular epistemological stance towards
questions of knowledge, the justification of beliefs, the validity of knowledge, etc. It
emphasizes the active, searching quality of knowledge acquisition and the intrinsically
situated character of knowledge (Dewey 1938).

Another important aspect of the epistemology of practice is its social character.
At least two characteristics define the social aspects of practice. First, practice originates
and evolves in a community. Practice implies that one is always aware of one’s position
in a larger network of relations and obligations. The social basis of action is often given
so much attention in planning, for instance, that the concepts of ‘practice’, ‘action’, and
‘community’ begin to overlap (Healey 1999). In such a view, action is active
participation in a community. A practice is a way to transform the historical, cognitive,
emotional, and experiential capital of the community in purposeful collective action
(Bourdieu and Wacquant 1992). The concept of ‘community’ describes the social
configurations in which the aspirations, values, purposes, and standards are formulated
which indicate some activities as worthwhile and meaningful. This cluster of mutually
related concepts is captured by the term “community of practice” (Wenger 1998:5).

The second implication of the social nature of practice is its publicness. That is,
practice theory distances itself from “mentalistic and subjectivistic views of judging,
assessing, and knowing” (Putnam 1995). Contrary to the Cartesian view of knowing,
knowing is not something that takes place in the mind. Rather knowing is a public
process that originates and has meaning within a particular community (Putnam 1995).
Knowing and understanding are not subjective but observable phenomena. People learn
about the world in public shared processes in which they test what they have learned. The
way they test the relevance and validity of their knowledge in particular situations is through public discourse. The concept of practice thus stresses communication.

Central to the communicative dimension of practice are stories (Forester 1999). Stories are central to the generative, emergent quality of action-in-context. Actors negotiate reality by telling stories about their and other people's actions within the various elements of their community. Stories, however, are not merely representations of actions and consequences; stories are generative. As a form of discourse, by telling stories actors simultaneously shape, grasp and legitimate both their actions and the situation that gave rise to their actions.

This dissertation analyzes a set of practices. I follow the practices of a group of citizen-activists in the Greenpoint/Williamsburg neighborhood of Brooklyn, NY. In this Brooklyn neighborhood, residents have also organized to protect themselves from environmental exposures and disease and, with differing degrees of success, used their community-gathered information to influence professional decision-makers.

1.f. The Greenpoint/Williamsburg Neighborhood, Brooklyn, New York

In order to understand how planners can fuse professional expertise and local knowledge in environmental decision-making, I look in-depth at one neighborhood where residents have, in fact, mobilized to do this. The community is Greenpoint/Williamsburg (G/W), a section of Brooklyn, New York (Figure 1.1). This community is one of the most polluted in New York City. It continues to experience dangerously high levels of toxic exposure and its residents face elevated rates of disease.

The G/W neighborhood, defined by Community Board number one in Brooklyn,
has approximately 160,000 residents living in a less than five square mile area. These residents are some of the poorest in all of New York City, with 35.7% of the G/W population living below the poverty line (US Census 2000). The median household income for the neighborhood is $16,409, compared to $25,684 for Brooklyn, and $29,805 for New York City generally (US Census 2000). In addition to poverty, only 43.7% of adults over twenty-four years of age have a high school diploma or higher level of education, compared with averages of 63.7% in Brooklyn and 68.3% in New York City generally (US Census 2000). The ethnically diverse neighborhood is approximately 42% Latino (mostly Puerto Rican and Dominican), 24% Hasidic Jew, 13% African-American, and 10% Polish and Slavic immigrant (Figure 1.2).
The G/W neighborhood also has the largest amount of land (12%) devoted to industrial uses of any of New York City’s 59 community districts (Perris & Chait 1998). The average percentage of industrial land-use for all districts in the City is 1.9% (Perris & Chait 1998). The neighborhood houses a disproportionate number of polluting facilities, including: the Newtown Creek sewage treatment plant; 30 solid waste transfer stations where garbage is stored before transported to landfill; a radioactive waste storage facility; 30 facilities which store extremely hazardous wastes, 17 petroleum and natural gas storage facilities; and, 96 above-ground oil storage tanks (Figure 1.3) (NYC DEP 1997). In 1987, a study by Hunter College’s Community Environmental Health Center, called Right-to-
Chapter 1 – Local Knowledge in Environmental Health Policy

_Breathe, Right-to-Know_ revealed that Williamsburg was home to the largest concentration of Toxic Release Inventory (TRI) reporting industries in New York City (Steinsapir et al. 1992). Not much had changed 10 years later. In 1997 the community housed sixty facilities storing, using or manufacturing 10,000 pounds or more of a hazardous substance, 161 facilities reporting hazardous substances in the Citywide Facility Inventory Database, 21 Toxic Release Inventory (TRI) facilities, and 11 facilities using or storing extremely hazardous materials with Risk Management Plans (NYC DEP 1997). These numbers rank G/W first out of all community districts in New York City for housing the highest number of these facilities (NYC DEP 1997).

One result of the concentration of polluting facilities in the neighborhood is elevated levels of localized hazardous air pollutants (HAPs). A 1999 EPA study modeling 148 HAPs in the neighborhood at the census tract level found that concentrations of 17 HAPs exceeded EPA health benchmark levels (Table 1.1) (equivalent to a one-in-a-million lifetime cancer risk). These same air toxics were found to be greater than those estimated in 75% and sometimes 95% of all US census tracts and all NYC area census tracts (EPA 1999a).
Figure 1.3 Environmental Hazards in Greenpoint Williamsburg
Source: Watchperson Project 1999
Using the HAP exposures outlined in Table 1.3, EPA compared the toxicity-weighted cumulative HAP exposure for G/W to cumulative HAP exposures for the nation as a whole, urban areas throughout the nation and the greater New York City area (US EPA 1999: 6-11). The EPA analyses revealed that the cumulative HAP exposure in G/W is over 360 times greater than that which would result in a one-in-a-million risk of cancer, over 3 times higher than estimated national exposures, nearly 2.5 times greater than exposures in U.S. urban areas and 1.3 times higher than exposure in the greater New York City area (US EPA 1999:6-11).
Residents are also exposed to heavy vehicular traffic and mobile source pollution from the Brooklyn-Queens Expressway (BQE), an elevated roadway that bisects the community. Mobil Oil Corporation has recovered over 5.19 million gallons of petroleum product from underneath 52 acres of the neighborhood. This product resulted from years of negligent operations at neighborhood storage tank farms. Finally, only 3.0% of the neighborhood is shaded by trees, compared to an average of 11.4% tree cover for all Brooklyn neighborhoods and an average coverage of 16.6% for all of New York City’s neighborhoods (Perris and Chait 1998).

Despite the plethora of hazards in the neighborhood, there have been few public health studies focusing on G/W. A report by the NYC Public Advocate’s office in 1998 entitled Lead & Kids indicated that between 1994 and 1998, G/W ranked in the top 12 (out of 30) NYC health districts in number of new cases of children with blood lead levels at or above 10µg/dl (the CDC maximum safe standard) (Green 1998). The New York City Department of Environmental Protection (DEP) supported two neighborhood health studies of G/W focusing on rates of cancer, asthma, birth defects and childhood lead poisoning and found some statistically significant elevated rates of cancer in the community to cause alarm (Table 1.2) (Kaminsky et al 1992). These studies did not find any significantly elevated prevalence of asthma or birth defects. However, the asthma study was limited to hospitalization rates and the birth defects study reviewed data from only one local hospital, suggesting that these results may not capture the entire disease picture (Kaminsky et al 1992).
Table 1.2
Statistically Significant Cancers in the Greenpoint/Williamsburg Neighborhood and their Ranking for all NYC Health Districts

<table>
<thead>
<tr>
<th>Cancer type</th>
<th>Rank - based on incidence between 1978-87, all Community District 1 census tracks, and compared to all NYC Health districts (30 total Districts)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male Children under 15 yrs</td>
</tr>
<tr>
<td>All Cancers</td>
<td>2nd</td>
</tr>
<tr>
<td>Total Leukemias</td>
<td>1st</td>
</tr>
<tr>
<td>Leukemia (unspecified)</td>
<td>3rd</td>
</tr>
<tr>
<td>Acute Lymphocytic Leukemia (ALL)</td>
<td>2nd</td>
</tr>
<tr>
<td>Acute Myelogenous Leukemia (AML)</td>
<td>2nd</td>
</tr>
<tr>
<td>Chronic myelogenous Leukemia (CML)</td>
<td>4th</td>
</tr>
<tr>
<td>Nervous System</td>
<td>3rd</td>
</tr>
<tr>
<td>Stomach</td>
<td>NA</td>
</tr>
<tr>
<td>Lung</td>
<td>NA</td>
</tr>
<tr>
<td>Pancreas</td>
<td>NA</td>
</tr>
</tbody>
</table>

While I have studied this one community, its stories are similar to many other urban neighborhoods. The environmental justice (EJ) movement has highlighted how low-income and communities of color, often in urban areas, face disproportionate hazardous exposures and elevated rates of morbidity and mortality (Bullard 1994; Lazarus 1993; Bryant and Mohai 1992). Many residents in these communities, similar to G/W, lack a
formal education. These communities are also often comprised of different cultural sub-communities, most of which have distinct languages, practices and lifestyles. By analyzing the G/W neighborhood, I hope to generalize about the prospects for how the local knowledge of disadvantaged communities can help pursue environmental justice.

1.f. Research Approach & Case Studies

I assume that theory-backed participant observation can best enrich practice by offering explanation as well as understanding (Johannsen 1992; Greed 1994; Singer 1994). I turn to systematic firsthand investigation, objective though it may never be, to find threads that tie “the personal troubles of the milieu” to “the public issues of the social structure” (Mills 1959:20). This dissertation suggests a few persistent threads. I aim for “thick description” (Geertz 1973:45) – richly descriptive, firsthand accounts of settings, behaviors, and social meanings – informed by a wider array of observers and literature.

The research approach was interpretive or hybrid. By this I mean that I did not seek to find the causal factors that might allow local knowledge to influence professional decision-making, but rather I looked for tendencies, patterns and relationships among different factors, actors and events. This has led me to offer “qualified hypotheses,” meaning that I posit that certain tendencies seem to influence professional decision-makers, but I have not tested these in a typical causal, case method fashion (Abbott 1992). My research is also hybrid because it starts from the position that as an analyst, my social position and values shape the analysis – what I have observed in meetings and my interviews. I have entered an “on going conversation,” borrowing from Schon (1983)
and I am trying to make sense of the conversations as I also try to analyze the situations for environmental policy making.

The accounts, stories, tests and practices of residents' represent what I am calling “local knowledge.” Generally, local knowledge can be understood as the scripts, images, narratives and understandings we use to make sense of the world in which we live. I am especially interested in the types of local knowledge that have influenced policy-makers in the numerous battles that have unfolded in this community about whether, how, and when to respond to various health and environmental hazards.

As mentioned above, I offer ‘thick description’ of local knowledge and the decision-making context within which the knowledge operates. Thick description involves interpreting intentions and expectations, and especially the intricate public structures of meaning where intentions are formed and actions on complex expectations occur (Geertz 1973:12). Thick description is thus *interpretation* of those structures that constitute the complex contexts within which meaningful actions become possible. It involves the interpretation of the structure of some realm of complex human experience. According to Geertz (1973:30), the task of making the “voices” of diverse cultures audible in new places is part of the essential vocation of interpretive ethnography.

I review four separate episodes in which various community members organized around an environmental or public health hazard and challenged either the diagnosis or prescription of the relevant policymakers. I am especially interested in how community-knowledge helped to supplement and ultimately transform expert views about what was causing these hazards and how they should be handled. The four episodes include
patterns of subsistence fish diets, high rates of asthma, levels of lead-poisoning and the mapping of local air pollution sources.

**Summaries of the Four Episodes**

1) **Subsistence Fishing Risks**

Reacting to pressure from the environmental justice movement, the EPA decided to pilot its cumulative exposure project in the G/W community. The EPA was originally intent on modeling exposures in the neighborhood without local input, but at the request of the City DEP, the EPA held some meetings to inform the community that they planned to conduct a cumulative exposure assessment in the neighborhood. At these meetings, residents and community organizations approached EPA and informed the agency that many residents were eating fish from the East River and this represented a potentially serious hazardous exposure. EPA had no data on this exposure and originally planned to use a default set of dietary consumption patterns based on a typical “urban diet.” Residents told the EPA that an exposure assessment of the neighborhood that did not include the consumption of East River fish would be inaccurate. In addition, residents noted that since many of the anglers were poor, non-English speakers and immigrants, they would be reluctant to speak with outsiders. One community group, The Watchperson Project, convinced EPA that they should gather information on angler practices so that this exposure could be included in the pilot project. The EPA and the Watchperson Project worked together to develop a survey and interview protocol and the community organization organized volunteers to interview the anglers. The survey gathered information on the type and amount of fish residents were eating, the age of fish consumers and their ethnicity. This information was presented to the EPA and
incorporated into its exposure assessment. The project eventually led to fishing advisories, multi-lingual educational campaigns and the construction of a community garden to provide inexpensive food alternatives. The case exemplifies (1) how community residents can gather important information about potential neighborhood hazards that regulatory agencies and scientists often overlook, (2) that information is often embedded in cultural practices and, (3) that community information often supplements, but does not replace, professional analyses.

2) High Rates of Asthma

A high school science class project monitoring air pollution and neighborhood health sparked interest at El Puente, a community organization, in addressing alarming rates of asthma in the neighborhood. The student project led to a community health survey and El Puente partnering with the non-profit organization Community Information and Epidemiological Technologies (CIET). Since 1995, El Puente and CIET have undertaken five health surveys of local asthma rates, possible causes and health management practices of the neighborhood’s Latino population. The project has employed residents as community health workers who have designed and performed the surveys, lead focus-group meetings to interpret the survey findings and provided basic health maintenance information. El Puente’s surveys, focus groups and community organizing have tapped local knowledge previously unknown to outside health care providers, pointing out the prevalence of asthma among older women, how locals view professional asthma treatments and the use of cultural and religious home remedies to treat the disease. This knowledge contributed to local interventions, such as enrolling residents in free health insurance, educating physicians on the cultural medicinal
practices of local Latinos and developing asthma management plans for those with the disease. Despite the strong mobilization of resident knowledge about asthma and the local actions, El Puente’s work had mixed success influencing outside decision-makers. While the survey data were published in professional public health journals and the work is beginning to be studied by the NYC Department of Health as a possible model for other Latino communities, the findings have not influenced professional policy-makers in a noticeable way.

3) Lead Poisoning

When the city began sandblasting lead-based paint off the Williamsburg Bridge with no screens to capture the paint, community members reacted by organizing residents to determine whether the paint chips were a health hazard. After measuring neighborhood children’s blood for lead and finding some elevated levels, residents sued the city to stop the sandblasting. Subsequent soil tests around the bridge found highly contaminated soil. Residents organized the Williamsburg Around the Bridge Block Association (WABBA) and the city, reacting to pressure from the community, media and elected officials, convened a Task Force to address elevated blood and soil levels and to devise new guidelines for bridge sandblasting. After a year of negotiations, the Mayoral Task Force came up new guidelines for the bridgework. However, the WABBA decided that the Task Force guidelines were not protective enough. They wanted a formal environmental review. After two more years in court and an appeal by the city, the State Supreme Court ruled that the city had to perform an environmental and public health review of the bridge sandblasting. As part of the settlement, the city was instructed to fund a team of health experts, chosen by the WABBA, to assist the community in
participating in the review process. This episode reviews the face-to-face interactions between the professional consultants and the community. I review the challenges community residents encounter describing their local knowledge to professionals who might be sympathetic, but question their methods.

4) Air Pollution & Mapping Local Knowledge

The proposed siting of a solid waste incinerator in the neighborhood galvanized a group of high school students to form a group called the Toxic Avengers. The students produced a map of the neighborhood which helped organize residents to attend a public hearing and brought Latinos and Jews together in the neighborhood for the first time. An environmental town meeting was held to educate and organize residents to oppose the incinerator. The Toxic Avengers made a map entitled “Our Town” depicting the numerous environmental health hazards in the community. Out of the town meeting came the Community Alliance For the Environment (CAFE), the first multi-ethnic environmental coalition in the neighborhood and a key force that helped defeat the incinerator. The community eventually developed its own geographic information system (GIS) and generated its own maps. In one instance, the Watchperson Project used their maps to challenge the city’s approval of the largest waste transfer station on the east coast. The community map supported its argument at a public hearing challenging the anticipated cumulative environmental impacts in the neighborhood. In another case, the community generated GIS maps revealed to EPA that its air toxic dispersion model would miss thousands of small source polluters in the neighborhood. The EPA model was intended to model exposures to air toxics at the census tract level, but the community’s maps showed how the concentration of air polluters changed from block-to-
block and even along the same city block. The community also used its own maps to identify dry cleaners in residential buildings and highlighted how the EPA model would miss this potential air pollution hazard altogether.

1.g. Methods of Episode Analysis

I analyze the four cases on two levels: cognitive and normative. The first level asks, ‘what is local knowledge contributing to the knowledge base used in policy making?’ The normative level asks ‘what makes local knowledge work with professionals?’ In order to address these two levels of analysis, I hypothesized that local knowledge is important in policy making for at least four different reasons: (a) Epistemology—local knowledge makes a cognitive contribution by rectifying the tendency toward reductionism in professional vision and policy; (b) Procedural Democracy—local knowledge contributes additional and previously excluded voices, which can promote wider acceptance of decisions by fostering a 'hybridizing' of professional discourse with local experience; (c) Efficiency—local knowledge can point out low-cost and more efficient policy analysis and implementation options; and, (d) Distributive Justice—local knowledge can raise previously unacknowledged distributive justice concerns facing disadvantaged communities. The epistemology category can be factored out into four additional sub-categories: (i) Aggregation—that is, professional decision-making tools always aggregate, and this misses local particularity; (ii) Heterogeneity—local knowledge can highlight how professional assessment models pay inadequate heed to the inter-individual or inter-group variability of the population on which the model is being imposed. (iii) Lifestyle—professional models always try to say something about the relevant causal factors, and in so doing, they necessarily bound some
things out as not relevant. From the community perspective, this condition says 'your professional model of how I'm going to react (my body or my community) to this exposure is flawed because you are not taking a holistic enough look at how I move through the world.' (iv) Tacit Knowledge – local knowledge reveals the unspoken information that does not easily lend itself to the reductionist model-making that is characteristic of professional science.

In analyzing what accounts for the successful uptake of local knowledge with professionals, I also suggest that four preconditions are important: (1) Coalition formation – local residents mobilizing into a community coalition in order to gather information and influence professionals. (2) Issue linkage – the local knowledge of community residents is linked to a larger social movement outside the community. (3) Intermediaries – entrepreneurs or boundary spanners are available to translate local knowledge for professionals. (4) Low Cost Responses – when a response to claims made by local knowledge is politically and/or economically easy to implement professionals are more likely to be open to such information. The dissertation analyzes each case by first exploring the contribution of local knowledge to epistemology, democracy, efficiency and justice. I then look for the presence of coalition formation, issue linkage, intermediaries and low-cost responses, in order to understand why or why not there was professional uptake of local knowledge. The analytic template is outlined in Figure 1.4.
1) Epistemology

The first precondition posits that local knowledge can make a contribution to the knowledge base used for environmental policy-making. Part of the knowledge base for environmental decisions comes from professional science, or information emerging from a profession or discipline that undergoes a series of professional legitimacy “tests” (i.e., case-controlled experiments, statistical analyses, peer review, etc.). On the other hand, local knowledge can be thought of as deriving less from professional techniques and more from time-honored sources such as intuition, images, pictures, oral story-telling or narratives, and visual demonstrations and is “tested” via public dialogues and story-telling. The epistemological category looks at how local people engage with and seek to
extend science, but do not outright reject science. When lay people work to extend
science with their own knowledge, they change the ground rules about how science is
conducted.\textsuperscript{10} An example of lay people working to extend science is “popular
epidemiology,” in which “laypersons gather scientific data and other information and also
direct and marshal the knowledge and resources of experts in order to understand the
epidemiology of disease” (Brown 1992: 269). This approach is not “anti-science” but
“pro-knowledge,” as lay people seek “to re-value forms of knowledge that professional
science has excluded, rather than to devalue scientific knowledge itself” (Cozzens and
Woodhouse 1995: 538). By extending science, local knowledge can move science
beyond its adherence to “technical rationality” to include “cultural rationality” – where
rationality comes from an equally valid, but more informal logic and trust emerging from
the processes of knowledge creation (Plough and Krimsky 1987).\textsuperscript{11} An example is the
practice of community-based participatory research (CBPR), increasingly popular in
public health, in which professionals and lay people work to define problems, identify
data, perform analyses, interpret results and generate action options together (CDC 1997;
Higgins et al 2001; Minkler 2000; Schultz et al 1998). CBPR draws on participatory
action research and is grounded in the idea that people can and should help to shape how
they live their lives (Freire 1974; Fals Borda and Rahman 1991; Chambers 1997). When
lay people attempt to extend science, they expand the circle of participation, “create

\textsuperscript{10} This concept has also been termed “post-normal” science (Funtowicz & Ravetz 1999). The term ‘post-
normal’ provides a contrast to two sorts of ‘normality’. One is the picture of research science as “normally”
consisting of puzzle solving within the framework of an unquestioned and unquestionable ‘paradigm’, in the
theory of Kuhn (1962). Another is the assumption that the policy environment is “normal” in that routine
puzzle solving by experts provides an adequate knowledge base for policy decisions. The idea of Post-
Normal Science is to bring “facts” and “values” into a unified conception of problem-solving where a
plurality of legitimate perspectives are recognized as capable of contributing to addressing any given
problem (Ravetz 1999).

\textsuperscript{11} Technical rationality can be thought of as the belief in empirical evidence, the scientific method, expert
judgments, logical consistency, universal findings and quantifiable impacts (Plough and Krimsky 1987).
value” by identifying addition considerations, and alter the existing rules of the “scientific field.” At least four sub-categories help clarify how local knowledge might extend science.

**a) Aggregation**

Aggregation suggests that professional decision-making tools always aggregate, and this tends to miss local particularity. Local knowledge can point-out where an insupportable degree of aggregation is taking place. For instance, in the air toxics and mapping case, community members point-out to the EPA that its dispersion modeling of air toxics in the community misses small emission sources, and in particular, potentially dangerous perchloroethylene emissions from dry cleaners located in residential buildings. Thus, the aggregation category suggests that an epistemological flaw occurs when professional methods of data aggregation do not look at individual sources or particularities within the community, and this flaw can be corrected through local knowledge.

**b) Heterogeneity**

The heterogeneity category suggests that professional models of hazards are paying inadequate heed to the heterogeneity of population groups on which the model is being imposed. Inter-individual or inter-group variability is revealed by local knowledge when, for instance, women and young people are asked and considered serious sources of

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12 To “create value” means to expand the possible questions to ask, evidence to consider and options for action (See Susskind & Cruikshank 1987). For an understanding of “field,” I draw from Bourdieu and Wacquant (1992), who describe fields as specific, relatively autonomous, domains of social action, social production and reproduction, which both reflect and constrain the interests, positions, strategies, and investments of the actors within them. While this idea is helpful to understand how lay people attempt to locate themselves within science, it may be too narrow because Bourdieu portrays scientific practice as something carried out in laboratories, universities and peer-reviewed journals, not in foundations, defense departments, biotech companies and social movements. I explore this last category further in this dissertation.
information about asthma, as I will describe in Chapter 4. Heterogeneity also says that African-Americans, Latinos, Slavic immigrants, and Hasidic Jews, do not have the same diet, and this was an important insight from community members when EPA assumed an “urban default diet” when assessing dietary exposures in Chapter 3. The heterogeneity of a population that local knowledge can expose is critically important for understanding inter-individual and inter-group susceptibility to certain hazardous exposures, such as different diets, because such things as body weight, lung development in children, lead consumption, etc., all play a role in making some individuals/groups more susceptible to the same exposure. Yet, the heterogeneity of a population is often washed-out when professional models treat everyone the same.

c) Lifestyles

The Lifestyle category says that since professional models are always trying to say something about the relevant causal factors, they necessarily bound some things out as not relevant. Local knowledge captures the information that is often ruled out by professionals as ‘a way of living.’ For example, in Chapter 3 I will show how urban fishing in the river was not apparent to EPA, but even if it had, urban fishing would be thought of as a lifestyle issue not relevant to risk assessment. This category claims that it often doesn’t occur to professional scientists that local people with particular lifestyles can be good sources of information about technical matters. Latour notes in his “science in action” framework – which reveals that how scientists construct their workday, their networks of colleagues, and their lobbying in the outside world, all shape their definition of what is acceptable science – that the real meaning of epidemiological “facts” cannot be understood until the professional experiences the community and the problem being
Chapter 1 – Local Knowledge in Environmental Health Policy

studied (Latour 1988). When residents in G/W tell professionals that they need to pay attention to lifestyle factors as well, as I will show Latinos do when discussing the use of herbal home remedies in Chapter 4, they are saying that the professional model is inadequate because it has bounded out of its cognitive domain things that really do affect health and illness. Local knowledge demands that professional models look more holistically at how community residents are living. The Lifestyles category is not merely saying ‘you have to give weight to me and my experience’ as a narrative voice, but rather it says ‘your professional model of how I’m going to react (my body or my community) to this exposure is flawed because you are not taking a holistic enough look at how I move through the world.’ I will also show this dynamic in Chapter 5 when, after the City finds no risk to locals from lead paint sand blasting, residents claim that the City’s study doesn’t reflect their experience because it didn’t use local soil, resident’s own blood, or actual lead measurements in the community. In other words, residents failed to ‘see themselves’ in the science, and the professional study failed to take on board the very public whose health it was trying to assess.

d) Tacit knowledge

The Tacit Knowledge category says that local knowledge can truthfully discover information that does not easily lend itself to the reductionist model-making characteristic of professional science. The most obvious example of this occurs when professionals are doing research on the mafia; they can’t get truthful information unless they become part of the community, and some information is so tacit that only members of the community can gather it. We will see examples of this in Chapter 4 when residents attempt a community-wide asthma survey, and find out that Hasidic community members
are uncomfortable talking with outsiders. The Hasidim are only willing to perform asthma research with their own people. Another example is in Chapter 3, when gathering information about anglers is performed by community members with whom anglers share common language, cultural heritage, socioeconomic background, and immigration status – all counteracting disincentives and allaying fears for anglers’ participation in research.

2) Procedural Democracy

This category claims that local knowledge improves procedural democracy by including previously excluded and marginalized voices – in a world where expertise tends to exclude people. Including local knowledge with professional science can foster a 'hybridizing' of professional discourse with local experience and ultimately promote wider democratic legitimacy for professional decisions. This category explores whether democracy is enhanced when the voices of local knowledge are included into professional policy discourse.

3) Efficiency

The efficiency category claims that local knowledge can help identify low-cost policy options and more efficiently target implementation strategies. Low-cost policy options might include community residents’ performing education or information dissemination. By including local knowledge in professional science, community members are more likely to 'see themselves' in science thus finding it more acceptable, potentially saving time and money in policy-making. Implementation of policy options is likely to be more efficient and successful when local knowledge highlights existing practices embedded in the community that might affect an intervention, such as the cultural medicinal practices of Latinos discussed in Chapter 4.
4) Distributive Justice

Local knowledge can highlight distributive justice concerns of community residents. For instance, in Chapter 3 residents were concerned with asking whether the risk assessment captured the potentially hazardous diets of anglers, a particular sub-population in the community. In Chapter 6, residents challenge the EPA air toxic model for missing hazards in homes above dry cleaners. In both instances, local knowledge asks ‘who are the persons at risk,’ not just what level of risk is ultimately acceptable.

Level 2: Uptake Conditions

The second level of analysis looks at the conditions that may have contributed to the successful professional uptake of local knowledge. My hypothesis is that when a set of at least four preconditions exist, local knowledge is more likely to influence professionals. The uptake analysis of each case is schematized in Table 1.3. I posit that at least four preconditions comprise strong “uptake conditions:” coalition building; issue linkage; intermediaries; low-cost responses.

<table>
<thead>
<tr>
<th>Presence of Uptake Pre-conditions</th>
<th>INFLUENCE on PROFESSIONAL DECISION MAKING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Strong</td>
</tr>
<tr>
<td>Weak</td>
<td>Weak</td>
</tr>
</tbody>
</table>

Table 1.3 Professional Uptake of Local Knowledge

- Subsistence fish diet risks
- High rates of asthma
- Lead poisoning
- Air pollution hazards
1) **Coalition Formation**

The first precondition posits that local knowledge is most likely to influence professionals when the knowledge is part of a local coalition, not just the stories of one individual or even a few individuals. A community coalition can be a loosely-coupled group of residents who band together to investigate a problem or a more formal community-based organization with ties to the neighborhood. Social movements act as organizers of local environmental health knowledge, give public voice to private suffering, and gain the attention of elected officials and other policy professionals (Epstein 1996; Gamson 1992; Gibbs 1994; Mansbridge 1986; Szasz 1994). I contend that understanding the local knowledge generated in and offered by groups, not individuals, is crucial for understanding how lay knowledge might influence professionals. For instance, in the Woburn case made famous by the book and film *A Civil Action*, only after Anne Anderson organized concerned residents into a coalition called *For a Cleaner Environment (FACE)* were local people able to make their concerns widely known throughout the community, organize other residents to share their knowledge, and attract the attention of state and federal environmental regulators (Brown & Mikkelsen 1990; Harr 1996). Local knowledge is more likely to “filter-up” to professionals when advanced by a social movement, not individuals (Piore 1995).

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13 Brown (1993) notes that Anderson asked the state to test the water in Woburn after she collected stories of neighbors whose children had developed cancer, but was told the state could not test the water at an individual’s initiative. Brown (1993:17) also highlights the importance of coalition building:

> Through FACE, Woburn activists found pride in learning science, a way to protect and serve their community, a means of guaranteeing democratic processes, and a fueling of personal empowerment. Precisely because toxic waste crises destroy community cohesion by pitting
The formation of local knowledge "advocacy" coalitions is one way to understand how local knowledge might influence professionals (Jenkins-Smith and Sabatier 1997). In this view, state or professional knowledge reflect the knowledge of politically powerful knowledge coalition. As Kingdon (1984) and Reich (1991) have pointed out, the complexity of modern government not only makes it difficult for the lone amateur to learn what is going on, know who to contact and where to go to get information, but ordinary citizens must also compete against well organized interest groups (e.g., business lobbyists and trade associations). Civic coalitions organized into social movements can influence professionals by changing the terms of political discourse (i.e., civil rights movement), establishing a permanent place on the political agenda for issues (i.e., feminism raising awareness of gender relations), organizing alternative policy-oriented deliberative forums (i.e., the environmental justice networks), and creating the fear of political instability and so drawing forth governmental response (Piven and Cloward 1979).

2) Issue Linkage

The second precondition states that when citizens link their local knowledge to a larger social movement, they will more likely influence professionals. The most prominent example of a local environmental health movement hitching onto a larger movement is the story of the community-based anti-toxics movements linking-up with the civil rights movement to create the environmental justice movement (Bullard 1990; Hofrichter 1993; Dowie 1995). In another example, the success of the campaign against genital mutilation came only after the organizers framed the problem as one of human neighbors against each other, these groups are necessary to help victims and friends rebuild a trusting social network.

rights and violence to women and “hitched-onto” the global human and women’s rights movements. Similarly, issue linkage is seen in the attempt by gay rights activists to link the legalization of gay marriages to the children’s welfare movement, arguing that the ban on gay marriages endangers the children of gay couples by denying them health benefits and other legal guarantees intended to protect children. In each instance, a local issue is re-framed as a piece of a larger social, economic or political justice campaign (Schon and Rein 1994).

This precondition examines whether the “strength of weak ties” helps explain the professional uptake of local knowledge. Granovetter (1973) noted that weak ties are more important than strong ties among groups because when organizations are tightly coupled and interact frequently, ideas and information are re-circulated through the network. However, when organizations with “weak ties” (organizations having few overlapping interests and infrequent contact) interact, a greater possibility for new information to be passed between groups exists(Granovetter 1973; Tushman 1977).15

3) Intermediaries

My third precondition for success suggests that local knowledge is more likely to influence professionals when an intermediary or entrepreneur – an institution or agent who can champion and translate local information in professional terms – is present. Intermediaries can be professionals themselves or effective local people affiliated with a respected institution. Professionals often need “translators” because the value of local knowledge to their work and institutional commitments may not be obvious at first.

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15 The “strength of weak ties” idea has had a particular resonance in social network theory. The classic example claims that when job-seekers find work through personal contacts, the referrals come much more often through distant contacts than through more immediate relations. In an example from this case, many environmental activists know one another well, and public health professionals also know one another well. But few professional public health practitioners know many environmental activists.
Intermediaries do not speak for local people, but merely work to increase the “standing” of what they have described. Effective intermediaries must hold a “double consciousness,” of both the local understanding and the professional (Du Bois 1961). That is, intermediaries must have the language, skills and “cultural capital” to be accepted as legitimate in both local and professional circles.

Intermediaries can also be thought of as “boundary spanners,” or individuals and organizations with sufficient power and resources to move ideas, information and organizational legitimacy across institutional boundaries (Aldrich and Herker 1977; Tushman and Scanlan 1981; DiMaggio and Powell 1991). According to organizational theory, boundary spanning is intended to address uncertainty and indeterminacy in decision-making by increasing coordination and interdependence among stakeholders and organizations (Aldrich and Herker 1977). I will reveal what role boundary spanners played building bridges between local knowledge and professional circles.

4) Low Cost Solutions

The final precondition for success is whether or not a low cost solution is readily available for decision-makers. By cost I mean to include political, social or economic costs. A “solution” doesn’t actually need to solve a problem, but it must address some major concerns. This proposition is based on Kingdon’s notion of a “policy stream” in which a policy response is “waiting” for the articulation of a social problem (Kingdon

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16 In *The Souls of Black Folk* (1903; 1961), Du Bois described a double consciousness in black Americans, a dual lens through which they saw themselves. For Du Bois, the dialectic of black self-recognition oscillated between being in America but not of it. When black Americans faced the burden of trying to be accepted in white culture, Du Bois (1961:149) notes they lived “a double life, with double thoughts, double duties, and double social classes...giving rise to double words and double ideals, and tempt the mind to pretence or to revolt, to hypocrisy or to radicalism.” When the holders of local knowledge attempt to be heard in the realm of professionals, they may accept the expert’s world view. As Du Bois (1961:15-16) writes: “It is a peculiar sensation, this double-consciousness, this sense of always looking at one’s self through the eyes of others, of measuring one’s soul by the tape of a world that looks on in amused contempt and pity.”
1984). For example, the passage of the Montreal Protocol limiting the production and use of ozone depleting chemicals has been attributed to the ready availability of substitute chemicals (Benedick 1998; Susskind 1994). Clearly recognizable benefits and technological substitutes also contributed to the regulation of leaded gasoline (Susskind et al 2001). Lee (1993) suggests that environmental mediation was a politically low-cost response to the highly complex and controversial problem of managing resources in the Columbia River Basin. Of course, many “solutions” can have “displacement” effects; shipping toxic waste for cheap disposal in a developing country, smokestacks reduce local pollution but pollute farther away, and sewage sludge is dried and burned, turning a water pollution problem into air pollution. The aim is to avoid low-cost solutions that displace the locus of power.

**Decision-Making Influence**

The intent of this dissertation is to understand not just the cognitive contribution of local knowledge or whether and how it influences professionals, but ultimately whether local knowledge can contribute to improved living conditions for disadvantaged populations. Clearly, local knowledge might impact decision outcomes in various ways. For instance, I characterize a “weak” outcome as one that re-defines the way a problem was originally formulated by experts. An “intermediate” impact alters who gets to participate in problem re-framing (opening up the process to non-scientists). At the “strong” end of my influence continuum are situations in which local knowledge can be credited as the key contributor for making measurable improvements in people’s lives (Figure 1.4).
Figure 1.5

Measuring the Influence of Local Knowledge on Professional Decision-Making

<table>
<thead>
<tr>
<th>Degree of change</th>
<th>Weak</th>
<th>Decision Making Changes</th>
<th>Intermediate</th>
<th>Strong</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locals can</td>
<td>Problem reframed w/local participation</td>
<td>Problem reassessed w/local participation</td>
<td>Outcomes improve living conditions</td>
<td></td>
</tr>
<tr>
<td>Comment on process</td>
<td>⇐</td>
<td>⇐</td>
<td>⇐</td>
<td></td>
</tr>
<tr>
<td>change Weak</td>
<td>Intermediate</td>
<td>Strong</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Structure of Each Case Study

Each of the case studies will follow the following structure. First, I will present what professional knowledge has to say about each particular problem. For instance, I describe the professional approach to risk assessment in Chapter 3, epidemiology in Chapter 4 and map making in Chapter 6. Second, in each case study I will present what the community was trying to contribute to professional knowledge. Third, I will review what professionals did with the community knowledge. More particularly, I will highlight whether professionals: (a) did or did not take up local knowledge; (b) did or did not give it justification; and (c) did or did not have an impact on policy. Finally, I will discuss why professionals did or did not take up local knowledge in policy-making.

1.g. Chapter Summaries

This chapter outlined the general issues I raise in the dissertation and explained my research approach. In Chapter 2, titled “Characterizing Local Knowledge” I introduce and further explain “local knowledge.” Chapter 2 reveals the nuances, complexities and unique characteristics of local knowledge. I argue that local knowledge
ought to be seen as another type of “expertise” and is best understood by reviewing its actually use in everyday problem-solving practices.

Chapter 3, “Risk Assessment, Community Knowledge and Subsistence Anglers” offers the first of four episodes from the Greenpoint/Williamsburg neighborhood. I describe how residents organized in 1997 to tap the knowledge of anglers to contribute information on subsistence fish diets to the EPA’s cumulative exposure assessment. EPA was trying to move from conventional risk assessment to exposure assessment, a move largely prompted by the environmental justice movement. The Watchperson Project, spearheaded a survey effort to gather information about the practices of local anglers. The episode depicts a successful example of how local knowledge can both influence professional decision-making and improve the lives of disadvantaged populations.

Chapter 4, “Tapping Local Knowledge to Understand and Combat Asthma,” highlights El Puente’s community health surveys focusing on asthma. The community’s work intervention occurred as the disease reached epidemic proportions in New York City and while scientists continued to disagree over its causes. El Puente enlisted its own consultant to organize a series of resident survey in the Latino neighborhood. They found new evidence of the causes, triggers and treatments for asthma. The surveys helped explain the cultural and spiritual practices as well as economic and social constraints Latinos encounter dealing with asthma. Using this information, El Puente helped residents manage the disease, gain health insurance, and build trust with medical professionals outside the community. The episode is a mixed success because while El
Puente successfully gathered local knowledge, the organization had limited success influencing policy professionals.

Chapter 5, "Lead Poisoning and the Discourse of Local Knowledge," describes face-to-face negotiations between residents and public health professionals over how to address potential lead poisoning risks. The dialogue was stimulated by the City’s sandblasting operation on the Williamsburg Bridge which caused lead-paint chips to “rain down” on the neighborhood. Residents sued the city. After four years of litigation, the city agreed to perform an environmental and public health review of the bridge work. A community coalition, the Williamsburg Around the Bridge Block Association (WABBA), hired professionals to help them understand and participate in the environmental and public health assessment. The episode reveals the challenges facing communities in articulating their local knowledge even when working with sympathetic professionals.

Chapter 6, "Air Pollution and Community Mapping," describes how residents used maps to present local knowledge to professionals. This chapter highlights how the community’s maps of environmental hazards influenced, with mixed success, the relevant policy professionals. Neighborhood high school students produced hand drawn cartoons that helped organize residents into a multi-ethnic coalition that blocked the siting of an incinerator. Residents also developed sophisticated GIS-based maps documenting environmental hazards to challenge the permitting of a large neighborhood waste transfer station and an EPA air toxic dispersion model. The chapter argues that visual representations of local knowledge are important for community organizing and education, but can be less successful influencing professionals.
Chapter 7, “The Fusing of Local and Professional Knowledge,” compares the four cases using the two levels of analysis I proposed in Chapter 1. I also summarize the conditions that, when present, seem to lead to the successful professional uptake of local knowledge. The chapter describes the knowledge fusing process and offers some lessons for communities in order to successfully make knowledge fusion happen. I also note why environmental decision-makers ought to consider local knowledge, what the practices are that might make local knowledge more useful to professional decision-makers, and how the fusing of local and professional knowledge can contribute to environmental justice.
Chapter 2: Characterizing Local Knowledge

Both thinking and facts are changeable, if only because changes in thinking manifest themselves in changed facts. Conversely, fundamental new facts can be discovered only through new thinking. -- Ludwick Fleck, Genesis and Development of a Scientific Fact, 1935:50-1.

2.a. Understanding Local Knowledge

This chapter sets the stage for my analysis of the four episodes, in particular outlining what I mean by local knowledge and suggesting how it can be fused with expert judgment in environmental health decision-making. The policy sciences literature characterizes local knowledge as, “knowledge that does not owe its origin, testing, degree of verification, truth, status, or currency to distinctive...professional techniques, but rather to common sense, casual empiricism, or thoughtful speculation and analysis” (Lindblom and Cohen 1979:12). Local knowledge also includes information pertaining to local contexts or settings, including knowledge of specific characteristics, circumstances, events, and relationships, as well as important understandings of their meaning. A second definition of local knowledge comes from Geertz (1983:75), whose seminal anthropological work entitled *Local Knowledge*, defines it as “practical, collective and strongly rooted in a particular place” that forms an “organized body of thought based on immediacy of experience.” Geertz suggests that local knowledge can be described as simply as “to-know-a-city-is-to-know-its-streets” (1983:167).

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17 It is useful to be clear about what I mean by knowledge. According to the American Heritage Dictionary, knowledge is: "the state or fact of knowing; familiarity, awareness or understanding gained through experience or study; the sum of range of what has been perceived, discovered or learned; learning; erudition; specific information about something."

18 Levi-Straus (1962:10) comments on definitions of local knowledge this way: “The thought we call primitive is founded on this demand for order. This is equally true of all thought but it is through the properties common to all thought that we can most easily begin to understand all forms of thought which seem very strange to us.”
Terminology and language play a particularly important role in discussions of epistemology.\textsuperscript{19} For example, studies of international development note that many terms are used to describe what I call local knowledge, including: indigenous knowledge (IK); indigenous technical knowledge (ITK); folk knowledge; traditional knowledge; ethnoecology; and, popular science/epidemiology (Brown 1992; Chambers 1997; Irwin 1995; Warren 1991). Each implies something slightly different about how knowledge is “made.” For example, Grenier (1998), defines indigenous knowledge as "the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area." The Indigenous Knowledge and Development Monitor,\textsuperscript{20} an international journal, defines indigenous knowledge as:

[T]he sum total of the knowledge and skills which people in a particular geographic area possess, and which enable them to get the most out of their natural environment. Most of this knowledge and these skills have been passed down from earlier generations, but individual men and women in each new generation adapt and add to this body of knowledge in a constant adjustment to changing circumstances and environmental conditions. They in turn pass on the body of knowledge intact to the next generation, in an effort to provide them with survival strategies.\textsuperscript{21}

In the development literature, indigenous knowledge is the preferred term because it implies a practice of knowledge-making by certain peoples that occurs through experiential learning rather than a fixed body of information waiting to acquired in a particular place.

\textsuperscript{19} Foucault (1977) notes the disciplining and controlling power of language.
\textsuperscript{20} http://www.nuffic.nl/ciran/ikdm/index.html
While indigenous may be the most common descriptor used in the development literature, Escobar (1997) and Hobart (1996) note that defining which group or population is indigenous presents a challenge. They suggest that indigenous is not a neutral term and often elicits more conflict than clarity. Since I am concerned with the knowledge found in Western urban contexts, I have chosen local over other possible terms to emphasize the place-based character of this kind of information. Local also connotes the situated characteristics and viewpoint associated with knowledge claims and is reflective of the kind of information that urban environmental planners typically find useful (Brown 1997; Healey 1999; Innes 1997). I also chose local over other possible descriptors to distinguish it from the non-local or removed knowledge produced in settings (e.g., laboratories) where the goal is generalizable universal truths (Latour 1979). Finally, from my vantage point the terms local, indigenous, folk, traditional, etc., are often used interchangeably. Enough overlap among the different definitions exists to ensure a shared intersubjective understanding.

The term “local” comes with its own historical, moral and political baggage. For example, local has been associated with particular places, characterized as narrow-minded and parochial, part of a romantic past, an obstacle to modern development and as “a critical component of culturally-sensitive modernization” (Agarwal 1995). Defining local knowledge is far from simple. I will show that the most useful way to understand local knowledge is to reveal how it differs in practice from professional ways of

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22 They note that while it may be convenient to use a technical definition of indigenousness in terms of prior occupancy, length of occupancy, a capacity to remain unchanged, etc., measuring indigenous is never an exact science and seldom politically neutral. Given its conflicting ambiguities and moral loading, indigenous might seem the least useful way to describe a particular kind of knowledge.
knowing. In addition, I want to avoid essentializing local knowledge and romanticizing it as always superior to professional ways of knowing.

2.b. Local versus Professional Knowledge

In an effort to avoid essentializing local knowledge by offering one definition, I will instead highlight the particulars in which local and professional knowledge diverge according to the way I am using local knowledge in this dissertation. In this vein, I characterize local knowledge in *ideal-type representations* by asking a series of questions about its production. First, I ask who holds local knowledge? This question might also be framed by asking where, both institutionally and culturally, does local knowledge tend to emerge? Second, I ask how knowledge is acquired. This question recognizes that lay testing and folk experimentation often underlies local knowledge. In other words, I emphasize that local knowledge is not “mere” belief or a “hunch,” but has been subjected to at least common-sense tests of logic, coherence, and rationality that fit with larger community understandings. Third, I ask what makes evidence credible? This question notes that people often measure the credibility of knowledge by whether or not they have actually participated in its production. In the case of environmental hazards this often means community members conducting *their own* tests with *their own* samples. A fourth question asks in what forums is knowledge tested or legitimated? I acknowledge here that in some public forums both local and professional knowledge may be competing for legitimacy, such as in the media, so the distinctions between local and professional knowledge may be constantly renegotiated. Finally, I ask what orientation each type of
knowledge has toward action. My answers to these questions and the resulting differences between local and professional knowledge are summarized in Table 2.1.

<table>
<thead>
<tr>
<th>Knowledge Production Question</th>
<th>Local Knowledge</th>
<th>Professional Knowledge²³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who holds it?</td>
<td>Members of Community – often identity group/place specific</td>
<td>Members of a profession, university, industry, government agency; Sometimes sophisticated NGOs</td>
</tr>
<tr>
<td>How is it acquired?</td>
<td>Experience; cultural tradition</td>
<td>Experimental; Epidemiologic</td>
</tr>
<tr>
<td>What makes evidence credible?</td>
<td>Evidence of one’s eyes, lived experience; not instrument dependent.</td>
<td>Highly instrumentally mediated, statistical significance, legal standard</td>
</tr>
<tr>
<td>Forums where it is tested?</td>
<td>Public narratives; community stories; Courts; media.</td>
<td>Peer review, courts, media</td>
</tr>
<tr>
<td>Action orientation?²⁴</td>
<td>Precautionary/preventative; consensus over causes not necessary</td>
<td>Scientific consensus over causal factors; further study in face of uncertainty</td>
</tr>
</tbody>
</table>

I emphasize not only differences between local and other kinds of knowledge, but also the similarities LK has with other forms of knowing. In particular, I pay close attention to two potential paradoxes:

²³ By professional knowledge, I am conflating two types of science, research and regulatory. Research science can be thought of as activities aimed at extending knowledge and competence in a particular area without any regard for practical application, while regulatory science consists of activities aimed at improving existing practices, techniques and processes to further the task of policy development (Jasanoff 1990:76-77). Jasanoff (1990:77-8) also notes three different types of scientific activity in regulatory science. First, since regulatory science is sponsored by some entity, it can be thought of as including a component of knowledge production. Second, regulatory science involves substantial knowledge synthesis, such as evaluation, screening and meta-analysis. Third, science intended explicitly for policy involves prediction, such as predicting future risks or costs.

²⁴ There are clear crossovers in this last category, since professional knowledge-holders often hold precautionary views and likewise, local knowledge adherents are often perfectly respectful toward professional knowledge and may even think it deserves more deference than their own informal kind of knowing.
a) How to define local knowledge while avoiding the tendency to characterize all contextual information as legible to outsiders, thereby potentially emptying LK of its individuality and local variation; and,
b) How to understand and value knowledge specific to a particular place while also trying to grasp its more general appeal.

2.c Examples of Local knowledge in Environmental Health Policy

I offer three short vignettes of how local, ordinary or everyday knowledge has been useful in environmental health decision-making. Each suggests some of the methods lay people use to gather or shape LK, including the importance of local coalitions in knowledge mobilization, how stories and experiences are pooled to create local narratives, how lay people train themselves in science, how they collect and display information, and how local knowledge “travels” into conventional expert domains.

1. Workers and 2, 4, 5-T

During discussions of whether the pesticide 2, 4, 5-T should be banned or regulated in Britain, farm workers challenged experts whose claims of safety ignored the actual conditions and practices workers were subject to when applying the chemical. At the time of the British regulatory debate, a number of other countries had already banned or severely restricted the use of the pesticide. The British National Advisory Committee on Pesticides (ACP) initially ruled that 2, 4, 5-T was not harmful to humans when sprayed in calm weather conditions and workers wore protective clothing and respirators. Farmers were suspicious of the advisory committee findings and the farm worker union organized to testify and offer a combination of its own experience with the pesticide, along with contrary information from established medical sources.

The union gathered testimony on the experiences workers had when using the chemical by distributing a questionnaire, asking about standard chemical application practices and examining health problems that workers or their families were experiencing. Instead of trying to generate statistical data from worker testimony, the union organized the personal accounts into a series of case studies for the ACP to review. The worker stories told how they were not told about the use restrictions that would make the chemical safe and of how they rarely were offered protective clothing or respirators when applying these chemicals. Workers also described the time-pressures they were under to apply the chemical, ignoring use-directions and applying the chemical during “restricted” conditions, such as during high winds and hot weather and in thick undergrowth.

The farm worker accounts detailed how nonfunctioning or inadequate safety equipment, long distances to washrooms, inadequate cleaning facilities, and lack of

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25 This story comes from Irwin (1995).
proper hazardous waste disposal, were not merely periodic lapses but normal farm operation. Women farm workers told of numerous miscarriages and birth defects such as cleft palate. The farmers concluded their accounts by suggesting that with the "existence of alternative weed killers and the overall lack of information about the effects on users of 2, 4, 5-T [under recommended conditions]...it became incomprehensible that workers, their families and the general public would remain subject to these risks" (Irwin 1995:20).

The worker stories demonstrated the variability between what the regulators offered as standard operating procedures and the actual conditions surrounding local practices with the chemical, which the farm workers knew from their own experience. The ACP reviewed the workers accounts and concluded that, while compelling, they did not offer statistical evidence showing a causal relationship between worker exposure and health effects. However, the ACP members were concerned about the adequacy of the existing regulation which seemed to be based on false assumptions about pesticide application practices. The stories from the farm workers ignited a debate within the ACP which eventually led the commission to re-assess the chemical’s safety and ban its use in Britain.

2. Activists and AIDS Research and Policy

The story of AIDS activism in the US reveals that ordinary people can impact and change the scientific research and decision-making process. From the early 1980’s through the mid-1990s, AIDS activists contributed to an understanding of the etiology and treatment of the disease. In reaction to views that the medical community was not addressing the problem of AIDS quickly enough, activists organized and heightened popular resentment against what seemed like recalcitrant scientific experts.

The AIDS movement was organized as a diverse coalition of advocacy organizations, health educators, journalists, artists and health service providers. It encompassed the various communities affected by the AIDS epidemic including gays, lesbians, people with hemophilia, injection drug users and members of hard-hit African-American and Latino communities. The movement combined direct-action civil disobedience, such as theatrical attacks on the FDA by ACT-UP, with self-education about the details of virology, immunology and epidemiology.

Examples of activist influence over AIDS research and policy occurred early on in the history of the disease when there was substantial debate over what caused it, and later over which therapies ‘worked.’ Early scientific thought was that gay promiscuity caused AIDS, but activists challenged this as homophobic speculation. Pressured by both mainstream activists who began doing their own research on the causes of AIDS and radical ACT-UP protesters who galvanized popular sentiment, biomedical researchers looked for other causes and eventually found that a retrovirus was the culprit. After challenging science that seemed to be fueled by antigay lifestyle assumptions, activists also asserted that community-based AIDS organizations had the expertise to define public health constructs such as ‘safe sex.’ As the AIDS epidemic grew in the US, activists demanded that scientists investigate potentially useful, but risky treatments. After researchers refused, sufferers of the disease learned the science behind their

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26 This story comes primarily from Epstein (1996).
condition and, with no prior experience, took charge of their own experimentation with untested medications. With the help of lay activists who studied how to perform clinical trials, activists conducted their own “underground” drug trials and criticized the methods employed in much AIDS clinical research. The results of the activists trials were made public. With the assistance of activists who got themselves appointed to scientific boards and regulatory review bodies, scientists and regulators were forced to respond.

Over time, through education, using alternative evidence and demanding a seat at the table with experts, activists began to be seen by the medical and policy community as people who might legitimately speak in the language of medical science, in particular with regard to the design, conduct, and interpretation of clinical trials used to test the safety and efficacy of AIDS drugs. AIDS activists have been successful at provoking lasting changes in how government regulates new drugs and who may participate in the planning and execution of clinical trials. Additionally, the drug “cocktails” which constituted the majority of activist research became the basis of what remains as the most effective treatment for the suppression of AIDS/HIV.

The AIDS activist story is one of credibility struggles over whose claims can and should be trusted. It is not about romantic notions of resistance that privileges the ‘purity’ of knowledge-seeking from below, but rather a more complicated story of how lay activism influences experts while experts simultaneously transform the practices of the lay people who engage them. The story reveals how citizens can get involved in science and how experts can be forced to find ways to relate to public discourse.

3. **West Harlem and Childhood Asthma**

In Harlem, New York, a community organization called West Harlem Environmental Action (WEACT) has organized to address one of the nation’s highest rates of childhood asthma hospitalizations. Despite alarming rates of asthma, the neighborhood did not have a city-sponsored asthma prevention or research program. WEACT decided to organize youth in the neighborhood to learn more about local respiratory disease risks, to educate youth about what they could do to reduce their risk of an asthma attack, and to pressure the city, state and federal government to address what seemed to be “a growing epidemic.”

The WEACT project organized youth to map the assets and hazards, as they saw them, in their neighborhood. A community “risk map” was developed showing areas in the neighborhood where young people experienced foul odors, irritated throats, watery eyes, shortness of breath and other self-reported symptoms that are known to be precursors of lung dysfunction. The maps also showed assets of the neighborhood, such as parks, stores and community centers. WEACT and youth activists combined the risk maps with conventional pollution monitoring information, such as EPA and New York State air monitoring data, toxic release inventory sites and other noxious facilities. One finding was that many neighborhood youth were hanging-out in areas that were in very close proximity to a bus-depot, sewage treatment plant and a sanitation-truck repair garage.

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In an effort to follow-up the mapping project, WEACT partnered with the Center for Environmental Health in Northern Manhattan at Columbia University’s Mailman School of Public Health. The Columbia University researchers collaborated with youth from WEACT on two studies that examined how air pollution from buses and trucks in West Harlem might be adversely affecting their health. In one study, the partnership obtained data on concentrations of urinary 1-hydroxypyrene (a measure of exposure to polycyclic aromatic hydrocarbons, a component of diesel exhaust) and respiratory and asthma symptoms from seventh-grade students in both an exposed school in West Harlem and a nonexposed school from a sociodemographically similar neighborhood in Central Harlem. The study revealed the specific influence of diesel exhaust on area residents’ exposure to fine particles.

In a second study, the youth from WEACT were trained to wear personal air monitors in order to take air samples at home, school and on street corners throughout the neighborhood where they and other youth spent time. The personal monitors gathered measurements of particulates, soluble metals, sulfate, nitrate, and ammonium ions, as well as indoor levels of the pesticide chlordane. Personal air monitoring was combined with new ambient monitors placed in areas identified as noxious by WEACT, and focused on neighborhood concentrations of volatile organic compounds (VOCs), aldehydes, PM2.5, and metals. Youth also counted trucks, buses and cars at the intersections where they wore the monitors. The youth and WEACT staff worked closely with Columbia University scientists to identify the places where monitoring should take place, for how long, at what time of day and season, and how to identify confounding factors such as indoor tobacco smoke. The idea was to try to identify whether specific nodes of pollution exposure for Harlem youth might be contributing to elevated asthma rates and other respiratory disease, and if so, what to do about it. The study, while still on-going, gathered new air quality information at the neighborhood level and revealed that West Harlem youth experience significantly elevated exposures to air pollutants at home, school and at play.

In both studies, young people had access to information that would have remained inaccessible to scientists. By plotting the location of self-reported respiratory discomfort, WEACT was able to use the youth project to explore possible connections between pollution and health effects. Their hypotheses formed the initial research questions posed by the community organization and the research scientists. The Columbia University scientists helped legitimate health concerns that had been raised by WEACT for more than a decade. The cooperative studies kept WEACT activists, both adults and youth, in control of research design, data gathering and interpreting results – all of which was reflected by the listing of WEACT activists as co-authors in subsequent peer-reviewed publications.

The studies and collaboration between Columbia scientists and WEACT was chosen as a National Institute of Environmental Health Sciences (NIEHS) Highlight of the Month in March of 2000. The research also gained the full financial support from the NIEHS. The studies were presented at US Environmental Protection Agency (EPA) hearings on air quality standards and played a major role in prompting the agency to propose tighter air-quality standards. The work also highlighted the need for a city-
sponsored program to address neighborhood-specific responses to asthma and was instrumental in shaping New York City’s first ever Childhood Asthma Initiative.28

2.d. Characterizing Local Knowledge

The three vignettes show how local people – be they workers, health activists, young people or concerned community members – are more able to deal with complicated social and technical questions than the conventional wisdom generally assumes (Irwin 2001; Wynne 1996). Drawing from these vignettes as well as a review of the literature, the next section of this chapter teases out some specific characteristics of local knowledge by revealing how it contrasts with professional knowledge. I begin from the position that “all knowledge is local,” in the sense that it comes out of a particular socio-economic milieu, reflects certain disciplines and training, and depends on certain tools and methods of analysis.

1) **Who Holds it and how is it acquired?**

Local knowledge is often held by members of a community that can be both geographically located, or place-based, and contextual to specific identity-groups. This means that a “knowledge community” might be a neighborhood and/or a group with a shared culture, symbols, language, religion, norms or even interests. Specific information about where West Harlem youth hung-out was knowledge that only the young people and their trusted peers could provide. The broad coalition built by activists concerned about AIDS is an example of how identity-politics plays an important role in organizing local knowledge.

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Knowledge from a particular geographic place simply says, “I live, work or play here and therefore I know what is going on.” The place aspect of local knowledge stresses that those experiencing disproportionate environmental and disease burdens know more about what these things mean in their daily lives than anyone else. The power of place also suggests that those who do not live in these circumstances can never fully understand, so that outsiders must listen carefully to their stories and their ideas (Young 1990). For example, the knowledge of one’s geographic place is revealed in the story of an Anniston, Alabama, woman describing a contaminated open-air channel adjacent to her home that carried PCB waste from a neighboring Monsanto plant:

My daughter played in that ditch and my grandbabies, both of them, live on breathing machines... My oldest son played in that ditch. His baby doesn’t have any joints in her fingers... It all comes from the chemicals. We live in it all our lives, and this is the result (Bragg 1997: A16).

Place should be understood as a “material and social space, a habitus, infused with different meanings and transected by relations through which particular ‘cultural capitals’ are formed and transformed (Healey 1999:112).29

The notion that residents of places and members of groups have a privileged form of expertise about their place, its history, and practices is not new to policy-making. It has, however, gained salience in policy making recently under the guise of the new social movements (Calhoun 1994). Identity is understood as socially constructed in relations with others, not taken for granted, and is the social product of the processes by which individuals and groups make sense of the places and situations they face (Giddens 1984).

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29 The ideas of habitus and cultural capital come from Bourdieu (1977). For Bourdieu, habitus refers to the modes of conduct, taste, and feeling which predominate among members of particular groups. It can refer to shared traits of which the people who share them may be largely unconscious. It is very similar to the English expression second nature, or acquired tendency that has become instinctive. Cultural capital might be understood, like social, political and other forms of capital, as ways of being, acting, speaking, etc., that are considered legitimate in the eyes of the dominant culture.
As marginalized groups organize and begin to assign political importance to who they are (i.e., a specific ethnicity or religion) and what they know about their lives (i.e., African-Americans experiencing racism), they often demand that the general public and policy makers respect and acknowledge their self-definitions (Guinier 1994). For these new social movements, identity politics is inherently political because it involves not only seeking recognition, legitimacy and autonomy, but also refusing, diminishing and displacing identities others may have assigned.\(^{30}\)

However, this does not mean identity is a fixed concept and predetermined by such things as religion, ethnicity or neighborhood. My three stories make clear that understanding identity means embracing *intersectionality* and *anti-essentialism* — or the notions that no person has a single, easily stated, unitary identity and that no absolute “truth” from any one perspective exists.\(^{31}\) The AIDS activists came from many identity groups, and activists were as likely to be a black Latina of Caribbean heritage, as a gay, white, heterosexual, Jewish man as a suburban, housewife hemophilic. Those who “possess” local knowledge often have conflicting and overlapping identities, loyalties and allegiances.

The importance of place is especially relevant for the work of planners.

Environmental planners increasingly acknowledge that place-blind models of decision-

\(^{30}\) For example, Patricia Collins (1990:106-7) notes: “By insisting on self-determination, Black women question not only what has been said about African-American women but the credibility and the intentions of those possessing the power to define. When Black women define ourselves, we clearly reject the assumptions that those in positions granting them the authority to interpret our reality are entitled to do so.”

\(^{31}\) Michael Dyson (1993:xxi) writes on the need to move beyond essentialism in expanding African-American cultural criticism: “Of course, I don’t mean that there are not distinct black cultural characteristics that persist over space and time, but these features of black life are the products of the historical and social construction of racial identity. These distinct features of black life nuance and shape black cultural expression, from the preaching of Martin Luther King to the singing of Gladys Knight. They do not, however, form the basis of a black racial or cultural essence. Nor do they indicate that the meaning of blackness will be expressed in a quality or characteristic without which a person, act, or practice no longer qualifies as black. Rigid racial essentialism must be opposed.”
making are inadequate and have failed to protect some populations (Healey 1999; Lazarus 1993). Planning is increasingly trying to link decisions to the particulars of the places where decisions are made, as evidenced by such movements as community, equity and communicative planning (Krumholz and Forester 1990; Forester 1992; Innes 1997).

By emphasizing both place and identity, residents with LK might offer planners insight into the different ways that the qualities of places impact on people’s sense of well-being. For planners who emphasize place-attentive governance, the task is to identify which social relations really make a difference for improving environmental health decision-making. On the other hand, one danger of emphasizing the place and identity characteristics of LK emerges when such knowledge is “removed” from its context or location. For example, researchers might err if they tried to apply the specific insights of monitoring and assessment from Harlem into an “urban monitoring” program applied similarly in all settings.

2) What Makes Evidence Credible?

A second aspect of LK is that it rarely conforms to conventional notions of technical rationality, including the need to search for causal models and reliance on universal principles for getting to the “truth.” While I do not want to suggest that LK is always different from scientific or professional ways of knowing, a brief explanation of my understanding of scientific knowledge is needed here in order to explain the differences between expert and local knowledge approaches to data validation.

Science is a quintessentially public enterprise. Every finding is legitimated by the notion that science is “grounded in impersonal non-private reproducible procedures through which it can be certified by anyone who cares to do so, provided he has the
competence and the patience” (Ezrahi 1990:46). The legitimacy of scientific knowledge often depends on its epistemological differentiation from the everyday knowledge of ordinary people (Shapin 1994). Yet, these boundaries are continually made and remade. Therefore, what is important is to understand how boundaries are made and remade (Gieryn 1995). For instance, disinterested science often portrays itself as apolitical, but its conceptual categories, its rules of evidence, its distinction between appropriate and inappropriate subjects for investigation all reflect the society, and the accompanying social and practical judgements, within which scientists work. Sociologists of science have highlighted the multiplicity, patchiness and heterogeneity of the space in which scientists work, noting that ‘expert’ science is as much a cultural practice as a rational endeavor (Latour 1987; Shapin 1994; Yearley 1994).

The differences between professional and local ways of knowing can be characterized by examining the emphases each place on information collection methods, standards of evidence and analytic techniques. Practitioners of LK make explicit their reliance on evidence from time-honored traditions, intuition, images, pictures, oral storytelling or narratives, as well as visual demonstrations such as street theater. This knowledge is easily accessible to locals and widely shared. Tacit awareness and understanding, which generally are the product of historical experience not merely a hunch, are also explicitly emphasized by practitioners of LK.

In environmental health, community activists often draw from their experiences of seeing children with birth defects, hearing of a neighbors’ birth-defected newborns or from accompanying friends to chemotherapy appointments. At the same time, they observe industry smokestacks and smell the waste treatment plants in their
neighborhoods. Their knowledge comes in part from actual sights, smells and tastes, the tactile and emotional experiences they encounter in their everyday lives. As one community activist stated:

I did not come to the fight against environmental problems as an intellectual but rather as a concerned mother... People say, ‘but you’re not a scientist. How do you know it’s not safe?’...I have common sense...I know if dioxin and mercury are going to come out of an incinerator stack, somebody’s going to be affected (Hamilton 1994:209 [ellipses in the original]).

Another example of community intuition about environmental health problems comes from a woman living in Yellow Creek, Kentucky, after the Centers for Disease Control found her community’s health data statistically insignificant; “Statistics don’t tell you. People do. I’ve walked this creek and I’ve seen sick people” (Brown and Mikkelson 1990: 129). Although the relationship between industrial chemicals and disease is not something one can just observe or that one can learn by consulting one’s body, community activists insist that their intuition, common sense and experiential knowledge of place gives them privileged insights into local environmental health problems.

Local people make two very different forms of claims here. The first claim represents a type of local knowledge that identifies or poses a problem. This claim is reflected in statements like “I’ve seen sick people” and highlights contextual knowledge that allows professionals to focus on things they may have missed. Another claim reflects a type of local knowledge that hypothesizes a relationship between a hazardous exposure and illness. This claim is reflected in statements such as: “I know if dioxin and mercury are going to come out of an incinerator stack, somebody’s going to be affected.” Too often professionals assume that local knowledge is only of the second kind, dismiss these claims, and they miss the importance of the first type of local knowledge.
Historically, people’s intuition about disease has often changed in response to scientific discoveries. In the early nineteenth century, most physicians believed that the major epidemic diseases were caused by the odor of decaying organic matter. The general public thought so, too, and it seemed entirely reasonable (Tesh 1988). Disease and death rates were lower in rural areas than in urban neighborhoods, where a stench often rose up from piles of rotting kitchen wastes dumped in the streets, from overflowing outhouses behind buildings and from animal excrement (Melosi 2000). People avoided smells as best they could; common sense told them they caused disease. Later in the century, physicians learned that the smells themselves were not dangerous but major diseases were caused by microorganisms. Public health officials began spreading this new message to the public and people eventually acquired a “new” understanding of what caused disease (Tesh 1988). They no longer worried about miasmas but about germs and it became “common knowledge” that unwashed hands and bodies as well as imperfectly scrubbed dishes – however clean they might look – could harbor disease-causing bacteria and viruses. Thus, what appears as intuition, especially when it comes to environmental health issues, is often hard to decipher from the images and messages of science, environment and public health presented by government, corporations, mass media and public interest groups.

In the 2, 4, 5-T debate, farm-workers claimed a privileged understanding of their health conditions. They constructed narratives about their experience working with the pesticide while the union made a conscious decision not to turn the workers’ stories into statistics. Narratives are ways in which people often give meaning to their experiences and events. Oral story-telling is often the medium through which community-members
express, make-sense of, and understand the relationships between their life experiences and the health of their community (Shiva 1997).

3) *Heterogeneity and hybridity*

A third aspect evident from my three vignettes is that local knowledge is not systematized, centralized or static, but constantly re-negotiated among those who group it, especially as new circumstances, experiences and risks emerge in a place. As people reassess new circumstances they reconstruct events and even their own identity, suggesting that local knowledge is fluid and transforming, always partial and imperfect (Haraway 1988). As the AIDS activists learned more about how biomedical research was conducted and as the death rate of AIDS patients soared, activists became more active in organizing their own experimental drug trials. Their experiments produced results that were inconsistent, but they continued to work to develop a common narrative about the potential utility of experimental drugs. Similarly, the 2, 4, 5-T farm workers told different stories about their experience. The union made a conscious effort not to lose this heterogeneity by conflating the narratives into one quantitative assessment. In each case, heterogeneous local knowledge was checked publicly for its validity by, for instance, making test results public and publishing worker’s stories.

The qualities of heterogeneity mirror those found in science; definitions of scientific “facts” are constantly open to interpretation and re-negotiation. Thus, I am not suggesting a single definition of local knowledge, but rather a heterogeneous, partial and situated definition, meaning that our varied experiences cause us to see and interpret the world differently (Haraway 1988). Just as no one definition of “expert” or scientific
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knowledge exists today, we should conceptualize local knowledge as a set of narratives, tools and practices located in a particular place, culture or community.

The narratives of the 2, 4, 5-T farm workers and suggest that LK does not easily lend itself to precise measurement and quantification. Wynne (1996) describes how Cumbrian sheep farmers’ knowledge of soil-types was transmitted from practice-to-practice, not through theory. The flexibility of relating knowledge to action was evident by the Cumbrian farmers’ knowledge of local soil type variability, since their knowledge of soil-types was not constrained by assumptions about standard-type land conditions, but came from grazing experience and noticing how vegetation and soil-type changed along the same hillside within the same valley (Wynne 1996). While the characteristics of imprecision and variability might be crucial for the farmer, these same qualities make standardizing and generalizing from LK difficult (van der Ploeg 1993).

The heterogeneity of local knowledge also suggests that asymmetrical distributions of knowledge exist in a community, often by gender and age, and that no one individual fully “holds it.” There may also be disagreements within local accounts, over such things as which stories and evidence count, how they should be appropriated, and who in a community ought to narrate history and make authoritative claims (Agarwal 1995). Further, globalization, mass-media and the internet have led to a blurring of global-local knowledge distinctions. Any definition today of “local” will surely be influenced by, for example, conventional standards of scientific proof (Shiva 2000). Again, the more I attempt to demarcate the boundaries between local and expert knowledge, the more blurry the dichotomy becomes and the more clear the contextual nature of “expertise” is (Wynne 1996).
4) Oppositional Discourse

A fourth characteristic of those who rely on LK is that their information is confrontational, although not necessarily antagonistic to conventional science and expertise (Agarwal 1995; Shiva 1997). Knowledge claims are always embedded in power relationships (Foucault 1977; Bourdieu and Wacquant 1992). Power is expressed in public decision-making by who gets to define problems, offer evidence, be heard and design solutions. Professional knowledge currently retains hegemony over these features of environmental health research and decision-making. Yet, those who hold LK offer counter-stories which can displace, challenge or simply mock the dominant discourse. Local knowledge offers what Nancy Fraser (1992) has called an “oppositional discourse” much like, for example, feminist discourse. The 2, 4, 5-T farm workers, WEACT and AIDS activists were all attempting to confront experts who were either ignoring their situation or, in the activists’ eyes, not generating relevant knowledge that would help solve their particular problems.

Importantly, what the AIDS and WEACT activists’ accounts revealed is that confrontations with expert and scientific knowledge can occur when activists try and stake-out part of the scientists’ terrain. This claim is fundamentally different from activists who simply distrust experts and always view them with suspicion, or from those who claim science and truth are on their side because they have hired their own experts, or from those who reject outright the scientific way of knowing and advance claims to expertise based on a wholly different epistemological standpoint (Nelkin 1995). Confrontation occurs, for example, when the AIDS and WEACT activists wrangle with scientists about issues of truth and method, exerting pressure on them from both the
outside and locating themselves on the “inside” of research. These activists challenge not just the use and control of science and expert knowledge, but also the content and processes by which knowledge is produced. Fundamentally, these activists claim to speak credibly as experts in their own right, as people who know about things scientific and who can partake of this special and powerful discourse of truth. Brown (1992) has labeled one method of lay people engaging in environmental health research and decision-making “popular epidemiology,” and defines it as the process where lay people “gather scientific data and other information and also direct and marshal the knowledge and resources of experts in order to understand the epidemiology of disease” (1992:269). When the holders of LK confront experts by offering their own evidence and by trying to change the rules of who is qualified to play the game of knowledge-making from both inside and outside the field, they are not only confronting, but are also doing science.

Finally, the narratives describing local knowledge often cause confrontation by giving voice to the often silent suffering of disadvantaged people. The sharing of stories and personal narratives can demonstrate that others have similar experiences. This was evident to the union as they gathered stories from the 2, 4, 5-T farm workers. In order to confront dominant discourses local people had to carry a “double consciousness” of both conventional and local knowledge. Lay people often carry the extra burden of “translating” their knowledge to professionals in language they can understand, requiring locals to be “multi-lingual” in both their own and the dominant discourse. These extra burdens present challenges for LK entering into professional decision-making.

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32 See note 16 for a discussion of “double consciousness.”
2.e. **Challenges to the Professional Uptake of Local Knowledge**

The previous section highlighted why local knowledge is different from professional knowledge and why LK is a useful category at all. I also described the major contrasts between professional and local knowledge. This section explores how community members can insert their local knowledge into environmental policy-making and the challenges facing its uptake in professional decision-making circles.

1) **Highlights discreditable/inaccurate experts**

The knowledge of local people is often revealed, especially to those outside the local community, when locals sense that expert analyses or decision-making has inaccurately portrayed their experience. The 2, 4, 5-T farm workers gathered stories describing "standard" practice in response to what they felt were inaccurate expert assumptions. Similarly, the AIDS activists did not believe that biomedical researchers and the governmental institutions supporting them were acting quickly enough or in the interest of dying victims. The WEACT activists also did not believe that environmental regulators were doing enough to both monitor and prevent air pollution or asthma in their neighborhood. These activists took action because they believed that the institutions entrusted to protect them had failed.

Wynne (1996) suggests that public response to experts often has as much to do with the complexities of the issue at hand as with the historical relationships the public or particular groups have with the institutions offering the technical information. In other words, local knowledge is often revealed because of, for instance, a lack of trust in the social institutions performing assessments or making difficult decisions. The activists
revealed that a corollary to trust is *control*. The AIDS and WEACT activists confronted experts in part to gain control over their own situation.

Truth claims in science emerge because scientists trust either that an experiment was competently performed (thus granting credibility to the results) or they trust the result (thereby conceding that the experiment was competently performed). At any given moment, *some* knowledge must be taken on faith if science is to proceed. Even distrust is predicated on a background of trust; a scientist cannot distrust a particular finding or person except against a background of other shared knowledge which is unproblematically trusted (Shapin 1994:17).

Trust and credibility are fragile in the scientific community and are highly guarded through such mechanisms as allocating research funds, judging other’s work and policing abuses (Jasanoff 1990). But, for lay people trust in experts must be found through external markers of credibility such as the institutional affiliations of researchers, who funded them, where their results are published and, possibly, what the *New York Times* says about the findings. When lay people challenge the credibility, legitimacy and trustworthiness of experts, this can be very threatening for a professional, since their resources and maintenance of professional autonomy may be placed in jeopardy. When the local knowledge of community people enters environmental health problem solving, the normal flow of trust and credibility between expert institutions and lay people is disrupted. Thus, when lay people offer LK about problematic situations, they might highlight inaccurate experts and simultaneously disrupt taken-for-granted trust and credibility the public confers on expert institutions.
2) Extends work of professionals

While LK can often be revealed in response to inaccurate experts, it can simultaneously contribute to their work. By challenging entrenched expert paradigms of problem definition and analysis, holders of LK attempt to re-value forms of knowledge that professional science has excluded. For example, the AIDS and WEACT activists engaged with scientists to make professionals and public policy respond to their concerns. Both sets of activists also provided expert researchers with access to data and information that they could not have easily known without local participation. Those who advocate for LK in environmental health decision-making, often seek to replace or discard understandings gained from conventional science. Usually they focus on aspects of problem-solving that tend to be neglected in traditional accounts of scientific practice: uncertainty, social values, and a plurality of legitimate perspectives.

Policy analysts regularly document how science transforms society (Ezrahi 1990; Jasanoff 1990; 1996). Less often appreciated is how society, by speaking back to experts, can transform science and accompanying decisions making.\(^{33}\) When lay people “speak back” to experts and science, one thing they do is contextualize science by attempting to make it “work” and resonate with their lived experience (Gibbons 1999). This process most often occurs when scientists, administrators and lay people deliberate over controversial environmental choices. It can also occur when local people are allowed to interpret scientific understandings through their own experiences. When lay people bring science that historically remained in the lab into their daily lives, the information and

\(^{33}\) Krimsky (1984:253) notes that folk wisdom has contributed to technical knowledge through “pragmatic knowledge obtained through the intergenerational transmission of trail-error experiences, intuitive understanding of complex interactive systems, the generation of scientific hypotheses, and causal links such as identification of the environmental sources of human disease or ecological degradation and an understanding of meaning and value or urban life.
knowledge of science must now be valid in both the laboratory and “on the street” – demanding what Gibbons (1999) has called “socially robust knowledge.” Ideally, socially robust knowledge achieves validity through an extended group of experts, including “lay experts,” where different representations of knowledge are negotiated for their relevance to particular on-the-ground problems (Funtowitz and Ravetz 1993). The implication is a shift from science “speaking truth” to society, to the socially robust notion of “making sense together” (Forester 1989; Gibbons 1999).34

While LK can often extend the work of conventional science, the legitimacy of LK should not be discounted if it does not fit neatly into the categories of conventional science. Evaluating LK only according to the ability of those who have it to extend the work of experts can create a situation where LK is judged according to universalistic scientific standards instead of on its contextual merits. This tension is currently being played out in the debate over intellectual property rights, where agricultural and pharmaceutical companies have sought to codify and exploit LK for commercial purposes. In some cases, corporate scientists enter communities to learn the time-tested healing traditions of an Amazonian tribe or the farming techniques of an Andean village, and upon their return to the North, patent these techniques and sell them as their own (Shiva 1997). While a full discussion of intellectual property rights and LK is beyond the scope of this chapter, the example is raised here to highlight how insights from LK can both extend the work of experts and simultaneously be removed, disassociated and

exploited from its origins, often at the expense of those who developed and shared it in the first place (Shiva 1997; 2000).

3) **Reorients Problematic Situations**

A third way practitioners of local knowledge can influence environmental health decision making is when practitioners go beyond description to offer analytic and prescriptive advice. In re-orienting problematic situations, local people might attempt to redefine accepted social conditions, define what is just, and even assign responsibility for perceived injustice. The 2, 4, 5-T farm workers were successful in using their experiential knowledge of working conditions to redefine “standard practice” and reorient the way decision-makers viewed the efficacy of safety measures associated with the application of the pesticide. The worker narratives altered systems of belief and typical categories by calling attention to neglected evidence.

When community activists in environmental health decision making use local knowledge to reframe a problem offered by experts, local activists attempt to make problems align with their particular “capital” – or their form of credibility – in order to have a say in problem solving (Bourdieu 1977). In public decision making, power is often manifested in the ability of professionals to label, classify and condemn, as well as in the capacity of publics to resist the imposition of certain expert definitions (Foucault 1977). In “reframing” problems, holders of local knowledge can “create value” by identifying additional considerations and options for action unseen by others.  

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35 “Creating Value” is a term borrowed from the negotiation literature and suggests that problem solving is not a “zero sum” game (i.e., what I win, you lose because there is a fixed amount of gains to be had between the two of us). Instead, “creating value” implies that the “pie of gains can be enlarged” (Raiffa 1982; Susskind and Cruikshank 1987).
Chapter 2 – Understanding Local Knowledge

The notion of policy-framing is often used to described how ideas become practice (Goffman 1974; Schon and Rein 1995). Frames impose order upon experience. For example, diseases have often been framed through attributions of causality and blame, leading to what seems like inevitable social action (Rosenberg 1992; Tesh 1996). Similarly, Jasanoff (1990) notes how scientific advisory boards often frame environmental risk questions and conflate science evidence with social and political judgements.

Schon (1983) highlights the importance of policy-framing for both professionals and lay publics. According to Schon, a lack of authentic expert-client interaction in policy sciences exists and one consequence is an adherence to the technical model of rationality and the subordination of the client by professionals. This subordination of the client or lay citizen, has given rise to one-dimensional, distorted communications between practitioners and clients, ultimately impeding the activity most crucial for effective practice, what Schon (1983) calls “problem setting.” In problem setting analyses focus on identification and discovery, a “conversation with the situation,” and often require the consensual reshaping of new problem orientations in order to: a) determine relevant problem situations to be addressed, and; b) the theoretical normative frames that structure and shape our basic understandings of (and discourses about) particular policy issues, including evaluation criteria. Schon (1983) describes problem setting as preceding technical problem solving and calling for “reflection in action” where practitioners and lay people set the problem solving agenda.
4) Suggests Precautionary and Contingent Action

Local knowledge can also be used to influence decision-making by highlighting preventative, precautionary and contingent actions. The 2, 4, 5-T farm workers made explicit in their statement to the ACP that with the existence of alternative pesticides and the uncertainty and lack of information about the effects of 2, 4, 5-T on workers, the regulatory body should opt for caution and not take the risk of exposing anyone to potential risks from the pesticide. The AIDS activists were not necessarily precautionary but they advocated for contingent action, pressuring scientists and policy-makers to approve experimental drugs until new information revealed that the treatments were ineffective, harmful, or another safer and more effective treatment was discovered.

Communities of disadvantaged populations who suffer from disease or environmental exposures often recognize that environmental health decision-making must proceed under a veil of uncertainty. These populations cannot wait for “definitive proof” to guide interventions and commonly invoke the “precautionary principle” when acting on local information (Raffensperger and Tickner 1999). The precautionary principle affirms that one does not have to wait until definitive evidence of a health risk has been demonstrated before regulatory action should be taken.

This chapter has outlined why local knowledge is a useful category, its differences with professional knowledge, how it might be used in policy-making, and some of the challenges facing its uptake by professional decision-makers. I have shown that local knowledge can contribute both epistemologically and normatively to environmental decision-making. Local knowledge has authority beyond the often
assumed parochial, subjective and emotional world of the community members who hold it. Local knowledge has also problematized our conventional understanding of ‘professional knowledge,’ particularly dispelling the false dichotomy between expert and lay knowledge. The porous boundaries between local and professional knowledge suggests that planners and policy makers interested in democratic practice ought pay attention to local knowledge as they manage processes that legitimate some information as relevant for decision-making. This, however, calls for new practices and professional-local relationships, much like those envisioned by Schon (1983) and Forester (1999). These practices must find new ways of expanding the knowledge-base and fusing local and professional knowledge, not on deciding which alternative – professional or local – is best. The next four chapters present more detailed studies of how local and professional knowledge might be fused in order to improve environmental health decision-making.
Chapter 3 – Risk Assessment, Community Knowledge and Subsistence Anglers

On any morning they are out there, steady as the sun rise. Along the pier at India Street and the vacant lot off Kent Avenue, the fisherman line up every morning. I love coming out here because it is my time to ease into the day...you know have a smoke, coffee, watch the traffic build on the FDR in the city. I mean you can’t beat this view of Manhattan! For some of these guys, boy, it ain’t a hobby. They got the system down; a few different rods, nets, tackle boxes, the whole ‘nine. Know what I mean? They’re back here in the afternoons. For me its fun, but its also dinner sometimes.

-- Carlos Serna, describing the action along the East River in Greenpoint/Williamsburg on a typical morning, June 3, 1999.

This chapter shows how the knowledge of community residents improved environmental health decision making in Greenpoint/Williamsburg (G/W). The story reveals how residents of G/W, organized by the Watchperson Project, gathered information about subsistence angler practices and how these data were used to improve the US Environmental Protection Agency’s Cumulative Exposure Project (CEP) in the neighborhood. Information about subsistence anglers was a type of local knowledge that only members of the community could truthfully collect. This information was eventually incorporated into the EPA assessment and improved both professional and local understanding of the hazards facing community residents living off subsistence diets of locally-caught fish.

3.a The Cumulative Exposure Project

In 1995, the US EPA was considering using its newly devised air toxics modeling procedure at the community level. The agency had developed a model for estimating the dispersion of air toxics at the census tract level nationwide. The methodology allowed regulators, for the first time, to estimate the concentration of 148 hazardous air pollutants (HAPs) at a small scale – an aggregation at which air pollutants are suspected of impacting human health. Before the development of the national air toxics modeling project, HAPs were either measured pollutant-by-pollutant, or they were not measured at
all. The development of the air toxic dispersion model allowed the agency to consider assessing the human health and environmental impacts of multiple toxins at a very fine scale.

The air toxic modeling formed the center-piece of a new program at the EPA called the Cumulative Exposure Project (CEP). The intent of the CEP was to combine the air toxic modeling with similar multi-toxin inputs for other ingestion pathways, such as through food and drinking water, and to derive a cumulative exposure profile for states, regions and even neighborhoods. The CEP represented a new movement within EPA looking at alternatives to traditional risk assessment techniques, a movement which is questioning the assumptions behind the use and methods of risk assessment (Finkel and Golding 1994).

For most of its history, EPA has assessed risks and made environmental protection decisions based on individual contaminants—such as lead, chlordane, and DDT—with risk assessments for these chemicals often focused on one source, pathway or adverse effect. In 1997, EPA announced guidance for cumulative assessments, which they claimed would allow them to describe and quantify the risks that Americans face from many sources of pollution, rather than by one pollutant at a time. According to the memorandum by then EPA administrator Carol Browner:

We are increasingly able to assess not simply whether a population is at risk, but how that risk presents itself. In addition, we are better able in many cases to analyze risks by considering any unique impacts the risks may elicit due to the gender, ethnicity, geographic origin, or age of the affected populations. Where data are available, therefore, we may be able to determine more precisely whether environmental threats pose a greater risk to women, children, the elderly, and other specific populations, and whether a cumulative exposure to many contaminants, in combination, poses a greater risk to the public (EPA 1997).
This shift at EPA occurred in large part because of criticisms of risk assessment by environmental justice (EJ) activists and their sympathetic academic supporters (Goldman 2000; Lash 1994; Sexton 2000). The EJ movement had been arguing for a shift away from risk assessment because it saw the process as systematically burdening those populations that were already disproportionately exposed: the poor and people of color. EJ activists argued that when risk assessment relied on a single exposure pathway, source and health endpoint (with an almost exclusive emphasis on carcinogenesis), it ignored the multiple pathways, numerous sources of toxic exposures and non-cancer health endpoints, which disproportionately afflict poor populations and people of color (Geronimus 1999; Krieger and Fee 1996; Northridge and Shepard 1997; Williams and Collins 1995). The activists also challenged risk assessment because the process by had become so complex that it became the exclusive domain of highly specialized experts. The result, claimed EJ activists, was an expert-dominated process that excluded the very populations assessments were supposed to protect.

The exclusivity of the risk assessment process was a critique echoed by other environmental and public health reformers who sought to challenge EPA’s risk analysis framework more generally. The risk analysis framework separated the assessment, management and communication of risks into three distinct and independent processes. In this scheme, technical experts preformed the assessments which were supposed to inform policy administrators who made risk management decisions, which were then “communicated” to concerned publics by a third set of administrative specialists. Both the reformers and EJ activists were pressuring the EPA throughout the 1990’s to “democratize” the analysis process by, among other things, including those being asked
to bear risks in the assessment itself. They were also pressuring EPA to move away from the conventional risk assessment process toward alternatives hazard assessment and decision-making processes such as comparative risk analysis and cumulative risk assessment (Finkel and Golding 1994; CEQ 1996).36

At the same time EPA was exploring methods for cumulative assessments, the New York City Department of Environmental Protection (NYC DEP) was also working on a project to measure the cumulative environmental burdens in city neighborhoods. The DEP had initiated a project entitled the Baseline Aggregate Environmental Load (BAEL) [pronounced ‘bail’] project. The BAEL was part of the Environmental Benefits Program (EBP) at the DEP. The EBP was a program the agency was forced to establish after community groups pressured New York State to enforce Clean Water Act violations by the DEP at the Newtown Creek sewage treatment plant in Greenpoint. The state ordered the DEP to fund a Supplemental Environmental Program, and the EBP was one result. The Watchperson Project was also funded as a part of the EBP, and it was during EBP community meetings with the Watchperson Project and other community groups that the BAEL project was conceptualized (Hanhardt 2000).

The BAEL attempted to derive a weighted measure for the cumulative environmental burden for each city block in New York. This was clearly a mammoth undertaking, but it’s first tasks were to gather as much existing environmental data available for the G/W community and place this into a database that could be joined with the City’s database of every land parcel. The idea was to develop an “environmental load” on each land parcel in G/W based on zoning, land use and existing environmental data. The DEP also enrolled the EPA in this effort to help with data access.

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While the BAEL and EPA projects were proceeding, residents of G/W were organizing to stop the siting and operation of additional noxious facilities. Residents had organized to stop an incinerator from operating in the neighborhood and had organized to stop the siting of two garbage transfer stations. The community argued that the garbage transfer stations violated environmental and health regulations when the two new projects were considered in combination with the other existing 28 transfer stations in the neighborhood. The cumulative effects, argued the community, represented a blatant violation of the EPA’s commitment to environmental justice and the community called on the US Department of Justice (DOJ) to hold a hearing. The DOJ hearing was held in G/W and the EPA was asked to explain its position on cumulative risk.

At the request of local and national environmental justice activists, EPA responded to the Justice Department hearing and the BAEL project by deciding to pilot the exposure project in G/W.\(^{37}\) According to the EPA, G/W had the three elements that they thought could lead to a successful pilot project: an active and organized citizenry; available local and national data; and the presence of many hazards where they were “likely to find something” (Talcott 1999).

The EPA chose to develop its research methodology for the CEP in consultation with its consultant, Industrial Economics, Inc. of Cambridge, MA, and the NYC DEP, but not with the community. The EPA did, at the urging of the DEP Director of the EBP, present their methodology at a community meeting. Having been party to the BAEL discussions, the activists were fairly well versed in cumulative assessments and

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\(^{37}\) Another major outcome of the DOJ hearing was an investigation by the National Environmental Justice Advisory Council, a Federal Advisory Committee to the EPA, on the civil rights implications of the location and siting practices for waste transfer stations (NEJAC 2000). I explore this meeting in more detail in Chapter 6.
immediately noted some gaps in EPA’s proposed methodology, such as its inattention to small source polluters (Hanhardt 1999). One particular concern of the activists was that the EPA proposal made no mention of assessing potentially toxic exposures from eating fish caught in the neighboring East River.

The EPA food exposure assessment included information on the average northeast “urban diet” from the National Health and Nutrition Examination Survey (NHANES). This survey made no mention of diets that might consist of locally caught fish. When EPA scientists heard from community members that residents were eating fish from the East River they were surprised (Talcott 1999). They had no data to confirm or dispute this claim. The activists, specifically The Watchperson Project, offered to gather some information on local anglers to show EPA that it was a serious issue. At first EPA refused. They were intent on using their proposed method, which assessed food exposures using exposure estimates based on the typical urban diet in the Northeastern U.S. The Watchperson Project argued that without the angler information, the CEP would miss an important potentially hazardous exposure. The community group also noted that since many of the anglers were immigrants, non-English speakers, and driven to fish because of poverty and culture tradition, the anglers would be unlikely to talk with outsiders about their practices. The group argued that only local people could gather this important information. While these arguments seemed persuasive it was only after the EPA visited the community and the Watchperson Project staff took them on a tour of the piers along the East River that the agency acquiesced and agreed to let the community organization interview anglers (Swanston 2000; Hanhardt 1999).
EPA chose to work with the Watchperson Project to devise an interview protocol and methods for collecting information. The Watchperson Project enlisted volunteers to interview local anglers and collect information on subsistence fish diets in the neighborhood. The group gathered stories of anglers and collected survey data. The remainder of this chapter will explore in more detail the processes the Watchperson Project used to collect information from the anglers. I will show how the activities of local activists revealed how local knowledge can improve professional decision-making by: (a) adding data sources such as angler information; (b) providing access to difficult to reach informants, such as immigrants; (c) bridging linguistic differences, by relying on non-English speakers; and (d) counteracting disincentives of informants to participate, due to poverty, culture, fear and defensiveness. I will also reveal how the community-gathered information influenced EPA. However, before delving into these details I emphasize that understanding the EJ movement’s critique of the conventional risk assessment process is important for understanding how and why the EPA’s CEP emerged in G/W in the first place.

3.b. Professional Views of Risk Assessment

The conventional process for assessing hazards in a community involves quantitative risk assessment. This process remains relatively the same today since the first EPA guidance memorandum was issued in the early 1980’s (EPA 1986). In risk assessment, one identifies an environmental hazard, describes the potential adverse effects of exposure on a hypothetical individual, and estimates the probability of an adverse effect to a hypothetical individual (NRC 1983). The process includes identification of a single hazard, evaluating how much of the hazard – the dose –
stimulates an adverse response, and estimating how often and at what concentrations humans are exposed to the hazard. These three steps – hazard identification, dose-response and exposure assessment – are combined into a fourth step that generates a risk characterization (NRC 1983).

Hazard identification is a process whereby analysts use available evidence to determine whether a substance is linked to a particular human health or environmental effect (Paustenbach 1989; Wilson and Crouch 1987; Kammen and Hassenzahl 1999). This generally involves EPA scientists reviewing respected health studies to determine whether a chemical or other substance poses a threat to human health. Researchers typically use data from long-term animal bioassays (Wildavsky and Levenson 1995). EPA generally chooses a uniform, or default set of assumptions from these studies, which are then applied to each substance assessed (NRC 1983; Paustenbach 1989). Risk assessors use these judgments as the default toxicity weightings for chemicals they are studying (Graham and Wiener 1995).

The second step in risk assessment, the dose-response function, is a way to estimate the relationship between exposure to a harmful substance and health effects it can have (NRC 1983). Because data on the human health effects due to exposure are in short supply, largely because experimenting on humans is unethical, dose response assessment typically requires researchers to employ sophisticated mathematical techniques to extrapolate health effects observed in rodents give relatively high doses to effects which could be observed in humans exposed at low doses (Wildavsky and Levenson 1995). Such techniques rely on what are called low-dose extrapolation models (Kammen and Hassenzahl 1999). Of the four risk assessment steps, dose response
assessment may contain the most uncertainty because of the difficulty knowing whether
the effects observed in animals administered high doses can be extrapolated to accurately
reflect what people encounter in their everyday environment (Graham and Weiner 1995).
In attempts to be extra-conservative when it comes to carcinogenesis, EPA recommends
that a “linearized multistage” (LMS) model be used, meaning that scientists assumed that
more dosage of a substance will lead to increased incidence of cancer and that there is no
threshold level (i.e., all non-zero doses have some positive effect) (Paustenbach 1989).
In the end, the methods employed in low dose extrapolation must use complicated
statistical models and not biological information, suggesting that the dose-response
function is more a statistical measurement than a real estimator of disease (Ozonoff and
Boden 1987).

Exposure assessment is the third stage of a risk assessment. At this stage, analysts
attempt to identify how much of a population will receive some exposure to a substance
(Paustenbach 1989). Exposure assessment methods can vary greatly, depending on the
type of pollution source. For example, the exposure assessment for dispersion of air
pollution bears little resemblance to the exposure assessment for the dispersion of
pollutants from a landfill (Kammen and Hassenzahl 1999). Relevant data for exposure
assessment consist of information that is usually well known or readily knowable – the
concentration of a chemical at a pollution source, the nature of migration from the source
and the location of the surrounding people (Wilson and Crouch 1987). The difficulties
arise in choosing a concentration to model (i.e., daily, monthly, yearly averages) key fate
and transport assumptions (i.e., meteorological data) and which receptors to include (i.e.,
what distance from source, sensitive populations, treat all people the same) (Graham and Weiner 1995).

Risk characterization is the fourth and final stage of a traditional quantitative risk assessment. Multiplying the harm from incremental doses (the number derived from the dose-response assessment) by the dose a population is expected to receive (the number derived from the exposure assessment) generates the risk characterization (Kammen and Hassenzahl 1999). The resulting number is supposed to represent the threat to a population from the concentration of a chemical that might reach them (Douglas and Wildavsky 1982). However, the risk characterization merely consists of a “stacking” of all the uncertainties of the exposure assessment with all the uncertainties of the dose-response function (Ozonoff and Boden 1987). This process can mask the uncertainties in the previous steps, thereby inaccurately portraying the potential severity of the risk.

By emphasizing the scientific objectivity of the procedure, risk assessment tries to offer policy makers a means to persuade the public that regulatory decisions are based on rational analysis (Jasanoff 1990). One intention of risk assessment is to enhance public confidence in the impartiality of regulatory agency decisions (Finkel and Golding 1994). While the models and default assumptions used for site-specific risk assessments are intended to protect public health, many scientists and risk assessment professionals state that the subjective judgments inherent in risk assessment make the process more art than science and its weaknesses ‘an open secret’ (Lash 1994). In fact, William Ruckelshaus, a former EPA Administrator, once described risk assessment data as “like the captured spy: If you torture it long enough it will tell you anything you want to know” (Ruckelshaus 1984: 158).
Environmental justice activists have offered some specific challenges to the risk assessment process. First, they claim that the process focuses on individual contaminants from one source – with an overwhelming emphasis on carcinogenisis – while ignoring the multiple hazards that usually face low-income populations and communities of color (Austin and Schill 1994; Kuehn 1996). Second, activists claim that the institutionalized risk discourse, which require descriptions of hazards to be made in quantitative terms in the categories of the four-stage assessment process, has systematically excluded lay knowledge and observations from the assessment and decision-making process. The process has ignored lay judgments by creating hard boundaries between what counts as scientific expertise and what is relegated to merely political values (Bryant 1995; Collin and Collin 1998; Di Chiro 1998).

3.c. Community Challenges to Risk Assessment: Procedural and Distributive Justice

Quantitative risk assessments rarely distinguish inter-individual variability in susceptibility to disease. The default assumption generally employed in risk assessment is that humans on average have the same susceptibility as persons in epidemiological studies or as the most sensitive of the animal species tested (EPA 1986). However, Zahm et al (1994) report that in a survey of occupational cancer epidemiological studies, only two percent of the studies had any analysis of the effects on nonwhite women and only seven percent addressed the effects on nonwhite men. King (1996) notes the persistent under-representation of non-whites in epidemiological studies, clinical trials and medical textbooks. The EPA default “reference man” for developing dose-response predictions has been described as “a seventy-kilogram man with the general biology of a Caucasian” (Kuehn 1996). While EPA acknowledged in its 1992 Environmental Equity Report that
health risks differ according to race and class, the agency continues to rely on the default
dose-response assumptions that all humans are equally exposed and susceptible for risk
assessment purposes (EPA 1992). The present practice of excluding information
regarding the hazards faced by more susceptible ethnic and racial sub-populations results
in an assessment that fails to reflect higher environmental risks to those groups.

A second challenge states that traditional risk assessment fails to account for how
discrimination might influence health. Epidemiologists have been studying how being
treated as a second class citizen, based on economic status, ethnicity, gender, disability
and age, influences health for over a century and a half (Krieger and Fee 1996; Porter
1999). However, new areas of epidemiology such as “ecosocial theory” take the notion
of “embodiment” literally and highlight how we literally incorporate biologically – from
conception to death – our social experiences and express this embodiment in population
patterns of health, disease, and well being (Krieger 1999; Link et al 1998). This theory
explicitly recognizes the social, economic and political judgments that help produce
population distributions of health, including: (a) societal arrangements of power and
property and contingent patterns of production and consumption, and (b) constraints and
possibilities of our biology, as shaped by our species’ evolutionary history, our ecologic
context, and individual trajectories of biological and social development (Krieger 1999).
Together these factors structure inequalities in exposure and susceptibility to – and
potentially options for resisting – pathogenic insults and processes across populations.

A third critique suggests that risk assessment’s almost exclusive focus on cancer
ignores important non-cancer health effects, such as respiratory, neurologic, reproductive
and psychologic disorders (Kuehn 1996). Over-reliance on cancer leaves many other
serious diseases and human health problems unaddressed – many of which appear to increasingly fall on low-income communities and people of color (Northridge and Shepard 1997; Geronimous 2000). Even when cancer acts as the primary focus for risk assessment, environmental justice criticisms note that assessments only identify single exposures from a single source. Cumulative exposures, where individuals are exposed to numerous chemicals through different media and/or sources, are rarely if ever part of a risk assessment (NRC 1996).

One reason cumulative risk is not considered in traditional risk assessment is that the exposures individuals are experiencing before the addition of a new exposure – referred to as the “background exposure” condition – are rarely known. The importance of this information becomes apparent when questions of chemical additivity and synergism are considered. Chemical additivity occurs when chemicals or pollutants mix and result in an exact combination of all their individual effects (i.e., a chemical with a toxicity of two plus another chemical with a toxicity of two might result in a mixture with a toxicity of four). Synergism occurs when chemicals combine for a greater additive effect (i.e., toxicity of two plus toxicity of two combine and results in a toxicity of ten). Conversely, antagonism of chemicals can occur where the combined result is a diminished toxicity. Yet, since toxicology has not developed an accepted method for determining these effects they are ignored in traditional risk assessment (Kammen and Hassenzahl 1999).

Since people of color and low-income communities face greater exposures to environmental contaminants, the failure of risk assessment to account for multiple and cumulative exposures may be impacting these subpopulations greatest. The 1992 EPA
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report on *Environmental Equity* and the 1999 Institute of Medicine report, *Toward Environmental Justice*, both state that racial minority and low-income populations have greater than average observed and potential exposures to pollutants because of where they live, where they work and what they consume (EPA 1992; IOM 1999). The higher exposures experienced by these communities mean that risk assessment’s failure to take account of cumulative and multiple exposures and its failure to aggregate risks based on race, ethnicity and class, result in risk characterizations that are less accurate for low-income populations and people of color.

Finally, communities criticize risk assessment because it tends to rely on quantitative data over the experiences of those living with persistent pollution (Collin and Collin 1998; Di Chiro 1998). Quantitative analysis often leads to what Tribe called the “dwarfing of soft variables:” the fact that information that cannot be quantified is not considered and conclusions are biased toward considerations that the quantification process can incorporate (Tribe 1972). Environmental justice advocates are often more concerned with asking who are the persons at risk rather than, for example, whether one-in-a-million is an acceptable level of risk (Bryant 1995; Di Chiro 1998; Bullard and Johnson 2000;). While risk implies that the chance of the harm in question is accepted willingly in the expectation of gain, many environmental justice activists are concerned about whether they will actually receive any of the gains (Northridge and Shepard 1997). By engaging in debates over risk calculations, the discourse of environmental policy is shifted from talk of hazards and dangers to the notion of ‘risk’ implying that that the chance of harm in question is accepted willingly in the expectation of gain (Winner 1986). O’Brien (2000) suggests that before risk is selected as a focus in any area of
policy discussion, other available ways of defining the question should be thoroughly investigated, since one’s initial definition of the problem shapes who is empowered to dictate the conversation and who will be excluded, deemed inarticulate, irrelevant or incompetent. Lois Gibbs characterizes risk assessment as describing the “risks that someone else has chosen for you to take” (Gibbs 1994:329).

Despite these critiques, risk assessment continues to drive environmental health decision-making and demarcate who is “expert” to make judgments over potentially hazardous situations. For example, Chief Justice Stephen Breyer has called for bureaucratically rational risk assessment to be insulated from politics and the public in a federal “superagency” assigned all risk assessment duties (Breyer 1993). However, the EPA, the Science Advisory Board, the National Research Council and the Presidential Commission on Risk Assessment and Management have all rejected Breyer’s suggestion, and instead recommend meaningful public input in all stages of hazard assessments (SAB 1999; PCRARM 1997). According to the 1996 NRC report, *Understanding Risk: Informing Decisions in a Democratic Society*, a new assessment process should include constant public feedback, so that initial problem frames can be revisited and redrawn in the light of new information and experiences, and noted the following advantages of public participation in the process:

- Clarifying and potentially advancing resolution of issues of fairness. (When we use the word “fairness” we are referring to both distributional and procedural equity, two issues that have been concerns of the Environmental Justice movement);
- Informing multi-dimensional tradeoffs among efficiency, fairness, environmental sustainability and other concerns;
- Increasing credibility;
- Informing priorities for research. Studies suggest that more data are not necessarily better for organizational decision-making. Deliberation can help
determine the research that is most likely to be key to decision-making (SAB 1999:30).

The SAB also noted that making ever smaller reductions in selected single risks may not necessarily be the best policy either for protecting overall environmental quality or for making the best use of society’s resources (SAB 1999:5). Finally, the EPA’s cumulative risk assessment guidance states that the agency’s goal is to ensure that citizens and other stakeholders have an opportunity to help define the way in which an environmental or public health problem is assessed, to understand how the available data are used in the risk assessment, and to see how the data affect decisions about risk management (EPA 1997). In this context and in response to the challenges raised by environmental justice activists, the EPA initiated its Cumulative Exposure Project in the Greenpoint/Williamsburg neighborhood.

3.d The Cumulative Exposure Project in Greenpoint/Williamsburg

The Cumulative Exposure Project began in 1994 as an EPA study to model exposures to hazardous air pollutants nationwide, a mandate given EPA in the 1990 Clean Air Act (EPA 2000; Caldwell et al 1998; Talcott 1999). The air toxics assessment was intended to help states identify and prioritize those air toxics that might present the greatest potential health risks and those with the highest concentrations for regulatory purposes. Building on prior work at EPA on integrated risk assessments, the CEP was aimed at moving beyond the source-by-source approach to human health risk assessment by recognizing that populations are simultaneously exposed to multiple environmental pollutants from multiple sources (Woodruff et al 1998). It attempts this in two ways: first, by summing up the combination of chemicals in a community’s environment and
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second, by translating this information into a cumulative risk profile (EPA 2001). The Cumulative Exposure Project (CEP) sought to combine the air toxic exposure modeling with multiple pollutant exposures from other media, such as water and food, in order to identify communities or demographic groups most at risk (EPA 2001).

Cumulative assessments are intended to differ from the single-source risk assessment approach on a number of fronts (Table 1). EPA's Guidance on Cumulative Risk Assessment (EPA 1997:ii) states:

The practice of risk assessment within the Environmental Protection Agency is evolving away from a focus on the potential of a single pollutant in one environmental medium for causing cancer toward integrated assessments involving suites of pollutants in several media that may cause a variety of adverse effects on humans, plants, animals, or even effects on ecological systems and their processes and functions.

Cumulative assessments consider multiple pathways, sources and endpoints, while conventional risk assessments only consider a single pathway, source and endpoint (EPA 1997; CEQ 1996). For example, exposure assessment focuses on populations not individuals and aggregates by population subgroups, such as those highly exposed and highly sensitive. Highly exposed populations are further aggregated by specific geographic area (i.e., neighborhoods), age, gender, race, ethnicity and economic status while highly sensitive populations are aggregated by such categories as those with pre-existing conditions (i.e., asthmatics), age (i.e., infants) and gender (i.e., pregnant women) (CEQ 1996). Cumulative assessments also focus on multiple pathways, such as ingestion, inhalation and dermal contact, while also looking for potential routes of community exposure, such as direct or indirect contact, bioaccumulation, biomagnification and vector transfers (i.e., mosquito bites) (EPA 1997). Since the focus is on exposures, multiple human health endpoints – carcinogenic, neurotoxicologic,
reproductive, developmental, immunologic, renal, hepatic etc. – are considered (CEQ 1996). While conventional risk assessment models a linear acute dose of a toxin, cumulative exposure assessment considers the different frequencies, durations and intensities of exposures, such as chronic low doses where there might not be any observable adverse effect (EPA 1997; CEQ 1996). Finally, the EPA claims that cumulative assessments shift the process from the conventional “one-size-fits-all” centralized model of decision-making to a case-specific, community based decision-making model (EPA 1997).

<table>
<thead>
<tr>
<th>Table 3.1: Risk Assessment vs. Cumulative Exposure Assessment</th>
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<tr>
<td><strong>Traditional Risk Assessment</strong></td>
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<tr>
<td>Single exposure pathway</td>
</tr>
<tr>
<td>Single source</td>
</tr>
<tr>
<td>Single endpoint (Carcinogenesis)</td>
</tr>
<tr>
<td>One linear dose (mostly high acute)</td>
</tr>
<tr>
<td>Modeling (dependent on rodent studies)</td>
</tr>
<tr>
<td>Maximally Exposed Individual</td>
</tr>
<tr>
<td>Probability outcome – point or Monte Carlo</td>
</tr>
<tr>
<td>One-size-fits-all, single stressor</td>
</tr>
<tr>
<td>Expert-dominated, centralized assessment</td>
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Source:

The CEP uses existing data and methods to evaluate the exposures through three different pathways – air, food, and drinking water. The food component of the Cumulative Exposure Project aimed to estimate exposures to 37 contaminants in 34 different foods (EPA 2001). The original proposal by the EPA was to analyze food exposure levels across the entire community population and then aggregate the analysis by age subgroups (EPA 1999a). Contaminants of concern consistent of pesticide residues and common industrial pollutants found in produce, meats and dairy products. The
analysis was to combine data on contaminant concentrations in specific foods with data on patterns of consumption, mostly derived from default values estimated for a typical urban diet (EPA 1999a). The aim was to generate a set of estimates of average daily contaminant exposures summed across different types of food (Talcott 1999). To evaluate the significance of these estimated exposures, the estimates are compared to toxicity values for each contaminant. According to the EPA CEP guidance documents (EPA 1999a) the analytic methodology used to estimate the average toxic exposures from food involves four separate steps:

1) Creating a food contaminant data base by obtaining and compiling measured contaminant data;
2) Creating a food consumption data base that provides information on consumption patterns by population subgroup;
3) Combining contaminant and consumption information to estimate exposures from individual food types; and
4) Estimating total dietary exposures by summing across all food types (EPA 2001).

The EPA methodology called for calculations of exposures for each food identified as common to the population and these estimates would then be summed across different food types and for each contaminant (EPA 1999a).

3.e. Local Contributions to the Dietary Exposure Assessment

While developing the methodology for and gathering data on neighborhood exposures, the EPA relied on its own experts, consultants and the NYC DEP for some neighborhood environmental monitoring data. The EPA had no definitive plan for public participation while conducting the CEP in G/W (Hanhardt 2000). However, at the request of the then-DEP director, Eva Hanhardt, EPA scheduled a series of community meetings to inform the community about the CEP and to ensure the agency was capturing
as many potentially hazardous environmental exposures as possible (Talcott 1999).

Hanhardt was already working with many of the community organizations in G/W on the BAEL project and sensed that the EPA project would be entirely rejected if the agency did not consult with residents (Hanhardt 2000).

During the first community meeting, the agency heard from residents that the existing data were a good first step but, according to Samara Swanston, Director of the Watchperson Project, insufficient to characterize the multiple hazards in the neighborhood (Swanston 2000). In particular, residents noted that EPA’s approach to assessing dietary risks was based on a series of default “urban diet” assumptions, which lacked any specific information about the potential hazards from eating locally caught fish (Swanston 2000). According to Deborah Masters, who was coordinating the Watchperson Project in 1996:

When we heard they were going to assess dietary risks using some default diet, we all just rolled our eyes. You’ve got Hasidic Jews here eating only kosher; Poles eating an Eastern European diet; Puerto Ricans, Dominicans and Guyanese. I mean it is like the UN of food over here. You’re gonna tell this community we’ve got an “average American” diet?

For many residents, the EPA assumption of an “urban default diet” represented a lack of sensitivity to local culture and further stirred mistrust. According to Swanston (2000) of the Watchperson Project:

At the meeting we finally got EPA to let us review their research protocol. The thing that jumped out to us was the culturally insensitive language, like not recognizing that people of color do not have choices about where they could live. The language was also insensitive to cultural tradition and it sounded like they were blaming us for fishing from the river. The use of default assumptions really raised skepticism that the project was going to do anything more than just rubber-stamp what community members already knew; that we are a highly exposed community. A little thing like the wrong assumptions about what people eat had
most people associate the EPA project with another wasted effort by government on a study that was going to sit on a shelf somewhere and not help anyone.

According to Talcott of the EPA, the agency knew of the local ethnic diversity, but was unsure how this might influence their assessment of dietary risks: “In the absence of information on the eating habits of these ethnic groups, we chose to use the default assumptions. We didn’t anticipate that this would raise such a red-flag with the community” (Talcott 1999).

Residents suggested during the meeting that a large number of local people were living off a diet of fish caught from the East River. This was the first time EPA had heard of this potential health hazard. According to one EPA official:

> When the residents raised the concern about people fishing out the East River we initially responded by saying, ‘we understand recreational fishing can pose a health risk, but we do not think the practice of eating fish is that widespread.’ But, the residents insisted that this was not a recreational activity; many families were eating fish from river as a staple of their diet. To be honest, we were in disbelief and shocked. 38

While the EPA was skeptical of the community’s concerns, in part because residents only had anecdotal evidence about the extent of local subsistence fish diets, the agency also knew that if the claims were true they presented a potentially serious toxic exposure for local people.

3.f. Hazards from Urban Fish Diets

Of all the risks facing the poor and people of color, the health hazards from eating toxic fish may be the least understood and given the least attention (IOM 1999). The EPA and Institute of Medicine have both recognized that subsistence fish diets represent a real and potentially significant source of contamination for the urban poor, immigrants,

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38 EPA official interviewed on condition of anonymity
and people of color (EPA 1992; IOM 1999). However, understanding the potential health risks from subsistence fish diets of urban populations has proved difficult, since researchers rarely gather these data or monitor the dietary practices of urban populations (West et al 1995). These data are also difficult to gather. For example, a study of New York City anglers found that anglers are reluctant to participate in studies because they are immigrants, are not comfortable having their traditional practices studied, and are non-English speaking (Burger et al 1993). Researchers have recognized, however, that food, and fish in particular, are integral to the cultural identity and even the survival of some urban populations (EPA 1999b).

The EPA has recognized that socio-cultural considerations are important when assessing fish consumption, especially for new immigrants since food habits are some of the most resistant to change (EPA 1999b). Food habits often act to maintain cultural identity, particularly for those groups for whom the consumption of fish is a long-standing tradition. The EPA report notes:

Fish, as an important cultural resource, may contribute to community well-being and cohesiveness...may hold a prominent place in religious and cultural rituals...[and] often involves the intergenerational transfer of knowledge and may contribute to sharing and social bonding within family and community. For some, the consumption of self-caught fish is an important means of augmenting family food supplies; it has important economic impacts (EPA 1999b:5-1).

Other researchers have noted that fish foods among immigrants serve as a link to the past, ease the shock of entering a new culture, and provide a means to maintain ethnic identity (Story and Harris 1989). When strong cultural ties are linked to fish diets, it may be difficult for these populations to conceive of these foods as hazardous, particularly if immediate negative health effects are not perceived to occur (EPA 1999b: 5-2).
The most common contaminants found in fish include chlordane, chlorpyrifos, polychlorinated biphenols (PCBs), DDT, methyl mercury (MeHg) and other pesticides and industrial chemicals discharged in surface waters from non-point sources (EPA 1999b).\(^{39}\) Heavy metals commonly found in fish, such as cadmium and lead, have been linked to immunosuppression, which is suspected of causing decreased resistance to infections. Schantz et al. (2001) notes that impairments of memory and learning can occur from consuming fish contaminated with PCBs. The EPA warns that intake of PCBs from fish have been associated with liver disease, diabetes, compromised immune function, thyroid effects, and increases cancer risks, particularly non-Hodgkins lymphoma. Methyl mercury, a neurotoxin, has proven to present a risk for brain and nervous system damage, especially to children and unborn babies of mothers who eat mercury contaminated fish during pregnancy. EPA recommends that women who are pregnant or may become pregnant, nursing mothers, and young children limit their consumption of fish caught by family and friends to one meal per week. The PCBs and mercury are particularly dangerous to subsistence anglers because the concentrations of these toxins tend to build up or bioaccumulate in fish and human fatty tissue, and they do not degrade or disappear like some other persistent organic pollutants (EPA 1999b).

### 3.g. The Knowledge of Anglers Contributing to Professional Knowledge

The EPA faced a dilemma with regard to the neighborhood anglers. First, they knew eating locally caught fish presented a potential toxic exposure, but they had no data regarding this exposure. Secondly, the agency also sensed that EPA researchers working alone would likely be unsuccessful trying to gather information on these practices. The

\(^{39}\) This brief discussion comes from the National Forum on Contaminants in Fish, May 6-9 2001. http://www.epa.gov/ost/fish/forum/fishforum.pdf
Watchperson Project offered the agency a way around this dilemma and volunteered to interview local anglers and collect data that could potentially be used in the exposure assessment. The community group emphasized to EPA that since many of the anglers were immigrants and non-English speakers, the locals would be reluctant to speak with outside researchers (Swanston 2000). According to Swanston of the Watchperson Project:

After we took the EPA people on a trip to the piers, it was clear to them that there were a lot of locals eating fish from the river. They also saw that almost none of the fisherman were speaking English or even looked like most of the EPA people. If they wanted information about who was eating fish, I think it was obvious to them that community people – African-Americans, Spanish and Polish speakers – were going to have to collect the data. The fishermen were not going to talk to some government officials. Not around here.

The tour of the community was a significant event for convincing EPA about the seriousness of the problem and whose claims should and can be trusted and who was credible to gather additional information. Community-lead tours, often called “toxic tours,” are rituals of learning. Forester (1999) notes that these rituals are performances that enable learning, by both locals and outsiders:

We can think of participatory rituals as encounters that enable participants to develop more familiar relationships or to learn more about one another before solving the problems they face – for example, the informal drink before negotiations; the meals during focused workshops;…Participatory rituals are encounters in which “meeting those people” comes first, even if it serves the secondary objective of “solving our problem.” On such occasions we discover that we learn about our problems through, and as we learn about, other participants too (Forester 1999:131-2).

Thus, part of local knowledge is not just about providing information, but involves professional’s participation in rituals that allow residents to gather local data.
Chapter 3 – Risk Assessment, Community Knowledge and Subsistence Anglers

After considering whether to ignore the subsistence fishing exposures altogether or have community members gather this information, EPA agreed to help The Watchperson Project collect information about the practices of local anglers. According to Talcott of the EPA:

After the tour and learning from residents that they were eating fish from the East River, we had no choice but to let the community groups gather the data. For a number of reasons, including language, cultural barriers and potential trust issues, we felt the local people could best gather this data. This was one situation where residents raised an issue we hadn’t considered, defined the extent of the problem, and provided the data for analysis.

The Watchperson Project developed a protocol to interview anglers to identify approximately how many people were eating fish out of the river, the amounts and frequency of fish consumption and the types of fish anglers and their families were eating (Swanston 2000). With the help of EPA survey instruments used to capture similar information in other communities, the Watchperson Project tailored a survey for the local population (EPA 1993; 1994; 1999a). According to Swanston (2000) of the Watchperson Project:

The EPA and their consultants gave us lots of ideas and sample surveys and these were useful for asking some questions. But, at the end of the day, we had a good sense of what to ask and how to ask it. A lot of the language of the questionnaires the EPA people gave us had no sensitivity to Black or Latino culture. They gave us surveys from the Midwest or Alaska, or ones for Native Americans. Most of the language and questions were either Euro-centric or not really relevant for people in this community.

The community group spent ten weeks interviewing anglers at the India Street and the North Seventh Street/ Kent Street Piers along the East River. Community members volunteering with the Watchperson Project visited the piers twice a day for two weeks during August and September and observed and interviewed over 200 anglers. Each
angler was asked about their age, race, country of origin, and the number and age of people in their family. The species of fish and the number they regularly caught was also reviewed. Since the interviewing was conducted during the summer, each interview included questions about seasonal variability and frequency of catches in different seasons. Finally, each angler was asked about her or his fish consumption patterns and those of their family, including the species, quantities, and preparation techniques of the fish they ate (Swanston 2000; EPA 1999a).

**Some Angler Stories**

Along with administering and collecting survey data, the Watchperson Project interviewed anglers to get a better sense why they might be eating fish from the river and whether they thought there was a health risk from eating the fish for themselves or their families. The interviews provided the stories or narratives behind the anglers’ practices. While the Watchperson Project did not systematically record the interviews, they informally recounted what they heard from anglers for EPA when they presented their survey findings.

Javy and Ricardo, a Puerto Rican and Dominican in their “late forties,” spoke about why they fished from the river and whether they thought there was a potential health problem. Their account was typical of most anglers in the G/W community.

Javy: My Dad used to take me fishing in Fajardo [a coastal area in Puerto Rico] and those were the best times of my youth. I mean doing a family-type thing; how could that be unsafe, right?

Ricardo: The cops don’t bother us down here and fishin’ keeps me outta trouble. I mean don’t got no body breathin’ down your neck out here.

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40 The following accounts come from the author’s interviews with anglers, most of whom were interviewed by the Watchperson Project during the survey project. Since the interviews conducted during the Watchperson Project survey were not recorded, I chose to interview anglers to re-capture these stories for this analysis.

41 These anglers requested that I not use their last names. Interviewed October 14, 2000.
J: Yeah, *mira*, at home [Dominican Republic] eating fish was for survival. Really, it ain’t much different for us here. I got to feed myself and three kids and every fish I catch is one less thing we got to buy at the *mercado*.

R: The fish we catch are fresher, you know, than anywhere else. I know the government people put up signs once in a while to say stop fishing or something. I’m not really sure what the signs say and within a few days some homeless guy’s tore it down for firewood anyway.

J: We ain’t stupid, we know this river isn’t the cleanest. It is probably polluted. I mean I wouldn’t swim in here or nothin’. But this cove over here, it’s pretty clean. There ain’t no dead fish. Its not so bad. And, the fish we catch come in from the Atlantic, they don’t feed in here. So, they don’t got no chemicals in them. I mean we don’t know anyone whose gotten sick from eating what we catch here.

R: We’ve been out here a long time. I was taught how to recognize a bad one [fish]; you look for lesions, make sure it is the right color and if it smells funny, we throw it back. You can smell the bad ones usually.

J: Yeah, you know we clean and cook ‘em real good too. That is the best way to make them safe. If I thought there was a problem, I wouldn’t be feeding these fish to my kids a few times a week. My family depends on me for food. My neighbors even buy my catch sometimes. They trust me. I know a clean catch.

Stories like these suggested to the Watchperson Project and EPA that many anglers were eating fish from the East River because it was part of their cultural tradition and a way to survive. They also imply that anglers have a sense that some fish might be contaminated ("the river isn’t the cleanest"), but that somehow the fish they are catching and eating are safe ("this cove is clean;" "the fish we catch come in from the Atlantic"). The anglers also told interviewers that they would know when a fish was contaminated through visual inspections or smell ("I was taught to recognize bad ones;" "it is the right color" "you can smell the bad ones"). Finally, subsistence anglers typically believed that the fish they were feeding their families with was safe because of the way they cooked and cleaned the fish. Interviews like these were important. They provided the narratives or stories that helped make sense of and provide contextual meanings to the survey data.
3.h. Angler Survey Findings: Community Knowledge’s Contribution

The community-gathered information was divided by age and ethnicity, and separate categories were created for whites, Poles, African-Americans and Latinos (EPA 1999a). Almost all the anglers interviewed were Latino or African-American, although some were Caucasian (primarily Slavic). Of the Latinos, most had origins in Puerto Rico, the Dominican Republic or Ecuador (Swanston 2000). The Watchperson Project also found that almost all the anglers were male between the ages of 16 and 60 years old. The family size of each angler ranged from three to 10 persons, and all anglers interviewed noted that at least one family member was under the age of 19 (EPA 1999a). The Watchperson Project survey determined that local anglers were catching between 40 and 75 fish per week, averaging 57 fish per week, and that each family member of an angler was eating approximately 9.5 fish per week (EPA 1999a).

During the survey, each angler was asked to identify the four species they most frequently caught and consumed. All the anglers interviewed listed the same four species: blue crab, American eel, blue fish and striped bass (EPA 1999a). Most anglers reported that they ate whatever they caught. One of the challenges for the interviewers was that anglers might not have been identifying the fish they caught and ate accurately (Swanston 2000). Therefore, the interviewers also collected fish samples to confirm species identification.

During the Watchperson Project’s surveying and interviewing, EPA analysts met with the community group several times to determine whether subsistence fishing really constituted the potential risk residents made it out to be (Swanston 2000). The EPA emphasized that the meetings were to help the group organize its findings in a useable
way. The EPA did not, however, interfere with the data collection; this was left entirely
to the community group. The interviewers’ stories played a role in convincing the EPA
about the prevalence of local subsistence anglers and the potential severity of the risks
facing hundreds of residents. According to one EPA analyst:

We were never quite sure the community survey was going to be helpful or that
eating local fish was really that big of an issue. But then we started to hear how
many people the community group was talking to, their ethnicity and the sheer
amount of fish they were catching. The preliminary accounts were compelling
and surprising to many of us. We started to believe this was a potentially serious
issue in the community. That’s when we realized that good data on the anglers
would be important to complete the exposure assessment.

After compiling the data they collected, the Watchperson Project met with EPA
analysts to present the information. According to Swanston of the Watchperson Project,
by the time of the meeting, the EPA officials seemed convinced that toxic exposures from
local subsistence fish diets presented a serious problem: “It wasn’t like they needed
convincing anymore. Now it was whether the data we collected was ‘good enough’ for
them” (Swanston 2000). The EPA found the community data useable enough to
generate a fish consumption rate for G/W residents in grams per day. The community
survey data was found to be consistent with fish consumption rates from other urban
areas where residents relied on subsistence diets of locally caught fish (Burger et al 1993;
EPA 1999a; EPA 1999b).

The agency also gathered toxicological information on the fish species from New
York State Department of Environmental Conservation studies, which estimated
contaminant concentrations in East River fish (NYS DEC 1996). The EPA took fish
samples from the East River and performed their own toxicological tests. Finally,
contamination levels were estimated based on previous DEC measurements (NYS DEC
Recognizing the fallibility of local knowledge, the EPA used these procedures to check the claims coming from residents. Thus, local knowledge altered the questions EPA professionals were asking and forced them to ask new questions about the data that were previously ignored.

Combining the local and professional data, EPA determined that the contaminants of concern in the locally caught fish included cadmium, mercury, chlordane, DDT, dieldrin, dioxins, PCBs, arsenic and lead (EPA 1999a). However, arsenic was removed from the analysis since, according to EPA, “much of the arsenic in edible fish is present as arsenic-containing organic compounds...and these organic forms of arsenic are generally not considered a threat to human health” (EPA 1999a). And, since lead exposures were slated to be analyzed in a separate, multi-media study under the CEP, lead was also removed from the fish contaminant analysis (EPA 1999a).

Resident exposures were then calculated based on fish tissue contaminant concentrations found in the fish samples and based on the observed and calculated consumption rates. High and low-end consumption rates for both adults and children were calculated in order to develop a range of exposure estimates (EPA 1999a). Combining the survey data with previous EPA studies, the agency derived exposure estimates for G/W anglers and their families. The calculations found that exposure to toxic contaminants for local anglers and their families exceeded EPA’s Oral Reference Doses (RfD) (which generally serve as benchmark levels for non-cancer health effects) for all contaminants except cadmium at both low and high-end consumption estimates (EPA 1999a). Exposures to dioxins were particularly high. For example, the EPA reference dose for Dioxin is \(1 \times 10^{-9}\) (mg/kg/day) while the estimated exposure level for
the average high-end adult eating locally caught fish in G/W is $8.2 \times 10^{-8}$ (mg/kg/day) and for the average high-end child fish consumer $1.5 \times 10^{-7}$ (mg/kg/day) (EPA 1999a).

As part of the CEP, EPA decided to generate a life-time cancer risk for local subsistence anglers. The life-time cancer risk for adult subsistence anglers in G/W exceeded one in 10,000 ($1 \times 10^{-4}$) for every exposure scenario. For subsistence anglers at the high-end consumption rate, the estimated individual lifetime cancer risk across all contaminants ranged from $8.7 \times 10^{-2}$ for the single species maximum contaminant concentration to $5.8 \times 10^{-3}$ for the minimum contaminant concentration. Using the cross-species average contaminant concentration, the estimated individual lifetime cancer risk for the high-end fish consumer was $4.2 \times 10^{-2}$ and $6.0 \times 10^{-3}$ for the low-end fish consumer (EPA 1999a).

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<thead>
<tr>
<th>Table 3.2</th>
<th>Greenpoint/Williamsburg Angler Health Risks</th>
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<tr>
<td>Individual lifetime cancer risk</td>
<td>Low end consumer</td>
</tr>
<tr>
<td>Consumer of a single fish species</td>
<td>$5.8 \times 10^{-3}$</td>
</tr>
<tr>
<td>Consumer of multiple fish species</td>
<td>$6.0 \times 10^{-3}$</td>
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3.i. **Local Knowledge for Local Action**

Without the community-generated information, EPA would likely have ignored this potentially serious health hazard. In their final analysis, EPA arrayed the results of the individual exposure assessments to show the range of contaminant exposures that exceeded health benchmark levels (EPA 1999a). While the results were compelling, the
The community group had already begun to act to prevent these exposures before the EPA analysis was complete.

While the EPA spent over five years completing the CEP in G/W, the Watchperson Project could not wait that long to take precautionary and preventative action. As their survey interview data began to suggest just how many residents were eating fish from the river, the Watchperson Project organized a series of “fish-in” days to educate anglers about potential toxic contamination in the fish they were eating (Waterfront Week 1999). Educational materials, printed in English and Spanish, described possible health risks from eating locally caught fish and suggested such things as cleaning and cooking techniques which might reduce contaminant intake (Swanston 2000). The Watchperson Project partnered on these efforts with the local chapter of the Sierra Club and other community environmental groups including Neighbors Against Garbage and The Friends of the India Street Pier. To try and ensure that the issue of subsistence fishing reached a larger audience, The Watchperson Project, working with the Sierra Club and NBC news filmed a program on the Health Risks from Subsistence Fishing and Swimming in the East River. This television program aired on Labor Day (Swanston 2000). In addition, the Watchperson Project has been working with other groups in the area to identify alternative sources of food for subsistence anglers, such as community gardening.

The community group not only significantly altered and improved the EPA exposure assessment to take account of a hazard that would have been ignored, the effort has also influenced EPA actions elsewhere. The community data, the accounts from local anglers, and the exposure assessment results, have become a central piece of the
EPA’s and NYS DEC’s Hudson River Estuary Plan (EPA 1999a). The efforts have also changed the State DEC’s approach to issuing and communicating fish advisories in the neighborhood and other communities along the Hudson River estuary. The work of the Watchperson Project has helped the State begin to develop a culturally-sensitive fish advisory program.

The community group’s interviews of local subsistence anglers revealed that the reasons they ate fish from the local river were complex; a combination of poverty, cultural tradition, and dietary habits all contributed to most anglers accounts of why they ate potentially dangerous fish. Swanston understood that conventional fish advisories, which were already in existence before the EPA assessment, were not going to work in low-income ethnic urban neighborhoods such as G/W:

Telling anglers to just stop eating these fish, while maybe the safest thing, just isn’t a reality for many of them. For some families the fish are their primary source of protein. Lots of fisherman were immigrants from the Caribbean and, being from the island of Nevis myself, I know fishing means more than just a meal. It is part of our identity. We’ve been working with the DEC to get them to integrate these understandings into their fish advisory programs.

Changes in the EPA assessment and the DEC programs would not have occurred without information from local anglers gathered by the community organization.

3.j. The Cognitive Contribution of Community Knowledge

In this case, the resident’s local knowledge successfully influenced (and improved) professional decision-making. First, the community’s involvement in the CEP re-framed the original dietary exposure assessment and pushed the EPA to more closely reflect “lived reality.” While the EPA had intended to rely on national dietary survey information and assumptions about food intake from an “urban default diet,” locals challenged this assumption. What seemed obvious to any community-member or even a
visitor to the neighborhood – that the numerous distinct ethnic groups who lived in G/W made the neighborhood an extra-ordinary community – was missed by the EPA.

Residents convinced EPA that local culture contributed to a new exposure that the agency had not considered. Practice was also changed when the Watchperson Project convinced EPA that local people were capable of gathering appropriate information about anglers. Not only was the knowledge of local people used to reframe the scope of the assessment, but it changed who was qualified to gather information. Local people became “equally expert” in assessing a practice within their own community.

The narratives behind local fishing practices convinced EPA to develop a separate exposure assessment for subsistence anglers. Again, professional practice was influenced by local knowledge. Commonly, in risk assessment an absence of data leads to an assumption of an absence of harm; without any information about a hazard, the potential harm is, by default, ignored. In this case, the locally-gathered data filled an information gap and an absence of data did not lead to an assumption of an absence of harm.

Finally, the results of the exposure assessment continue to influence EPA. The EPA funded a community waterfront clean-up project sponsored by the Watchperson Project. The community group assisted the EPA and DEC in developing culturally sensitive fish advisories for the entire Hudson River Estuary (Swanston 2001). The EPA has used information from the Watchperson Project interviews and survey in a new guidance book aimed at educating local health departments about urban anglers (Swanston 2001).
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Table 3.3 Cognitive Contribution of Community and Angler Knowledge: selected examples

1) Epistemology
   Angler information extended the EPA risk assessment by including hazard data previously overlooked.
   a) Aggregation
      Local knowledge pointed out that EPA’s “urban default diet” was too general a level of aggregation for assessing dietary exposures.
   b) Heterogeneity
      Community members gathered angler data by age and ethnicity enabling the risk assessment to estimate hazards for different sub-populations.
   c) Lifestyle
      EPA considered urban fishing a lifestyle issue, not a source of hazard data, and only changed after community members took agency members on a tour of the neighborhood’s piers.
   d) Tacit Knowledge
      Angler information was from a hard to reach population that was reluctant to cooperate with outsiders because of deportation fears, they did not speak English, and embarrassed by poverty-driven practice.

2) Procedural Democracy
   Community and angler voices that were previously excluded became an integral part of the assessment.

3) Efficiency
   The Watchperson Project performed education campaigns, identified alternative food sources for angler families and advised agencies on developing culturally-sensitive fishing advisories.

4) Distributive Justice
   Community knowledge changed risk assessment from one about estimating acceptable dietary risks, to focusing on which population groups were most at risk.

3.k. What Contributes to the Successful Professional Uptake of Local Knowledge?

The second level of my analysis asked whether the five preconditions might help explain why the local knowledge of citizens sometimes influences professionals and sometimes does not. The Watchperson Project organized concerned residents into a coalition that gathered angler data. Anglers were also organized for the first time, enabling the community group to document their practices. The knowledge local activists gathered consisted of both stories of anglers and statistical survey data. The narratives reflected what residents already knew and the quantitative data allowed EPA to find a way of incorporating local narratives into the exposure assessment. Both types of
information worked to fill gaps and allowed the study to more closely reflect how exposures are experienced by community members. The epistemological contribution is one of “extending science;” the community-sponsored data provided more accurate dietary information than the EPA was able to collect on its own. It produced an assessment of a hazard that would have been missed without local input.

The knowledge of local residents was also influential with professionals because it was linked to the larger environmental justice movement. Activists in G/W characterized the initial CEP research methodology as insensitive to local culture. They claimed it was another example of government ignoring the plight of the poor and people of color, noting how the agency overlooked whether there might be local diets consisting primarily of locally-caught fish. The activists were able to frame the CEP as an environmental justice issue by linking the local project to ongoing debate over cumulative risk assessment and exposure disparities nationwide. The Watchperson Project had gained credibility as an environmental justice organization with the EPA because the group had been involved in the DEP’s earlier environmental benefits program and a DOJ investigation into unfair practices of waste transfer station siting in the neighborhood.

Another factor that contributed to the success of locals was that the Watchperson Project and its director acted as an intermediary, translating local experiences into terms that professional decision-makers could take seriously. The group brought the concerns of residents to EPA and volunteered to organize the angler survey. In particular, Samara Swanston, the group’s Executive Director, was someone able to manage the organizing of local knowledge and its uptake into professional domains. As a lawyer with training in
environmental health, Swanston had legitimacy within both circles. She had been intimately involved in the BAEL project with the DEP. This was where she “cut her teeth” on community cumulative hazard assessments. She had also gained the respect of DEP staff through her involvement with the EBP, while retaining her position as a strong community advocate by organizing a local coalition to stop the siting of waste transfer stations. As a woman of color from the island of Nevis in the Caribbean, she had an intimate knowledge of Caribbean immigrant dietary and fishing practices. All these factors contributed to her legitimacy with residents.

Finally, this effort was successful because the EPA had a relatively low-cost way of responding to the challenges local knowledge presented to their assessment. Adding the angler survey data to the CEP did not require the agency to radically alter its plans or even expend significant resources collecting additional information. Moreover, the changes required low or no political cost since the agency had already announced that it was committed to involving community members in a more meaningful way. Further, the information locals offered was unlikely to assign blame for any hazardous results on a particular industry or firm. The debate would have been more politically charged if locals insisted on documenting discharges of waste into the river by local firms.

In the three cases that follow I will use the results of this episode to better understand why the knowledge of local residents is sometimes influential with environmental professionals and sometimes not.
CHAPTER 4
Tapping Local Knowledge to Understand and Combat Asthma

When we said “health” they would ask us about some medical problem they were having. When they heard we were from El Puente, they would ask where they should send their kids for school next year or where they could get free food to feed their family that evening. We had to know where the food kitchens were, the drug-counselors, church leaders, you know? If we couldn’t answer or at least send them to someone who could, they weren’t going to trust us or talk to us. Before we even got to the questionnaire they wanted us to help them. Knowing how to do a survey about asthma was only part of what we did.

-- Cecilia Iglesias Garden, Coordinator of El Puente’s Community Health Educators, describing their community asthma survey in Williamsburg’s Latino community.

This chapter reviews another instance in which G/W residents organized to investigate a health hazard. El Puente, a community learning and development organization located in Williamsburg’s Southside, conducted a series of community health surveys focusing primarily on asthma. The information they gathered revealed unique information that would have been difficult for outsiders to know. El Puente successfully tapped into the knowledge of the neighborhood’s Southside Latino population to develop an asthma management program. I will argue that although El Puente’s work contributed to the general understanding of asthma and to local health promoting interventions, it was less successful influencing policy-makers. This chapter reviews the epistemological contributions of El Puente’s work, how this knowledge was fused with that of professionals, and why community knowledge failed to be meaningfully considered by policy-makers.

4.a. Professional Health Assessments in Greenpoint/Williamsburg

The first environmental health studies in G/W came out of the community advisory committee meetings of the New York City DEP’s Environmental Benefits Program (EBP). The community advisors to the EBP, which included the Watchperson Project and El Puente, requested that the DEP support a health study in the neighborhood. The representatives asked that the studies look at cancer, lead poisoning, birth defects and
asthma, and in 1992, two studies reviewing available health data were conducted by the City University of New York (CUNY) Medical School in conjunction with the NYC Department of Health.

The health studies came in the wake of a protracted and contentious battle between the City and G/W community groups over the operation of an incinerator in the neighborhood. With the incinerator battle still being waged in court, the study was released. It found few statistically elevated rates of asthma hospitalizations in the neighborhood (Kaminsky et al. 1993). Almost as soon as the health study was released, community activists challenged some of its findings, particularly the fact that the study of asthma hospitalizations only reviewed data from the local hospital, Woodhull Medical Center. According to locals, this was an institution that residents rarely visited for medical treatment. Indeed, residents noted that Woodhull had a “bad reputation” and a study that only relied on asthma hospitalizations from this institution could not accurately characterize what was going on in the neighborhood (Penchaszadeh 1999).

In the same year the DOH/CUNY health studies were released, El Puente started its high school for Peace and Social Justice. The high school curriculum was geared toward learning and action for social change, and community health and environmental justice became one focal point of the high school’s curriculum. Students created an environmental group called the “Toxic Avengers.” Science classes were spent studying a neighborhood facility that stored radioactive waste and the health effects of air pollution. Students helped organize a protest on the Williamsburg Bridge to raise awareness about the proposed incinerator. Students were also following daily readings from a

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42 I will return to the details of the incinerator story in Chapter 6.
meteorological and air quality monitoring station on the roof of their building as part of their science class project.

The students and El Puente were interested in trying to draw a connection between local air pollution and community health, particularly asthma. In the high school it was typical that every student either had asthma or had a family member with the disease (Penchaszadeh 1999). In order to try and make the pollution-health connection, El Puente knew it would need help. They turned to a non-profit group specializing in helping communities perform epidemiological studies, called Community Information and Epidemiological Technologies (CIET) to assist them. El Puente chose CIET because they had worked for two decades performing community health research in Mexico, their staff spoke Spanish and understood Latin culture. Additionally, one of their principle investigators, Robert Ledogar, was based in New York City and was interested in partnering with a Latino community in the US. El Puente and CIET set out to try and explore the relationships between local air pollution and public health and to reveal the weaknesses in the DOH/CUNY health study.

El Puente and CIET received foundation funding to develop a general health survey for high school students to perform among their peers, family members and El Puente members. This survey did not mention the word asthma, but an overwhelming number of responses identified asthma as their number one health concern. El Puente and CIET recognized that if they were going to make any connections between asthma and air pollution, they needed to survey the entire community and have the assistance of more than just students and volunteers.
After El Puente's first survey was complete and while they were planning a follow-up survey, the New York City Childhood Asthma Initiative was launched by the City DOH. The asthma initiative was the result of pressure from physicians and community groups contending that the City had no coordinated program to address what appeared to be a growing asthma epidemic afflicting many of NYC's school children (Claudio et al 1998; O'Neill 1996). The City program was also a response to a New York Daily News investigative report, which revealed that most City public schools lacked nurses trained in treating asthmatic students and the schools had no asthma education program, despite the fact that asthma was the leading cause of school absenteeism (Calderone et al 1998; Carr et al 1992; De Palo 1994). As a public high school, El Puente Academy was eligible for a grant from the Asthma Initiative and the community group used this support to organize a community-wide asthma survey.

In order to explore a community-wide survey investigating asthma rates, El Puente organized a meeting of the Community Alliance For the Environment (CAFE). This coalition consisted of a number of community organizations in G/W and originally came together in the early 1990's to stop the proposed incinerator. The coalition brought together the neighborhood's different cultural and ethnic groups and their representative organizations: The Polish and Slavic Center (PSC) representing these immigrants; United Jewish Organization (UJO) representing Hasidim; and El Puente representing Latinos. When El Puente suggested a community-wide survey, the other groups balked, each for different cultural reasons. The Hasidim were reluctant to talk publicly about health issues and the Poles and Slavs were not comfortable with having strangers interview them in
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their homes. While the CAFE tried to reach agreement on a collaborative asthma project, the meeting collapsed and no agreement was reached.

El Puente chose to forge ahead on its own and developed a community asthma survey targeting the Latino population in Williamsburg’s Southside. Since considerable disagreement persists over the causes of asthma, designing a survey was challenging for El Puente. In the next section I briefly review the debates over asthma in the medical community in order provide some context to the choices El Puente made in their own research.

4.b. The Epidemiology of Asthma

For immunologists, epidemiologists and others in public health, asthma has become a fascinating mystery. At a time when biomedicine claims to have a handle on controlling the spread of infectious disease, chronic diseases like asthma remain unstoppable. Asthma is the most common chronic childhood disease in the developed world, affecting approximately 10 million children in the United States under 16 years of age (Gergen et al 1999). Between 1982 and 1992, the prevalence rate for pediatric asthma (under 18 years of age) in the United States increased by 58%. The mortality rate from asthma for persons 19 years of age and under increased by 78% from 1980 to 1993 (IOM 2000). Although asthma was the 10th most common principal diagnosis in emergency department visits among all patients in 1996, asthma led in emergency department visits for children, excluding accidents (Clark et al 1999; Noble 1999).

Asthma is particularly prevalent in urban and racial/ethnic minority populations (Miller et al 2000; Mott et al 1995). In the United States, the asthma hospitalization and morbidity rates for nonwhites are more than twice those for whites. The activity
limitation rate due to asthma is 30% higher in African Americans than any other group (Eggleston et al 1999). The causes of increased morbidity and the differential risk for urban, racial/ethnic minority populations are not well understood.

New York City has one of the highest rates of asthma in the United States. Rates are especially high among Latino and African-American children, and asthma has become the leading cause of hospital admissions for urban children. A study conducted by Mount Sinai Medical Center examined New York City rates of hospital admission for asthma by ethnicity (Crain et al 1994). Asthma admission rates were found to have increased by 12.7% in 3 years, and mortality has also increased. Asthma hospitalization rates were 7.5 times higher for minorities than for whites. This same study found that the Bronx and Upper Manhattan (Harlem) had the highest asthma admission rates in all of New York City, with East Harlem and Williamsburg, second and third respectively (Calderone et al 1998; Carr et al 1992; Claudio et al 1999).

While debate continues over whether the rise in asthma rates is due to a change in reporting or an increased awareness by patients and physicians, definitions of the disease remain elusive. Asthma remains a particularly difficult disease because its principal causes are difficult to isolate. The Institute of Medicine (IOM) describes asthma as a chronic disease characterized by inflammation of the airways and lungs that causes attacks of wheezing and shortness of breath (IOM 2000). However, no scientific consensus exists over what causes asthma development. Allergens, irritants, environmental tobacco smoke, air pollution and a host of other factors are suspected as acting as "triggers" which increase the severity of the disease, but no one or constellation of these triggers has been identified as the leading causes. So little is known about asthma
that scientists are often uncertain whether asthma is one or a number of different diseases that have a common clinical picture (Clark et al 1999).⁴ Three hypotheses that currently dominate the literature take a biomedical approach to the disease and claims that asthmatics are more atopic than non-asthmatics and allergens are the primary trigger and most likely cause of the disease.⁴⁴ This theory states that the immune system "over-reacts" to certain allergens, producing chemicals such as leukotrienes, which cause inflammation in the airways of the lungs, narrowing of airways and excessive mucus production (Platts-Mills 1999). Cockroach allergens found in household dust, along with dust mites, cats, and pollens (e.g., ragweed and rye grass) are suspected of being the leading allergens which both cause and trigger childhood asthma morbidity and mortality (Gergen & Weiss 1995; Platts-Mills 1999). The proponents of this theory also claim that these particular allergens are more likely to be found in the dirty, dilapidated homes of poor inner-city children, explaining the distribution of the disease among these populations (Platts-Mills 1999). Yet, another take on the cause of asthma from a biomedical viewpoint argues that early childhood exposure to allergens helps prevent the onset of asthma by building immunities, and the parents of poor inner-city children are not exposing them enough to allergens at an early age (Rosenstreich 1997). However, neither explanation suggests why different asthma rates appear among African-Americans and Latino populations in the US (Pearce et al 2000).

⁴ Despite the statistics, some scientists suggest that the increased prevalence is merely reflecting a change in diagnosis. They claim that since more people are aware of asthma symptoms physicians are more likely to report respiratory dysfunction today than even ten or twenty years ago. Yet, there remains no standard asthma diagnosis which might lead to an increase in reporting, except that recently health surveys report asthma only after respondents have been told by a physician that they have the disease.

⁴⁴ Atopy is defined as a tendency to immediate hypersensitivity (allergic) reactions involving certain familial conditions such as hay fever, asthma and atopic dermatitis (Pearce et al 2000).
A second hypothesis, often called the behavioral or lifestyle framework, claims that asthma occurrence is the result of an individual choice about a way of living (Rosenstreich 1997). A leading lifestyle theory for explaining asthma distribution claims that societal excess has led people to not exercise, eat a poor diet of fatty-foods and, because they are inside more often, increased their exposure to harmful allergens such as environmental tobacco smoke and dust mites (Rosenstreich 1997). This hypothesis suggests that the children of America’s worst off groups – such as those in poverty and people of color – are most likely to spend time indoors and the more children stay inside, the higher their exposure to the triggers of asthma, such as indoor allergens, tobacco smoke, gas from open pilot lights and chemicals from cleaning solvents (Platts-Mills 1999).

A third set of hypotheses claim the causes of asthma rests in the “environment” (Eggleston et al 1999). One environmental theory suggests that dirty indoor air, including allergens and environmental tobacco smoke, are the leading cause of asthma. The hypothesis claims that in the homes of the urban poor, common over-crowding contributes to dirt, dust, mold, humidity and mildew, all of which instigate harmful allergens (Gergen et al 1999). Combustion effluents from residential gas stoves, especially oxides of nitrogen (NO2) have been associated with respiratory symptoms and reduced lung function in populations of both healthy and asthmatic children (Quackenboss et al 1991). Yet, another contradictory “environmental” hypothesis states that excessive indoor hygiene is the leading cause of asthma. In this view, modern hygienic practices such as industrial cleaning agents and solvents have eliminated the “useful” microbes and parasites that challenge but ultimately strengthen the human
immune system and ultimately protect one from developing asthma (Carpenter 1999; Shell 2000).

Other explanations that fall under the banner “environment” claim that outdoor air pollution is a leading cause of asthma (Eggleston 1999; Kinney et al 2000). An analysis of the U.S. EPA's nonattainment regions for national ambient air quality standards found that Latinos and African Americans are more likely than whites to live in areas that exceed federal standards for many toxic pollutants such as lead, ozone, carbon monoxide, and particulates (Wernette and Nieves 1992). The disparities that these authors found are significant. For example, the percentage of the population who lives in areas of nonattainment air quality standards for ozone is 52% for whites, 62% for African Americans, and 71% for Latinos. The pattern is similar for a variety of other air pollutants (Wernette and Nieves 1992). This finding is important for children's environmental health, as levels of ambient air pollution such as particulate matter and ozone have been shown to correlate with morbidity from respiratory illness (Choudhury et al 1997). One hypothesis claims that while overall quality of ambient air has improved, an uneven distribution of air pollution persists that may contribute to some of the increased rates of respiratory disease found especially among minority and poor children (IOM 2000). A study by the American Lung Association found that 61% of pediatric asthma cases occur in children who live in areas of nonattainment for air quality standards as defined by the U.S. EPA (ALA 1993). Another study conducted in Canada showed that a low socioeconomic status is an important risk factor for respiratory symptoms suggestive of asthma (Ernst et al 1995). This finding is important because it suggests that differential access to health care is not a significant factor in the increase of
asthma among the poor and minorities, as Canada provides universal access to health care.

Exposure of children to ambient air pollution has been associated with acute respiratory effects. For example, ozone causes airway inflammation and hyperactivity, bronchial epithelial permeability, decrements in pulmonary function, cough, chest tightness, pain on inspiration, and upper respiratory tract irritation (Kinney et al 2000; Rios et al 1993). Epidemiologic studies undertaken in a variety of locations indicate a relationship between outdoor air pollution and adverse respiratory effects in children. The pollutants most frequently implicated in these studies have been respirable particles (notably acidic sulfates) and ozone (Northridge et al 2000).

One apparent paradox is that cleaner air doesn’t necessarily lead to fewer asthma cases. Why is it that in New York City, Chinatown, with much worse air quality than Harlem or the South Bronx, has much less asthma (Carr et al 1992; Claudio et al 1999)? Similarly, at the end of the Cold War the West German city of Munich was prosperous and relatively clean. Leipzig, a poorer East German city that was dependent on dirty-burning coal for fuel and choked with Soviet high-smog industries, had very dirty air. But, asthma rates, according to some German studies, were 50% higher in Munich than they were on Leipzig (Shell 2000). Other similar examples exist; Westernized Hong Kong has more then four times as much asthma as dirty, poor Beijing. Indonesia has little asthma, but New Zealand and Sweden, both with relatively clean air, have an increasing number of cases (Shell 2000).

Clearly, asthma is a disease that remains highly uncertain in the scientific and policy communities. David Satcher, the Surgeon General noted in 1999:
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One of the real issues is, why are we seeing this increase in asthma? And we don’t know the answer to that. Until you understand why you have an increase, and you have documented it, it is very hard to say you have a strategy that is going to make a difference.45

Understanding asthma rates and triggers in the Greenpoint/Williamsburg neighborhood has proved equally challenging for experts.

4.c Professional Analyses of Neighborhood Asthma

The asthma study in G/W performed by the NYC Department of Health (DOH) and the Department of Community Health and Social Medicine at the City University of New York (CUNY) Medical School, was intended to determine the prevalence of neighborhood asthma. The study calculated the percentage of residents in all census tracts in G/W (e.g., Brooklyn Community Board #1) who visited Woodhull Medical Center at least once for asthma between 1987 and 1991 (Kaminsky et al 1992, 1993).

The study revealed that the percentage of the population in any census tract in G/W who visited Woodhull for asthma in the years 1987 to 1992 never exceeded 4.35% (Kaminsky et al 1993:13). The report also notes that the census tracts in G/W with the highest percentage of the population visiting Woodhull for asthma were tracts 487 and 507, each with 89 and 97 percent Latino populations respectively (Kaminsky et al 1993:13, 75). Of the five census tracts with the highest percentage of asthma visits to Woodhull, all were over 75% Latino, with an average Latino population of 86% (Kaminsky et al 1993: 13, 47). The report also notes that these same five census tracts had the lowest median family income of all the tracts in G/W. While the report noted that these findings were not statistically significant and there did not appear to be an asthma problem in the neighborhood, the report did include the caveat that “not all persons with asthma go to

45 Quoted in Stolberg (1999).
Woodhull for treatment” and “while these data provide an accurate picture of where Woodhull asthma patients live, they do not reflect the total number of persons with asthma in Greenpoint/Williamsburg” (Kaminsky et al 1993:18).

For many at El Puente and those in the community who eagerly anticipated the results of this study, the “caveat” of the asthma findings turned out to be more like “a gross inaccuracy.” The study was dismissed from the outset by community members for failing to aggregate results by age, gender and ethnicity and, perhaps most importantly, for only using hospitalization data from a local hospital which “most neighborhood residents rarely if ever visit” (Penchaszadeh 2001). It was common knowledge, at least among longstanding Latinos and Hasidic Jews in the neighborhood, that Woodhull was a hospital to be avoided. According to Igelsias-Garden of El Puente:

For as long as I’ve lived in this community, we’ve [Dominican population] avoided Woodhull. It was just a scary place. I mean we used to joke as kids that if you were bad they were going to send you there. Nobody I know ever goes to Woodhull.

Community health survey findings that El Puente would later publish supported these stories, as the survey found that over three-quarters of Southside Latino residents reported visiting a hospital for asthma outside the community and not at Woodhull. In Kranzler’s (1995: 68) history of Hasidic Williamsburg, he notes that Woodhull was the only center treating “mentally ill Hasidim,” but was avoided by Hasidim for almost all other health problems.

By ignoring this “common knowledge” the DOH study couldn’t offer a portrayal of asthma that reflected local practice. The study seemed to undermine, rather than enhance, neighborhood trust in the agencies and experts that were supposed to protect
them. Wynne (1996:51) has noted that studies intended to placate weary publics often do just the opposite; “institutions which can be seen to be reconstructing history so as to confirm their own blamelessness whilst attempting to manufacture public trust and legitimation are prima facie likely to be undermining public trust rather than enhancing it.” The DOH/CUNY asthma study seemed to further alienate residents from professional decision-makers and contributed to locals taking their own action to understand the disease.

4.d. El Puente’s Community Health Survey Philosophy

None of the expert studies of asthma seems to have a reasonable explanation for why the disease is increasing at alarming rates for poor inner city kids? The epidemiological approach of searching for individual causal factors has obscured research into how, for instance, biology, psychosocial stress, socio-economic status and discrimination might all be contributing to the onset of asthma (Daniels et al 2000; Krieger et al 1997; Miller 2000). In other words, few of the theories look explicitly at the social, economic and cultural causes of disease, instead relying primarily on biomedical and personal responsibility explanations. Why is this and what are the implications for professional-lay interaction in environmental health problem solving? Brown (1992) notes that when public accountability gets replaced with stories of individual responsibility and personal blame, already disenfranchised populations feel further alienated from science and the institutions supporting technical solutions to environmental health problems (see also: Krimsky & Plough 1988). Omar Freilla, an environmental justice activist in the South Bronx, offered a similar hypothesis:

On the one hand you have a lot of researchers following their own questions, legitimate questions that need to be answered. The problem is when you have a
good question being asked, but the people who are responsible for implementing some sort of solution purposely put it in a context where they don’t have to do anything. Government agencies don’t want to look at asthma as an air pollution problem because then they’d have to do something about it. \[46\]

This same sentiment in Williamsburg led El Puente to try and offer a counter-story to the DOH/CUNY study by having residents perform a health survey (Ledogar 2000).

El Puente’s survey approach aimed to empower individuals to investigate the local factors that might be contributing to asthma while emphasizing what residents could do about managing the disease (Ledogar 2001). According to Louis Garden-Acosta, Executive Director of El Puente, their health research “stems from the conviction that science should be used as an instrument for collective self-help” (Ledogar et al 1999:1795). The asthma research was also an extension of the organization’s ongoing environmental health and justice program, which included issues ranging from stopping neighborhood waste transfer stations to creating community gardens (Ledogar et al 1999).

El Puente and CIET adopted a research methodology called Sentinel Community Surveys (SCS) or Service Delivery Surveys (SDS) (Freire 1974; Ledogar et al 1993). In these methods a mix of quantitative and qualitative data is gathered by existing community organizations which are trained to conduct questionnaires, face-to-face interviews and public discussions of survey design and results — all with the intention of collective action (Fals Borda & Rahman 1991). According to CIET, the methodology includes:

data collection cycles to be repeated at regular intervals. Local researchers become increasingly capable of conducting these surveys themselves. With each new cycle, information on the previous cycle is disseminated to communities.\[46\] Quoted from McGowan (1999).
Over time, success of solutions derived from previous cycles can be measured, and topics for investigation gradually broadened. In this way, the methodology provides the basis for sustained, critical dialogue on issues that affect people's daily lives (Ledogar et al 1993).

The research philosophy is rooted in the Latin American tradition of participatory action research (PAR) which emphasizes that research ought to be understood as a process of education; and pedagogy should be a practice of social transformation (Freire 1974; Fals Borda & Rahman 1991; Chambers 1997). The techniques used in PAR include listening, observation, community meetings, socio-dramas, critical recovery of history, valuing and applying folk culture, and the production and diffusion of new knowledge through written, oral and visual forms (Chambers 1997: 108). El Puente adopted an aspect of PAR called “listening research.” In this technique, teams of community residents, trained by research scientists, combine their training with their own skills in observation, questioning, semi-structured interviewing and group discussions in order to gather data (Ledogar et al 1999). The group also used a technique from Freire (1974) called “thematic investigation,” where local data are gathered by community residents and the information is then discussed in groups settings. In these dialogues, the gathered information is analyzed by community members for its local relevance and its relation to the larger community. This process continues in an iterative fashion until the community gathered information is being examined in relation to local, state and world affairs (Freire 1974:80; Ledogar et al 1999). According to Analia Penchaszadeh of El Puente:

Fundamentally for us, what is important is to change relationships between community members and the powerful influence of expert science. Models that put the expert at the center of decision-making, with all the power to define problems, result in actions dependent on the expert; either that or individuals are
told what to do to solve their own problems. In our model, we seek to place power for conducting research and taking action within the group—the collective—not with an expert or only individuals.

Between 1995 and 2000, El Puente conducted four surveys, with each building on the previous by incorporating community learning to develop new and more focused questions (Ledogar et al 2000). The group has limited their surveys to the Southside of Williamsburg, an approximately two square mile section of the five square mile G/W neighborhood. The Southside study area is bordered on the west by the East River; on the North by Metropolitan Avenue; on the East by Union Avenue, and; on the south by Division Avenue (Figure 1.1). In this corridor of Williamsburg close to 85% of the population is Latino, a majority are of Dominican and Puerto Rican ancestry, and nearly 90% of the resident living in the Southside do not speak English as their primary language (Sexton 1997). Only 5% of the Southside’s residents hold college degrees and over half were receiving public assistance in 1997 (Sexton 1998). El Puente chose this area because the Southside is where a majority of the Latino population that it serves lives and it made the most sense for the organization to start its survey work in the community it served, especially since the surveys were to be administered by those living in the community (Ledogar et al 1999).

In an effort to help students think about ways to make the connections between air pollution and public health, El Puente enrolled CIET and together they developed a survey instrument. The CIET staff provided a survey instrument they had used in developing countries and the students and staff helped make it relevant to Williamsburg. Students and staff provided the epidemiologists information about what some of the constraints might be for soliciting information and who else in the community could help
administer the survey and participate in follow-up discussions (Penchaszadeh 2000).

Eventually, students, El Puente Academy faculty and CIET developed a 28-item questionnaire focused on soliciting perceptions of community health.\(^{47}\)

With financial assistance from the Nathan Cummings Foundation, 50 El Puente Academy high school students, five teachers and five El Puente staff members performed door-to-door interviewing reaching 280 households and 1,065 individuals in December of 1995 (El Puente-CIET 1995). The survey was performed in homes using face-to-face interviewing. A student teamed-up with an adult to interview the respondent, normally the head of the household. Often the adults did not speak English, so the students helped in translation (Penchaszadeh 2000). All the data were statistically analyzed using the epidemiological software package known as Epi Info (Leadogar 2000).

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Percentage of All Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Causes of pollution</strong></td>
<td></td>
</tr>
<tr>
<td>Vehicles</td>
<td>42%</td>
</tr>
<tr>
<td>Factories</td>
<td>17%</td>
</tr>
<tr>
<td>Garbage</td>
<td>10%</td>
</tr>
<tr>
<td><strong>Solutions to pollution</strong></td>
<td></td>
</tr>
<tr>
<td>Recycling</td>
<td>40%</td>
</tr>
<tr>
<td>Reduce traffic</td>
<td>21%</td>
</tr>
<tr>
<td>Limit factories</td>
<td>4%</td>
</tr>
<tr>
<td>Believe there is a serious air quality problem</td>
<td>84%</td>
</tr>
<tr>
<td>Believe pollution in the neighborhood is heavy</td>
<td>60%</td>
</tr>
<tr>
<td>Smoker in household &gt; 15 yrs</td>
<td>20%</td>
</tr>
<tr>
<td>Smokes inside</td>
<td>77%</td>
</tr>
<tr>
<td><strong>Asthma sufferer in house</strong></td>
<td>26%</td>
</tr>
<tr>
<td>Self reported respiratory problem</td>
<td>18%</td>
</tr>
<tr>
<td>Self-reported asthma</td>
<td>13%</td>
</tr>
<tr>
<td>People with asthma who think there is an air quality problem</td>
<td>70%</td>
</tr>
</tbody>
</table>

\(^{47}\) In an effort not to bias the questionnaire towards asthma, the word asthma does not appear in the survey until question #18, and it is only used if the respondent mentions the term first. The questionnaire appears as Appendix A.
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The survey revealed to El Puente that residents felt that there were serious problems of air pollution and respiratory disease in the neighborhood but, most residents had not taken action, nor were they aware of any actions they could take, to address these conditions (Table 4.1). For El Puente, the community perceptions over pollution and their lack of information over available health-promoting activities revealed in the survey, provided the impetus to plan a series of follow-up surveys to obtain more detailed information and provide health-promoting options for residents (Ledogar 2001). El Puente also recognized that only surveying the Southside population might not allow them to draw any conclusions about possible relationships between neighborhood environmental quality and public health (Ledogar 2000). In order to do this, El Puente realized that they would need to expand the survey project to the entire G/W community.

4.e. Attempting a Neighborhood-Wide Asthma Survey

Soon after the completion of El Puente’s first survey, the New York City Department of Health (DOH) established its Childhood Asthma Initiative. The Initiative focused on educating community organizations and school children about asthma triggers and how to manage the disease (DOH 2000). The Initiative’s mantra was “I might have asthma but asthma doesn’t have me” (DOH 2000). Through this program, El Puente applied for and received financial support under the guise of asthma education. The monies were not intended to support a community health survey and according to Louise Cohen, Director of the NYC Childhood Asthma Initiative:

We were reluctant to support a community survey performed by a community organization because we felt they were just going to be disappointed after putting a lot of hard work into such a large undertaking. We felt the resources would be better spent on education and improving case management. El Puente insisted on a survey project and we compromised by agreeing that the survey should include
the entire community. We figured a survey might be a good way to involve all the groups in Williamsburg in the Asthma Initiative (Cohen 2000).

El Puente called a meeting of the Community Alliance for the Environment (CAFE), a coalition of Latinos, Hasidic Jews, and Polish immigrants that formed in the early 1990's to stop an incinerator from siting in the neighborhood (Greider 1993). These three ethnic groups make up over 85% of the G/W population, but live largely segregated from one another; the Latinos occupy the Southside, the Poles are in Greenpoint and the Northside, and the Hasidim occupy the Southside around the Navy Yard and East Williamsburg (Figure 4.1). At the CAFE meeting, the three community-based organizations representing each ethnic group were present; El Puente for the Latinos; United Jewish Appeal (UJO) for the Hasidic Jews; and, the Polish-Slavic Center (PSC) for the Poles. Since each of these groups has a different mission, El Puente suspected that a collaborative asthma research project might be met with some skepticism (Penchaszadeh 2001). For example, the PSC and UJO are community service provider organizations, which often implement city-funded programs for their constituent populations. El Puente, as a member organization, differs from these groups because the organization is also a community-learning center, and home to a charter high school, but not a social service agency (Ledogar et al 1999).

Almost from the outset, according to Rabbi David Niederman, Executive Director of UJO, the idea of a community-wide survey was problematic. The Rabbi explained that the Satmar Hasidim lead a life largely isolated from the “outside” world, where issues of health are not talked about publicly and where residents would be unlikely to open their doors to surveyors – even if they were Hasidim (Niederman 2001). The Rabbi also
explained that since most Hasidim are not educated in the sciences or human health most would not possess the knowledge or language to describe asthma and even more troubling, talking about a “disease” might immediately raise fears of death and create community panic (Niederman 2001). Rabbi Niederman described his opposition to the community survey this way:

Remember, we are not the Amish but really only one step away. What I mean is that we are a very insular community, more than any other of the Hasidim. There are no English newspapers, no TV, no internet, no radios, no newstands. We have one Yiddish newspaper, and that is all people read. English is a second language for everyone. Most people have very little or even no exposure to the outside world. It is just not encouraged or valued here. So, talking about disease such as asthma is something that they are not familiar with or even comfortable talking about. When most hear disease it means ‘near-death’ and public conversations about disease are just not part of our lives.

In our community we are very interdependent, and there is a fear of being stigmatized. God forbid you are known as the family with disease! This is a close knit community and people are afraid of sharing certain information. When it comes to illness, unfortunately, we generally don’t talk about it.  

Instead of a survey, UJO advocated for an asthma education program in the schools. This, it turned out, was something only they could provide because the schools for Hasidim are all privately run Yeshivas where lessons are taught in Yiddish. The Rabbi’s statement highlights that good health data is often embedded in tacit knowledge and group lifestyles – largely due to language, customs and traditions – and suggests the relevance all the more of local knowledge.

48 Hasidim who spoke to me on the condition of anonymity, said that the biggest issue was that all marriages are arranged by family and friends, so if someone knows you have a health problem, even at an early age, you can be stigmatized. They noted that there is a high degree of confidentiality in the community. Christina Lawson, the former Director of UJO’s Asthma Education Campaign, confirmed this barrier and noted that most people do not speak English well enough to understand or read about health and good translations into Yiddish do not exist. Lawson also noted that the separation of the sexes required by the Rabbinic Council meant that all survey and education materials had to be reviewed and approved and men could not be alone with women unless she was his spouse. All these dynamics, according to Lawson, contributed to UJO’s adamant rejection of the community asthma survey idea (Lawson 2001).
Like UJO, the PSC was reluctant to engage in a community survey. Part of the problem for the PSC appeared to be ownership. Since El Puente was spearheading the project and already had CIET as a consultant, the PSC was concerned that the survey would reflect the values of El Puente and the PSC might not have the chance to make the project sensitive to their community (Jablonski 1999). In addition, according to Renata Jablonski, the PSC’s Asthma Program Director, the PSC was more interested in taking action against the truck-traffic, waste transfer stations and sewage treatment plant that they believed were the causes of resident’s health problems (Jablonski 1999). Eventually, the idea of a community-wide survey spear-headed by El Puente died when the other community organizations realized they could get funded to do their own projects from the NYC Childhood Asthma Initiative (Penchaszadeh 2000).

4.f. El Puente’s Action-Research

After their 1995 survey and the rejection of the idea of a community-wide survey, El Puente decided to hire a dedicated survey staff from the neighborhood in order to make the survey project a full-time project (Ledogar et al 1998). El Puente recruited community members to act as “health promoters” to administer the surveys, lead community discussions over interpretations of results, and help residents manage their asthma and their health more generally (Iglesias-Garden 2001). El Puente’s objective was to hire community residents with long-standing ties, commitments and knowledge of the neighborhood, including people who knew about available neighborhood social-services (Iglesias-Garden 2001). According to Cecilia Iglesias-Garden, CHE Coordinator, it was not only important that the health workers could speak credibly about asthma:

We learned in the first survey that the first thing most people asked us when we came to their door had nothing to do with asthma. When we said “health” they
would ask us about some medical problem they were having. When they heard we were from El Puente, they would ask where they should send their kids for school next year or where they could get free food to feed their family that evening. We had to know where the food kitchens were, the drug-counselors, church leaders, you know? If we couldn’t answer or at least send them to someone who could, they weren’t going to trust us or talk to us. Before we even got to the questionnaire they wanted us to help them. Knowing how to do a survey about asthma was only part of what we did.

Since the survey administrators needed to have an intimate “local knowledge” of the neighborhood and an interest in asthma, El Puente also looked to recruit community members with a personal or familial stake in asthma and those who “had a passion for improving the health of the community” (Iglesias-Garden 2001). Eventually, El Puente chose ten women from the community, all Spanish-speaking Puerto Ricans and Dominicans, to be members of their Community Health Educators (CHE) team.

The CHE women were trained by CIET, the DOH and Hunter College in the etiology of asthma, epidemiological methods and how to facilitate community meetings about health. Since CIET and El Puente were committed to involving the CHE in survey design, administration and analysis, the women were also trained in survey methods. The CHE team acted as community health workers, not just survey administrators. Community health workers are lay health advocates and advisors who learn from and help educate individuals and groups toward increased well-being (Frankel 1992; Love & Gardner 1997; Ramirez-Valles 1998;). The workers act as bridge-builders between residents, cultural and folk practices and professional providers of clinical health care (Love & Gardner 1997; Ramirez-Valles 1998). This can be accomplished when the women workers offer basic disease education, screening and detection techniques, translate the cultural and folk practices for unknowing health care providers, and seek-out
professional health care for those who desire it (Parker et al 1998). They can also improve the quality of care for those often intimidated by physicians by facilitating better communication between patients and health care providers. In New York City’s Latino communities, the community health worker tradition dates to the Young Lords' "barefoot doctors" of the 1960’s who worked to raise public consciousness of lead poisoning in East Harlem (Witmer et al. 1995). Community health worker models are also increasingly used in research to understand and treat asthma in urban settings (Hill et al 1996; Parker et al 1998).

With the CHE in place, El Puente performed a second survey reaching 727 households and 2,311 individuals (Ledogar et al 1998). The survey gathered both qualitative and quantitative information about local asthma that had never before been organized and the quantitative data were again statistically analyzed using the Epi Info database authorized by the Centers for Disease Control and Prevention. The survey established an 8.4% active-asthma rate for all Latinos living in the Southside, and a 12.4% rate for children, more than twice the national rate of 5.4% (Ledogar et al 1998; Eggelston et al 1999). Other findings included that nearly one of every five women of ages 45-64 had been told by a doctor that she had asthma, and four out of ten asthma sufferers went to a hospital emergency room because of asthma in the 12 months prior to the survey, 27% more than once (Figure 4.1).

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49 A copy of the survey questionnaire appears as Appendix B to this chapter.
50 To put this finding in perspective, the active asthma rate for children in the South Bronx, which has been characterized as having one of the nation's worst childhood asthma problems, is 8.6% (Claudio et al 1996, 1998; Guarniccia 1994; Kozol 1995).
Asthma medication was taken every day or often by 41% of the population responding to the survey. One in five adults with asthma said something at their job was causing them breathing problems. Individuals older than 14 years who have lived in the neighborhood for 15 years or more are twice as likely to have asthma as those who have lived in Brooklyn for a shorter time. And, community residents who have moved to the neighborhood from the Dominican Republic, Puerto Rico or other Latin American countries, however recently or long ago, are only half as likely to have asthma as those who have moved to the neighborhood from within the continental United States. Many of these findings were eventually published in the *American Journal of Public Health* (Ledogar et al 2000), an event which gratified the community workers and suggested to them that their work was viewed as legitimate in both the community and in the eyes of professionals (Acosta 2001). Yet, it was during focus group discussions that followed the survey that El Puente began to uncover some of the specific local knowledge that provided the meanings, interpretations and explanations to help “make sense of and give reasons behind” the survey findings (Iglesias-Garden 2001).
### Table 4.2 Comparison of Selected Results from El Puente Community Surveys

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>People</td>
<td>1,065</td>
<td>2,311</td>
<td>3,015</td>
<td></td>
</tr>
<tr>
<td>Households</td>
<td>280</td>
<td>727</td>
<td>946</td>
<td></td>
</tr>
<tr>
<td>Told by MD have asthma in last 12 months (all ages/sex)</td>
<td>N/A</td>
<td>8.4%</td>
<td>8.3%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Do not have health insurance</td>
<td>N/A</td>
<td>30%</td>
<td>45%</td>
<td></td>
</tr>
<tr>
<td>Rely on Medicaid</td>
<td>N/A</td>
<td>67%</td>
<td>73%</td>
<td></td>
</tr>
<tr>
<td>Self-reported Asthma (all ages/sex)</td>
<td>N/A</td>
<td>12.4%</td>
<td>11.9%</td>
<td>5.4%</td>
</tr>
<tr>
<td>0-4 (n=280)</td>
<td>N/A</td>
<td>11.1%</td>
<td>14.4%</td>
<td>5.8%</td>
</tr>
<tr>
<td>5-14 (n=672)</td>
<td>N/A</td>
<td>14.1%</td>
<td>15.3%</td>
<td>7.4%</td>
</tr>
<tr>
<td>15-34 (n=1011)</td>
<td>N/A</td>
<td>12.4%</td>
<td>9.3%</td>
<td>5.2%</td>
</tr>
<tr>
<td>35-64 (n=875)</td>
<td>N/A</td>
<td>13%</td>
<td>12.3%</td>
<td>4.5%</td>
</tr>
<tr>
<td>65+ (n=165)</td>
<td>N/A</td>
<td>15.8%</td>
<td>11.9%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Take asthma meds daily or often</td>
<td>N/A</td>
<td>41%</td>
<td>44%</td>
<td></td>
</tr>
<tr>
<td>Use of home remedies</td>
<td>N/A</td>
<td>48%</td>
<td>43%</td>
<td></td>
</tr>
<tr>
<td>Use home remedies and Take asthma prescription medications</td>
<td>N/A</td>
<td>76%</td>
<td>90%</td>
<td></td>
</tr>
<tr>
<td>Do not discuss home remedy use with MD</td>
<td>N/A</td>
<td>80%</td>
<td>67%</td>
<td></td>
</tr>
</tbody>
</table>

### 4.g. Focus Groups and the Mobilization of Local Knowledge

Focus groups were an integral part of El Puente’s participatory information gathering and data analysis process. After each survey, a series of meetings was held where residents, the CHE team and CIET discussed some survey findings. The topics of the meetings were chosen by the CHE team and focused on survey findings or information the surveyors heard in the community that were interesting to them. The idea behind these community dialogues was that “the survey process was incomplete without community members helping to give life to the numbers as analysts and without local people learning about the findings and, most importantly, helping strategize over what to do about these problems” (Penchaszdeh 2001). Each focus group meeting was an informal community dialogue run by community members – the CHE team – where the young and old, asthma sufferers and those without the disease, gathered.

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51 Defined as active asthma, which includes: one or more asthma symptoms (wheezing, sleep disturbance, speaking difficulty) in the past 12 months; taking asthma medication frequently or every day; having been to the emergency room for asthma in past 12 months
El Puente’s objective was to create a forum where residents were in control of the subject matter and the dialogue. The forums were intentionally designed to address the loss of control over pollution and health issues that El Puente learned about in their first survey by emphasizing actions individuals could take to address the disease (Penchaszadeh 2000). According to Iglesias-Garden, the CHE coordinator:

The discussions were about the survey but also about people gaining control of their own well-being. You know, many poor Latinos feel their health is out of their control. Getting control of your own health, or at least talking about it, was a real act of resistance and empowerment. The focus groups were about discussing survey information as much as about sharing stories of what people could do. Yeah, the focus groups were about the asthma survey, but more so they were about challenging complacency and sharing stories of ownership over your health.

In order to encourage discussions of resistance and ownership, the CHE team focused on soliciting information that only local people could provide. For example, one survey finding was that women over 45 years of age had a high prevalence of asthma, similar to that found in children. This was surprising since children, not older women, are generally suspected as being the most vulnerable to developing asthma. During discussions with these women, El Puente learned that the only work available to them was in a laundries, dry cleaners, beauty salons, or “sweat-shop” textile factories. These women were driven to this type of labor because of immigrant status and language barriers. These are also occupational environments where solvents, heat, humidity and dust all contribute to potentially hazards exposures that can contribute to respiratory dysfunction. The group discussions also raised ideas about what El Puente and the women might do to avoid these exposures, and included everything from learning about health and safety standards, unionizing and learning a new “marketable” skill (Iglesias-
Garden 2001). The women also talked about what additional information El Puente might want to collect in subsequent surveys and focus-groups to learn more about why women over 45 years had elevated rates of asthma. In many cases, the focus groups allowed previously passive women to speak-out and share stories about their employment dilemmas and illness (Penchaszadeh 2001). Without the focus-group discussions, it was unlikely that the potential relationship between older women’s employment and asthma would have been revealed.

4.h. Latino Home-Remedies

El Puente’s third survey reached 3,015 people in 946 households. The survey gathered more detailed demographic information about the Southside and found that 47% of the households identified themselves as Dominican, 42% Puerto Rican, 6% other Latino and less than 5% other (Table 4.3). The survey also revealed that three out of ten people did not have any health insurance; nearly half of all children in Mexican, Central American and South American families, and 2 out of every 5 Dominican children were not insured. Overall, the survey found that 19% of all children 19 years of age or younger were uninsured. In addition, over two-thirds of respondents reported using herbal or some other home-remedy to treat their asthma. Whether insured or not, over 56% of Dominicans and 45% of Puerto Ricans had substituted a home-remedy for physician prescribed medication. The widespread use of home-remedies and why residents were replacing prescribed medication with traditional home-remedies became the topic of a series of follow-up focus group discussions.
El Puente chose to emphasize home-remedies in their survey and in the group discussions because it was one thing that almost all community members had a knowledge of and, according to CHE Coordinator Cecilia Iglesias-Garden, “almost everyone felt like they could speak credibly about home-remedies because they had experience with them.” In addition, the CHE team had a lot of experience with home and herbal remedies. According to Analia Penchaszadeh, Director of El Puente’s Health Programs, “during focus group discussions, the CHE and other community residents were educating Bob [Robert Ledogar, the epidemiologist from CIET] about the home remedies.”
Practitioners of herbal medicine from Puerto Rico, the Dominican Republic, Ecuador and other Central American countries were invited. For many of the practitioners it was the first time they had been asked to share their knowledge in public. Importantly, the focus-group process allowed those often marginalized in community health decision-making, particularly the folk healer, to become a valued participant in the research process. According to one woman:

I've been doing this stuff for as long as I can remember. My grandmother told me what to do and I tell the children. It was all by word of mouth. You remembered what worked and that was it. We might share remedies among friends, but if you were from a certain region in Puerto Rico, everyone used the same treatments, so it was taken for granted that your neighbor knew what you were doing or talking about.

During meetings, residents identified more precisely than the survey data could provide, some of the herbal mixtures and practices associated with home-remedies.

A concern for El Puente was that the home-remedies might be toxic or exacerbating asthma attacks and without more detailed information they could not make this determination. The use of herbs and home remedies are widespread in Latino cultures, especially for those following the spiritual practices of Santeria and Espiritismo, popular among Caribbean Latinos from Puerto Rico, the Dominican Republic and Cuba (Zayas & Ozuah 1996). According to one community resident, Loyda Gisela Guzman:

Look, everyone visits the Botanica for herbs and other remedies. I remember getting empacho as a kid [an illness of the gastro-intestinal tract] and visiting a santiguador [herbal masseuse]. They [the santiguadora] would massage my stomach and put all these oils and spices and say all these prayers. It was all sort of weird as a kid, but we did it because that is what my abuela [grandmother] said would work!
While most of these practices herbal and home-medicinal practices are not suspected of being harmful, at least one common practice, the use of metallic mercury, is suspected of causing serious health effects. Metallic mercury is sold in most Botanicas and is used for a number of religious healing practices. The mercury is sometimes worn around the neck, sprinkled in baby cribs, burned in candles or ingested with wine to ward off evil spirits. Mercury is also ingested raw by some to relieve indigestion (Zayas & Ozuah 1996). El Puente was intent on engaging residents in discussions about home-treatments to better understand what people were using for treatments and why they were so popular.

Practitioners of herbal treatments noted that the most common ingredients for treating asthma were lemon, aloe, anise, onion/shallot and garlic, most of which were ingested with honey (Ledogar 2001b). These ingredients were used mostly as expectorants to rid someone of phlegm or to calm the airways (Iglesias-Garden 2001). Common mixtures used to prevent asthma attacks or treat someone experiencing an attack included oral doses of: aloe, honey and lemon; radish, onion, honey and shark oil; and snake oil mixed with various herbs (Ledogar 2001b).

As the healers told their stories and explained what remedies they preferred for certain ailments, El Puente recorded these oral traditional practices. Since these recipes were being discussed and recorded in a public forum for the first time for many practitioners, the CHE workers were careful not to intervene too much when practitioners were telling their stories. According to Cecilia Garden:

For those of us in the Dominican community, it wasn't a surprise to hear about these home-remedies. I think the use of snake oil, animal blood, boiled lizards, and owls meat, shocked the epidemiologists. But, we made sure not to allow the scientists to interrupt the women telling their stories. Even when the scientists
wanted to butt-in or say that something might be harmful, or whatever, we didn’t allow them to question the practices or methods, at first. Part of this was that we knew that these practices were not just about health, but also spiritual and religious.

According to Robert Ledogar of CIET, as the woman talked about their practices, it became obvious to the scientists that the use of home-remedies could not be removed from their spiritual context. Ledogar noted that “this context often determined how and when the herbs were administered, how much was used, and the methods and frequency of ingestion. These were community traditions, not just health treatments” (Ledogar 2001).

4.i. Home Remedies versus Pharmaceutical Medicine

The surveys highlighted that many residents relied on herbal and other culturally-derived home-remedies to treat asthma, often in place of physician prescribed medication. However, since the survey was not only focused on the use of home remedies, specific questions were not asked about why residents were using home-remedies to replace pharmaceutical medication (Ledogar 2001). Thus, focus group discussions were held to further discuss this issue.

Many residents told of being shunned and ridiculed by their health-care provider when they tried to explain their cultural or spiritual practices (Igelsia Garden 2001). As a result, local people often did not trust a physician who made no effort to understand or appreciate traditional and spiritual practices (Igelsia Garden 2001). According to one resident, Mirabela Mercedes Martinez:

*Mira,* I go to the doctor and he gives me two minutes of his time. He don’t ask about whether I’m using some herbs. He don’t really ask me nothin’. One time I say somethin’ like, ‘hey, I use this herb at home.’ He says, ‘yeah, well do what you want, but that stuff don’t work.’ I can’t barely understand what he’s sayin’
most of the time anyways. Look, I just don’t trust ‘em ‘cause they don’t understand or even try to understand me.

El Puente learned that most residents using home-remedies were not comfortable talking about their practices with their health care provider and the physicians were often insensitive to the importance of cultural practices. According to Penchaszadeh of El Puente:

Because of trust, fear and cultural issues, people were not telling their doctors about home-remedies. The doctors were not asking them either. Since the doctors didn’t relate to them, they wouldn’t trust the medication they were giving them. Instead, they turned to what was comfortable – the home-remedies.

This doctor-patient relationship and community resident’s trust in prescribed medication was also reflected in the following story from a student in Williamsburg, Carla Romero:

Taking these [asthma] medications is a full time job. I got to do it three or more times a day, like taking a whole cocktail of stuff. It gets to be too much and sometimes I get lazy. I mean, like, I hate havin’ to take ‘em all the time, like a junky or sometin’, right? Inhale this, pop this pill, where is my inhaler? It never fuckin’ stops. The doctors tell me there are side effects. I feel ‘em too, like I’m tired a lot, I be breakin’ out, my face lookin’ all busted. I even think they be makin’me gain weight, not sure ‘dough. When I’m going out or somethin’, you know on a date or to a party, shoot, I just say f-it, no drugs for me. My doctor? He don’t understand what its like taking all this shit. I mean it ain’t all that bad, I mean, not bein’ able to breathe is a lot worse, right? I mean, like, sometimes I just go to my abuela [grandmother] and have her give me some stuff. Her herbs, they be smelly and taste nasty, but its better than havin’ to take all these drugs.

Accounts like these revealed that not only did some residents not trust their physicians and prefer traditional treatments, but that a physician-patient dialogue was crucial for effective asthma management. Without regular and candid discussion with a health care provider, asthma sufferers were likely to avoid using medication and have trouble managing their condition. This finding helped El Puente plan interventions to
improve this situation, including training physicians in cultural competency and having community-members form teams of local people to collectively manage their asthma (Iglesias-Garden 2001).

Another survey finding about home-remedies revealed that Dominicans were almost twice as likely to use home-remedies as Puerto-Ricans. During focus group discussions Dominicans, who had more recently arrived in the neighborhood, spoke of being more disassociated from the health care system than, for instance, their Puerto Rican neighbors. Dominican residents noted that home remedies were part and parcel of their familial and social networks, which often acted as their primary health care system (Iglesia Garden 2001). As Glinda Soto noted:

We came here from the DR with nothing except friends and some family. These are the most important people who help you make it. I mean the government don’t help and we didn’t have any work. You do what you can and stay connected to your people – for jobs, food, a place to stay and health care.

Thus, home remedies, especially for Dominicans, were more than just a source of health care; they were integral for staying connected to one’s social network, which was crucial for daily survival and integrating into American society. The importance of community-networks for promoting health has been noted in Mexican-American children who, despite having higher levels of poverty, lower levels of parental education, and more limited access to health care than non-Latino White children, have unexpectedly low rates of adverse perinatal outcomes and prevalence of chronic and disabling conditions (Mendoza & Fuentes-Afflick 1999).

The focus groups helped provide important contextual narratives to the quantitative survey data and revealed that for most Latinos maintaining health was
inseparable from the daily rhythms of everyday life. The community dialogues also instilled confidence in previously marginalized community members, particularly women, to speak about their expertise. Finally, listening to the meanings residents gave for some of the survey findings helped El Puente develop health promoting interventions that resonated with local cultural practices.

4.j. Local Knowledge for Local Asthma Actions

The intention of El Puente’s community health project was not to gather local knowledge merely to challenge experts, but to improve the lives of neighborhood residents. Their approach was to organize residents for collective self-help. Self-help came in many forms. For example, after learning from the surveys that adults in the community also had severe asthma and that most adults did not know how to help a child manage their asthma, the CHE developed a program called “asthma mastery in action” (Iglesias-Garden 2001).

The program developed individual asthma management plans for adults, children and families. The asthma management program also enrolled residents without health insurance in a NY State free health insurance program, ChildhealthPlus. The asthma management plans are similar to daily diaries outlining where one traveled and where they might encounter an asthma trigger in their daily activities. The management plans also asked questions about in-home triggers, such as housing condition, heating methods, smoking, pests/cockroaches, use of extermination chemicals, pets, typical humidity levels, and use of air filters, de-humidifiers, air conditioners or other air regulators. The program was structured around individual asthma case management program from the NYC Childhood Asthma Initiative and the collective or community health worker model.
employed by El Puente (Iglesias-Garden 2001). The idea was to shift asthma case management from a one-to-one experience to group management.

The CHE team helped improve individual case-management by doing such things as translate health documents, accompany individuals to a physician’s office and help patients understand their social service rights in legal hearings. However, the asthma mastery program also had CHE workers facilitate group asthma management sessions and, since many CHE workers were asthma sufferers or were taking care of family members with the disease, they were at once participants and facilitators (Iglesias-Garden 2001). El Puente’s approach to asthma management encouraged group learning and reflection, as well as community, not solely individual, responsibility for disease care and management (Iglesias-Garden 2001).52

Another action that grew out of learning from the community surveys was a project by El Puente Academy students to raise community awareness about asthma. The students began a mural project depicting asthma’s effects in the community and how people were responding to it. The mural covers the exposed wall of a three story high corner building in the heart of the community. It depicts some of the triggers of asthma (e.g., air pollution and cockroaches), what happens to the body during an asthma attack (e.g., red, inflamed lungs) and what sufferers can do for treatment (e.g., inhalers and women making herbal remedies) (Figure 4.2).

52 While the direct health impacts of such a program are hard to measure, a 2000 El Puente survey found that those with management plans were half as likely to have visited a hospital for asthma (Penchaszadeh 2001). While asthma hospitalizations are down city-wide, they have also decreased in Brooklyn Community Board #1 from 1,166 in 1997 to 484 in 1999 (NYS DOH 1999).
Mural projects in urban neighborhoods have been called the “notebooks of the poor.” In many neighborhoods, walls are a place where the voiceless can tell their stories of anguish, injustice, and disease. But more than just recording their lives and struggles, murals are an effective way to communicate with the rest of the neighborhood and especially to youth. The neighborhood mural can also alert local residents to the dangers of drugs, diseases, sexually transmitted diseases and pollution. The student muralist brigade acted to complement the work of the CHE (Penchaszadeh 2001).

4.k Community Asthma Knowledge Influencing Professionals

While El Puente’s focus has been to use local knowledge for collective self-help and capacity-building within the neighborhood, their work is also beginning to influence the practices of outsiders. After learning from residents that physicians often dismissed Latino folk medicinal practices in focus groups and that most residents avoided the local
hospital, Wodhull Medical Center, the CHE team developed a “cultural competency”
training for local health care providers. The training has CHE team members and other
community residents educating health care providers in Latino folk medicinal practices,
including their familial and spiritual aspects and the specific types of herbs and
treatments residents commonly use (Iglesias-Garden 2001). The NYC DOH is
considering using the El Puente trainings in other Latino neighborhoods in the City
(Ledogar 2001).

The El Puente survey findings have twice been published in the *American Journal
of Public Health*, suggesting that professional scientists are taking note (Ledogar et al
1999, 2000). One of the published findings from the El Puente’s work was that, to their
surprise, the reported asthma period prevalence (e.g., persons reported as having been
told by a doctor they have asthma and experience one or more asthma symptoms in the
previous 12 months) was 5.3% among Dominicans and other Latinos and 13.2% among
Puerto Ricans (Ledogar et al 2000). This was a surprising finding that could not be
explained easily by residential location, household size, smoking, health insurance status
or educational attainment. This meant that Latinos living literally side-by-side were
experiencing significantly different rates of asthma. This finding has aroused interest in
El Puente’s work at the NYC DOH and the health agency is now considering using El
Puente’s asthma research model in other Latino communities around NYC (Cohen 2001;
Ledogar 2001).

El Puente’s survey work has also been acknowledged by the National Institute of
Environmental Health Sciences (NIEHS). The NIEHS has funded “The Williamsburg
Brooklyn Asthma and Environment Consortium,” which will establish El Puente as the
this information did not strongly influence the New York City Childhood Asthma Initiative to consider addressing causes of asthma nor did the group’s work convince legislators to make fighting asthma a priority issue.

El Puente’s work was also an example of local knowledge extending science, not replacing it. The findings that, for example, older women had a high prevalence of asthma and the different incidence of the disease among Dominicans and Puerto Ricans, were both new insights for professionals studying asthma. The CHE team built on a tradition of community health workers in Latino neighborhoods and in health management in poor neighborhoods more generally. Additionally, community epidemiology, sometimes referred to as “popular epidemiology,” is increasingly recognized as offering a valuable contribution to population-based research (Brown 1997; CDC 1997).

One factor that may have limited the impact of this work on professional decision-making was that El Puente’s efforts were not linked to a larger social movement. While the group initially tried to build a community-wide coalition to perform an asthma survey, that effort failed. The group also chose not to align itself with other groups in NYC that were conducting asthma research, such as The Point CDC in the Bronx or West Harlem Environmental Action (Claudio 1996; Claudio et al 1998; Kinney et al 2000; Northridge et al 2000; Penchaszadeh 2001). With limited resources available, community groups around the city were competing for the same foundation and federal government grants (Ledogar 2001). While El Puente received the NIEHS grant to continue its asthma work, other community groups did not. Competition led to isolation.
principle investigator of a four-year community-based research partnership with Woodhull Medical and Mental Health Center and New York University School of Medicine, Department of Environmental Medicine (NIEHS 2000). The NIEHS grant is aimed at addressing El Puente’s original question that stimulated their first survey in 1995: what are the connections between asthma and environmental pollution? The grant will build from findings from some of El Puente’s previous surveys, such as the importance of considering occupational health and workplace exposures, outdoor air pollution monitoring, and indoor household environmental assessments, to fully understand local asthma (NIEHS 2000). According to the NIEHS, this project is unique because it will “document multiple exposures of residents in an industrial low-income community, use a community organizing model, focusing on capacity building of community residents through asthma self-help groups to conduct their own research, as well as design and implement interventions to improve environmental conditions” (NIEHS 2000).

While the information El Puente collected was clearly influential in the neighborhood, it had less impact on policy professionals. The strength of the local knowledge El Puente gathered was a direct result of the community coalition and organizing they did around asthma and community health generally. From the mobilization of students, to the hiring of community health workers to the focus group meetings, the local knowledge gathering process for El Puente was as much about coalition formation as data gathering. The group managed to gather persuasive narratives about the particular medicinal practices of residents and they turned their findings into data publishable in one of the leading public health journals in the country. However,
and the failure to mobilize a city-wide asthma coalition undercut the impact El Puente’s work might have had on policy professionals.

A second reason El Puente may not have linked its work to the national movement for childhood asthma, is because no such organized movement exists. The environmental justice movement has not made asthma one of its target issues. Somewhat surprisingly, no coordinated national movement dedicated to finding the causes of the disease has emerged (Pew 2000). At a 2000 National Environmental Justice Advisory Committee meeting held to discuss environmental health, there were no sessions dedicated solely to discussing the asthma epidemic in communities of color (NEJAC 2001). In the case of AIDS research discussed in Chapter 2, activists mobilized to challenge government research protocols and began performing their own biomedical research. Clearly, the “constituency” for asthma is mostly children of the poor and people of color, not the largely white, well-off organizers of the AIDS movement (Epstein 1996). In the absence of a national “asthma movement,” the influence of El Puente’s work remained largely neighborhood-focused.

Content with using its research for “community self-help” (Ledogar el al 1999; Acosta 2000), El Puente did not rely on an intermediary to help promote its findings with the larger policy-making community. Ledogar of CIET was the person who acted most like an intermediary for El Puente, bringing the group’s work to public health conferences, meetings with the DOH, and linking the results to his work in developing countries (Ledogar 2001). Ledogar also acted as lead author on the *AJPH* publications and, along with other epidemiologists from CIET, performed much of the statistical analyses. Indeed, it was after meetings with Ledogar that the DOH decided to explore
using the El Puente model in other communities (Cohen 2000). However, Ledogar rarely presented information about the group’s work without an El Puente staff member at his side, often Analia Penchaszadeh, the Director of El Puente’s Environmental Health and Justice Programs or Cecilia Iglesias-Garden, the Coordinator of the community health workers. Despite Ledogar’s role, Luis Garden Acosta, Executive Director of El Puente, did most of the public speaking about the project, particularly at conferences, with city agencies, for elected officials and in the media. The absence of a clearly identifiable intermediary to champion their findings in professional settings, helped to explain why El Puente’s work had limited impact on decision-makers.

Finally, El Puente’s findings suggested some low cost solutions. For instance, asthma research often has a treatment bias, that is surveys tend to ask largely about actions residents are or are not taking to treat the disease (e.g., taking medication, visiting clinic, quality of clinic care, home remedy use, health care access, etc.) [see Appendix B], as opposed to survey questions or focus group discussions that explore *causes* of the disease (e.g., women’s occupation hazards). This treatment focus was consistent with the NYC DOH Childhood Asthma Initiative, which had as one of its principal aims, enrolling young people and their families in asthma management plans. El Puente’s survey findings supported the goals of the DOH. The community group received funding from the DOH to have the CHE team run the group’s *Asthma Mastery in Action* program. So, in this way, some of the local knowledge El Puente gathered was consistent with the goals of the DOH and, thus, let the agency “off the hook” regarding other, perhaps more controversial, findings.
Table 4.4 Cognitive contributions of El Puente’s Asthma Research: Selected examples

1) Epistemology
   - Asthma surveys gathered previously uncollected disease information
     a) Aggregation
        Previous asthma study in the neighborhood grouped all Latinos into one category and only measured hospitalizations at a local medical center many residents avoided. El Puente’s surveys captured health differences among the neighborhood’s different Latino groups.
     b) Heterogeneity
        The survey and focus group discussions revealed that older women, not just children, were experiencing elevated rates of asthma.
     c) Lifestyle
        The surveys highlighted that home-remedy use was widespread and often replaced physician prescribed asthma medication.
     d) Tacit knowledge
        Through focus group discussions, El Puente found that differences in home remedy use between Puerto Ricans and Dominicans was suspected of being linked not trusting physicians, particularly those not familiar with Latino cultural practices, and to new immigrants trying to stay connected to social networks.

2) Procedural Democracy
   - The voices of students, the CHE women, and the folk healer, all largely ignored by public health professionals, contributed new disease knowledge.

3) Efficiency
   - After learning from the survey that many residents did not have health insurance, El Puente enrolled residents in a free state insurance program.

4) Distributive Justice
   - El Puente revealed that focusing in on the Southside population could highlight the unique health status of neighborhood Latinos

4.1. Influencing the Professional Uptake of Local Asthma Knowledge

Ultimately, this episode can be characterized as a mixed success for the professional uptake of local knowledge. While local knowledge may not have had a strong influence on professional action, the information from the community played a very important community-organizing role – a success that professionals should not overlook. If professionals are going to work well with residents, they need to understand what residents claim to know and why. This case highlighted that the production of local knowledge, not merely local knowledge claims and propositions, helps local organizations build community and that professionals can be more effective working with communities if they recognize this fact. However, the local knowledge claims from El Puente only had a moderate impact on professional action. The journal articles were a
serious achievement as was the finding of different asthma rates among Puerto Ricans and Dominicans sharing the same environment (Ledogar 2001; Northridge 2001).

Obtaining the NIEHS grant and acting as the principal investigator also reflects the influence local knowledge can have with professionals. Yet, despite this success, El Puente’s work has not “scaled-up” to influence policy decisions addressing asthma at the city, state or national level.
Chapter 5: Lead Poisoning & the Discourses of Local Knowledge

Finally, we have arrived at the age of extreme specialization, the present age, when the amount of specialized knowledge, often accurate, often extremely refined, has far outstripped our capacity to make use of it as part of a consistent whole. The remedy for this is not to be found in any mechanical combination of specialisms...The cure lies rather in starting from the common whole—a region, its activities, its people, its configuration, its total life—and relating each further achievement in specialized knowledge to this cluster of images and experiences.

- Lewis Mumford, Culture of Cities, 1938:385

Cari Comart watched as clouds rained down white flakes into her yard and windows. The flakes weren’t snow; it was June after all. The flakes were debris from sandblasting work on the Williamsburg Bridge 200 feet away from her home. She shut her windows and called her neighbors. She soon found out that the paint was lead-based and brought her 18 month old daughter Bettina to a physician. Bettina’s blood-lead levels were four times the levels deemed safe by the Department of Health. Cari then had the soil in her yard tested and the samples came back with readings 4,000 times above the acceptable limits.

Cari heard similar stories of lead poisoning coming from her neighbors. She helped organize residents and they filed a lawsuit against the Department of Transportation, which was performing the sandblasting in preparation for bridge repainting. The lawsuit, however, would not be heard quickly enough for some parents, so they filed for a court-ordered injunction to stop the city’s blasting immediately. They also demanded that the city begin testing neighborhood children and soil. Within weeks, construction was stopped and city officials confirmed that nearly a hundred soil samples around the bridge had indeed exceeded 1,000 parts per million (ppm). At one spot in Williamsburg, the city found a reading of 42,096 ppm.
Responding to pressure from residents, who had gained the support of the media and politicians, the city agreed to test and remediate soil around the bridge. While the city agreed to the actions, they insisted that the elevated lead levels in soils were not a result of the bridge sandblasting, but rather from historic lead deposits from leaded-gasoline and the widespread use of lead paint in older homes. Weeks passed and the city’s promises went unfulfilled. Sandblasting restarted before soil and blood-tests were performed.

The community returned to the judge and asked for a court order to stop the work. Before the court ruled, the city agreed to form a Mayoral Task Force to devise new procedures for sandblasting on city bridges, including the Williamsburg Bridge. The Task Force met for over a year, and in 1994, two years after the first paint-chips had fell into Cari Comart’s yard, the Task Force issued new guidelines for bridge paint removal that they claimed would be protective of human health and the environment. The community, however, did not trust the Task Force’s recommendations, even though some community members had been members of the Task Force. The community sued the city again, claiming this time that the Task Force recommendations should be required to undergo a full environmental review and be subject to public hearings and comment. The city disagreed. Sandblasting restarted on the Williamsburg Bridge, this time with the city following the guidelines recommended by the Task Force. The community pursued its case to the New York State Supreme Court, and in November, 1996, the court ruled that the city must cease all sandblasting and perform an environmental and public health review of the work.
Chapter 5: Lead Poisoning & the Discourses of Local Knowledge

This chapter discusses how the community organized local knowledge to support its legal claims and convinced the city to prepare an environmental impact statement (EIS). Part of the final settlement between the community and the city was that the EIS would include a public health assessment, and the city agreed to provide financial assistance to the community to hire its own professionals to assist them in reviewing the risk assessment. This chapter highlights the challenges the community coalition faced during interactions with its own professional consultants, particularly as residents and experts clashed over the most effective methods for community input into the EIS and health assessment. In particular, I highlight the face-to-face interactions between professional outsiders hired by locals and the locals themselves during these meetings. Through an account of the communication challenges community residents often face when talking with professionals, the chapter tells about the conditions that make local knowledge effective in influencing policy-making professionals.

5.a Analyzing Community Discourse

This chapter uses discourse analysis to explore professional-local interactions. I reject the assumption that even when we all speak the same language interaction is an unproblematic simple exchange of fact and opinion, and that obtaining and relaying information is thus a technical, not a social, problem (Forester 1999; Habermas 1990; Innes 1996). I also believe that community power relations are masked in public communicative encounters. While much work in planning has focused on issues of culture, power, conflict, and the legitimacy of the planner's role (Peattie 1969; Kaplan 1969; Rein 1969; Arnstein 1969), recent work celebrates community victories over indifferent developers and local governments, presenting the strategies that shaped those
victories (e.g., Medoff and Sklar 1994). Some analyses have helped professionals understand why certain processes fail and others succeed. For example, using a rare ethnographic account of local planning and development processes, Tauxe (1995), in a study of a boomtown in western North Dakota, shows how community voices, using value-laden local conventions of negotiation and rhetoric, were marginalized by planners in bureaucratic institutions who relied on, and attended more closely to, technical-rational styles of discourse. This study shows how community voices were marginalized despite the fact that organized efforts to involve residents were in place. For example, appeals to morals and small-town values, which Tauxe calls a “time-honored tradition in populist North Dakota politics . . . failed to strike a chord with [the] large corporations and urban-oriented technocrats” (1995:477) whose decisions held sway. Even where local residents managed to gain an audience, they had little impact on planning and development decisions in part because planners and residents did not speak the same language or understand each other's politics, and also because planners did not use their roles as information brokers or “organizers of public attention” (Forester 1989:20) to address the disconnect.

Kaminstein's (1996) study of public meetings around one of the nation's largest toxic waste disposal sites suggests similar problems of communication. According to Kaminstein (1996), public officials overwhelmed local New Jersey residents with technical data, responded to anxious inquiries with dispassionate and - to the layperson - confusing scientific explanations, and in trying to validate residents' concerns as important and understandable, often came across to the audience as arrogant, aloof, and patronizing. The “official and legalistic” atmosphere, established and controlled by
environmental agency experts and aimed at calming residents, did little to inform or build trust (Kaminstein 1996: 461).

Baum (1997) describes community planning in Baltimore and includes many rich spoken excerpts from public meetings and other social situations. These are used to illustrate the evolving role of residents and organizations in mediating competing agendas, not to focus on dilemmas for the planner or policy professional engaged in the face-to-face encounters; not to discern what “community talk” implies for planners in specific, and often very charged, situations.

Finally, Lowry, Adler and Milner (1997:177), in a study of citizen involvement in planning in Hawaii, examine the place of facilitation techniques in “the politics of meeting management.” The authors use a broad narrative, not meeting excerpts, to analyze several planning processes. Lowry, Adler and Milner (1997:186) conclude that “to regard meeting facilitation as merely a set of techniques to be acquired, mastered, and applied as part of the planner's skill kit is to misunderstand the fundamental political nature of group processes in planning.” In particular, the authors encourage planners to attend closely to who facilitates meetings, who sponsors the facilitators, who is invited, how decisions will be made, and how generated information will be used. They note important distinctions between public meetings and intra-organizational meetings, which may also be facilitated. The former tend to include participants who lack a shared organizational or occupational culture, vary much more widely in their understanding of the issues at hand, and may have little or no history of interaction. Drawing on work in communicative action, Lowry et al also emphasize planners' and other facilitators' power
to focus attention toward certain issues and interest group agendas and away from others (see Susskind et al 1999).

Drawing on these studies, this chapter examines an episode of community discourse, emphasizing how aspects in the community-professional interaction reflect the dynamics of “social performance,” or socially organized, politically subtle, culturally shaped, and talk-based public interactions or speech occasions in which participants play roles much like performers in a play (Goffman 1959, 1971, 1974; Chriss 1995). I focus on the patterns of social performance common to face-to-face citizen encounters in which professionals often find themselves. Borrowing from the linguistic, sociology and anthropology literatures, I consider the meaning of "social performance" and the impact of "code confusion" in face-to-face community meetings.

In order to highlight this “micro-politics of local knowledge,” I first trace the conflict between the City and the residents of G/W over the sandblasting of leaded paint from the Williamsburg Bridge. This account will help reveal the experiential knowledge and historical struggle residents bring to their later encounters with professionals. I then zoom-in on the face-to-face discourse between a community coalition, called the Williamsburg Around the Bridge Block Association (WABBA), and the professionals the coalition hired to help them navigate through the environmental impact statement and accompanying public health assessment of the bridge work. Through a re-telling of community meetings that I observed, coupled with interviews of the participants reflecting on the encounters, I highlight the challenges professionals and community members face during face-to-face dialogues over local knowledge.
5.b. Community Discovery & Coalition Building

In June of 1992, the DOT sandblasting work on the Williamsburg Bridge began with no prior environmental review. According to Joe Ketas, Assistant Commissioner of the DEP, the work was considered routine maintenance and improvements, which by law does not require a full environmental review. The blasting caused dust clouds that showered at least a 10 square block area around the bridge, according to Inez Pasher, who lives on Wythe Ave one block from where the blasting took place. According to Inez:

It was like pin pricks when you got hit by the dust. It should have been captured by tarps, but it wasn’t. That dust was constantly moving around. It was horrible. It moved inside on your clothes and through windows. It was a hot summer.

Inez, a Latina who describes herself as a “self-taught environmentalist,” collected dust samples in her home. She went to her neighbor’s doors and asked them to do the same. She described her actions that day:

I went around, door-to-door, and asked who noticed the dust and whether it was giving them a problem. We collected dust samples from inside and outside homes. We also took some soil samples in yards and playgrounds right around the bridge. We called the City DOT and State DEC to complain.

Inez and her neighbor collected approximately 15 grams of debris from their window sills and from the top of a table in a backyard garden. They also videotaped the dust clouds from the bridge blasting settling on the neighborhood, playgrounds and in their own yards. On June 15, 1992, they sent the samples to a lab in New Jersey. According to Cari Comart, Inez’s neighbor:

When I called the lab later that week, I was told that the samples contained 4.57% per weight lead, or 45,700 parts per million. I was advised by the lab, in no

53 The lab was International Testing Labs, Inc., of Newark, NJ.
uncertain terms, that the lead levels were extremely dangerous and should be corrected as soon as possible (Mitchell 1992).

Inez’s work was inquiry, knowledge production and organizing all at once, but also suggests that some rational order to community mobilization of local health knowledge exists. Brown and Mikkelsen (1990) note that community residents often begin with observations, hypothesize connections between what they observe and adverse health, contact professionals for answers, and then organize others into a coalition. This early work by Inez galvanized both community and professional attention to lead poisoning in the community.

On June 17th, 1992, inspectors from numerous city and state agencies visited Ms. Inez and witnessed for themselves the clouds of lead-based paint from the sandblasting operation. By 3:00pm that day, the NYS DEC shut down the sandblasting operation due to the contractor’s inability to contain emissions of blasted paint. However, operations continued sporadically until July 8th, 1992, when the State issued a court order ceasing the operations (DOT 1998).

54 Brown and Mikkelsen (1990) list the common stages of community mobilization of local environmental health knowledge:
1) People in a contaminated community notice separately both health effects and pollutants.
2) These residents hypothesize something out of the ordinary, typically a connection between the health effects and the pollutants.
3) Community residents share information, creating a common perspective.
4) Community residents, now a more cohesive group, read, ask around, and talk to government officials and scientific experts about the health effects and the putative contaminants.
5) Residents organize groups to pursue their investigation.
6) Government agencies conduct official studies in response to community groups’ pressure. These studies usually find no association between the contaminants and health effects.
7) Community groups bring in their own experts to conduct a health study and to investigate pollutant sources and pathways.
8) Community groups engage in litigation and confrontation.
9) Community groups press for corroboration of their findings by official experts and agencies. They note that each stage is not necessarily completed before the next begins, but the stages usually follow this order.
Chapter 5: Lead Poisoning & the Discourses of Local Knowledge

Test results taken from soil around the bridge by the city DOH on the day inspectors visited in June, revealed elevated levels of lead, with all readings exceeding 1,000 ppm and one sample over 42,000 ppm. Children whose blood was tested weeks after the incident were found to have blood lead levels exceeding city and federal action levels. Many readings were between 15 and 20 μg/dl of lead in the blood, while the actionable levels are 10 μg/dl.55

The city reacted to the sampling and blood lead tests by vacuum cleaning surrounding streets. Rooftops, sidewalks, streets and playgrounds were also scheduled to be swept. During this period, the city DEP ruled that readings equal to or less than 1,000 ppm equaled normal urban background conditions.56 Dr. Andrew Goodman, the Assistant Commissioner for the City Health Department, said at the time that the department was concerned about the "very high levels of lead," but that such levels were not unexpected in New York, as in most urban centers, where decades of automobile exhaust and paint flaking from buildings and bridges have tainted soil. "Our assessment is that these are levels that most likely have been around for a long period of time," Dr. Goodman said. "These are levels of great concern, but in fact the threat is not that significant because there are very few children playing in the streets directly beneath the bridges" (quoted in Myers 1992). But, community leaders did not see it the same way, according to Luis Garden Acosta, executive director of El Puente: "We're in the middle of a modern day

56 At the time, the EPA had not set cleanup guidelines for lead contaminated soil.
Love Canal, and we can't act as business as usual. We're dealing with a lead emergency and our community is being held hostage" (quoted in Holloway 1994).

Inez organized residents and local groups into a coalition to sue the city so that the bridge-work would be halted immediately and soil remediation and blood-screening would take place to determine the impact of the sandblasting on local resident’s health. A group called the Williamsburg Around the Bridge Block Association (WABBA) formed and included representatives from local organizations such as Community Board 1, El Puente, United Jewish Organizations, and the Community Alliance for the Environment (CAFE). The group also included organizations outside the community concerned about the impacts of lead paint in other neighborhoods, such as the South Bronx Clean Air Coalition and the New York City Coalition to End Lead Poisoning. Inez was able to organize the WABBA by sharing her experience of lead flakes falling from the bridge sandblasting into her home and the resulting tests that showed extremely elevated concentrations of lead with other organizations. Inez also used her position as a member of the environmental committee of the local community board (a neighborhood planning council) to mobilize other activists and community-based organizations to form the WABBA (Pasher 2001).

The WABBA demanded that the city halt the bridge work and assess the health and environmental impacts of the work. As the pressure on the city mounted, Mayor Dinkins decided to convene a Mayoral-level Task Force to review bridge-painting procedures city-wide. The Task Force was charged with developing new protocols for bridge-work and addressing the lead-paint exposures and health concerns in the Williamsburg community (Myers 1992). The Task Force consisted of city and state
agencies, the US EPA, elected officials, technical and medical professionals and community representatives. The Bridge Repainting Task Force was also charged with producing procedures to respond to the WABBA’s environmental and health concerns, as well as recommendations for how the city could effectively and safely proceed with the bridge work.

A year and a half later, the Task Force had devised new protocols. The city adopted these new guidelines for re-painting work on all 838 city bridges. The Task Force was charged with working quickly because the bridge-work was $30 million dollars over budget after the almost two year delay (Dube 1994). The Task Force guidelines were reviewed and approved by the EPA, the state DEC and DOH (Ketas 1999). The procedures included protocols for containment of sandblasted paint, continuous soil and air monitoring during bridge-work, clean-up protocols for existing contaminated soil and community notification procedures for lead paint removal operations. The Task Force recommended that all sandblasting be fully contained in negative air pressure tents, that real-time air monitoring occur and ambient air and soil monitoring be performed periodically. The protocol also required that work be halted when a number of thresholds were violated (DOT 1998).

The WABBA rejected the findings of the Task Force. Cari Comart, one of the community representatives on the Task Force, noted that “the protocols were not protective of human health and virtually gave the city a green-light to poison more people with lead paint.” She also stated that that Task Force ran roughshod over citizen concerns and adopted guidelines to suit the city’s concerns, not the WABBA. While the community agreed that the protocols were an improvement on the procedures the city had
started with, the WABBA chose to sue the city anyway because they feared the protocols would not be strictly enforced. According to Manfred Hecht, a community resident and member of both the Task Force and the WABBA:

The monitoring of these procedures is being thrown completely into the contractors' hands, which is suicide. We want to make sure there are effective checks and balances in place. We don't know if what we came up with at the table is safe. We [the community members] didn't have the expertise (quoted in Dube 1994).

Within weeks of the city's announcement that they had formed a city-wide consensus for new, protective protocols for bridge repainting work, the WABBA filed suit. The community suit claimed that since the Task Force had devised new rules that were in effect new regulations, the protocols must be subject to city and state environmental and public review requirements. The city denied this and restarted the sandblasting work on the bridge before the lawsuit could be heard in court. The WABBA went immediately to the judge demanding a stay on all work until the city could show that lead paint from the sandblasting did not pose a threat to human health.

Community knowledge was instrumental in creating the WABBA and the lawsuit. Inez gathered her experience with the paint-flakes and those of her neighbors to tell a passionate story about a dangerous, and involuntary, exposure for all residents but especially local children, to mobilize the coalition. Community narratives of the paint-flakes falling in the streets, the results of some blood-lead tests from parents living near the bridge who had their children tested, and local accounts of delay or inaction by the city in responding to local concerns, formed the basis of the legal claim. The legal claim also built on the history of lead-poisoning politics in New York City.
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5.c. Lead Poisoning in New York City

Lead is a poisonous heavy metal that is found in old paint, old pipes, and other industrial materials. Lead particles ingested by the human body cause severe damage to the brain and central nervous system. Children who have absorbed lead can suffer central nervous system damage and impaired intellectual development, shortened attention spans and behavioral disorders and/or anemia and impaired metabolism of vitamin D. Much of this damage is permanent and irreversible. Children from birth through age six years have the highest risk of lead poisoning. Their normal hand-to-mouth activity causes more frequent ingestion of contaminated particles. More significantly, children’s brains and nervous systems are particularly vulnerable in their early developmental stages. Children also are more vulnerable to lead poisoning because they retain two times more of the lead that they ingest than adults. During the period of greatest risk for lead poisoning, when children are between 9 and 18 months of age, they absorb lead at a rate that is five to ten times higher than adults (Ruff et al 1996). In addition, because their bodies are smaller, a smaller amount of ingested or inhaled lead can result in a higher concentration in a child than in an adult (ATSDR 1988; Silbergeld 1997; Ruff et al 1996).

Over the past 20 years, childhood lead poisoning has declined dramatically in the United States due to limits on lead in gasoline, paint, food cans, and other consumer products. While lead poisoning crosses all socioeconomic, geographic, and racial boundaries, the burden of this disease falls disproportionately on low-income families and families of color. In the US, children from poor families are eight times more likely to be poisoned than those from higher income families (CDC 1991). African-American children are five times more likely to be poisoned than white children. Nationwide, about
22% of African-American children living in older housing are lead poisoned (ATSDR 1988). According to the ATSDR, 88% of all children with family incomes below $6,000 – 80.4% of whites and 96.5% of African Americans – are estimated to be affected by lead poisoning. While the total number of children in NYC documented to have blood lead levels at or above 20 \( \mu g/dl \) in 1995 was 2,727, the number of children in the City under age six with blood lead levels documented at or above 10 \( \mu g/dl \) during this same year was 18,728 – nearly seven times higher. (For all children below age 18, the total is 21,158) (Green et al 1998:17). City DOH estimates that in 1995, approximately 35,000 children under age six in the City had blood lead levels of 10 \( \mu g/dl \) or higher.

Under normal conditions, or what might be considered the background conditions, children are expected to have no more than 2.7 \( \mu g/dl \) of lead in their blood. In NYC, the DOH commonly uses the term "lead poisoning case" to refer to those instances in which it must inspect a child's dwelling and order abatement of lead-based paint hazards – which is required when a child has a blood lead level of 20 \( \mu g/dl \) or more. The City Health Code defines the condition of "lead poisoning" as occurring at a blood lead level of 10 \( \mu g/dl \) or higher.\(^\text{57}\) This level is consistent with the guidelines of the Federal Centers for Disease Control (CDC), which reduced the "action level" for lead in children's blood in 1991 from 25 to 10 \( \mu g/dl \), urging close monitoring of a child whose blood lead level is within the range of 10-14 \( \mu g/dl \) and further action if it rises above that level.

Although New York City was one of the first jurisdictions to ban the sale of lead paint (in 1960 – most of the rest of the country didn't ban lead paint until 1978), lead

\(^{57}\) NYC Health Code, § 11.03(a)(1997). Lead poisoning was added to the list of legally reportable diseases on June 16, 1986, and the definition of lead poisoning under this code provision was amended to include all children with blood lead levels of 10 \( \mu g/dl \) or higher on October 6, 1992. The City Health Code is more strict than the State Health Code, 10 N.Y.C.R.R. § 22.7, which is permissible pursuant to Public Health Law § 228.
paint remains pervasive; the vast majority of painted structures constructed before 1960 contain some lead paint. The 1990 Census indicated that New York City has the nation's highest percentage of pre-1960 (63.5%) residential housing. The City estimates that almost 2,000,000 units of housing have lead based paint, approximately half of which are occupied by persons of low or moderate income; an estimated 323,000 apartments with lead paint have young children residing there, and of these, some 174,000 are occupied by low income families (Green et al 1998).

Until 1982, the City could demand the removal of lead paint only after a child was already poisoned. However, lead poisoning is a permanent injury so waiting until a child is poisoned is too late. In 1982, the City enacted Local Law 1 (LL1), which required landlords to immediately remove lead paint in any multiple dwelling where there were young children. The law was one of the strongest lead poisoning prevention laws in the country but was never fully enforced by the City (Green et al 1998).

In 1985, the New York City Coalition to End Lead Poisoning (NYCCELP) brought a class action suit against the City which resulted in several court orders directing the City to fully enforce LL 1. In 1996, New York's Court of Appeals declared that under LL1 landlords had a continuing obligation to ensure that dwellings with young children were free of lead hazards. However, in 1999 the City Council rolled back the lead poisoning laws by enacting Local Law 38 of 1999 (LL 38), despite the virtually universal objections of public health professionals and physicians, tenant organizations, disability, education, and environmental groups, as well as racial justice organizations and labor unions (Green et al 1998).
The new law shifted much of the burden of detecting and responding to lead hazards from landlords to tenants, eliminated lead dust (generally considered the prime cause of lead poisoning) from regulatory control, and scaled back the safety measures and training required during lead removal work (Green et al. 1998). Subsequently, NYCCELP and other organizations sued the City again, this time asserting that the City Council violated state law by enacting LL 38 without a proper environmental review. The state Supreme Court agreed and in October of 2000 declared LL 38 null and void and reinstated LL1 (Lambert 2000).

5.d The Community’s Case Against the Bridge Sandblasting

The WABBA used many of the same arguments that were successfully overturned LL38 in its case against the bridge sandblasting. In fact, the NYCCELP group was a party to both suits and both cases were arguing that any new rules should undergo a comprehensive environmental review. In the WABBA’s case, the community coalition rejected the Task Force’s guidelines, insisting that in addition to failing to perform adequate environmental and public notification reviews, the Task Force failed to address existing lead poisoning in the Williamsburg neighborhood. Citing NYC DOH blood lead screening in which 712 children between 1-6 years old were tested and 95 had blood levels above 10 μg/dl and 7 above 20 μg/dl, the WABBA demanded that the city address existing health hazards. According to Annemarie Crocetti, an epidemiologist who attended the Task Force meetings and assisted the community in its law suit, the Task Force was designed from the outset to support what the city wanted. She noted in her affidavit:

As far as I know, and I attended almost every Task Force meeting, there were no motions proposed, seconded, amended or voted on. The minutes do not
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necessarily represent the Task Force consensus of what took place at the meetings. The Task Force Chair and other city officials failed to pay serious and meaningful attention to the comments, objections, criticisms expressed by community members of the Task Force (Crocetti 1994:3).

In building its case against the city, the WABBA relied heavily on Dr. John Rosen, a professor of pediatrics and head of the Division of Environmental Sciences at Albert Einstein College of Medicine and attending physician at Montefiore Medical Center, in the Bronx. In his affidavit submitted with the community’s lawsuit, Dr. Rosen noted that “compared to lead from peeling paint in residential housing, the concentration of lead from lead painted bridges is many orders of magnitude higher in lead content” (Rosen 1994:8). The WABBA’s case claimed the work of the Task Force was inadequate, not due entirely to the new guidelines, but because the group failed to address remediation, monitoring and health screening concerns of the community, including. 58

1) Remediation:
   a) Failure to conduct a systematic survey of the extent of lead contamination in the neighborhood.
   b) Failure to obtain soil samples from residential areas, including yards and gardens.
   c) Failure to take interior household dust samples and measure them for lead.
   d) Remediation efforts have been ad hoc and, without the aforementioned sampling data, misguided. For example, the city tested in concentric zones around the bridge in 1/10th of a mile increments (500 feet). The percentage of samples found to have lead contamination in excess of 1,000 ppm in zones 1-5 were 84.6%, 42.1%, 16.2%, 33.3% and 34.8%, respectively. Yet, the city only performed remediation in zone #1.

2) Public Health Screening
   e) Determination that neighborhood children were “safe” was based on blood-samples taken 3 months after the sandblasting event, and no follow-up sampling has occurred to confirm that lead levels have decreased.
   f) The NYC DOH failed to institute an “intensive blood lead monitoring program,” relying instead on testing of only children of residents who “complained.”

3) Monitoring
   g) The Task Force Protocols give no detail about how and how often the paint removal procedures will be “continuously analyzed to ensure their safety and

58 All documentation draw from court documents: NY State Supreme Court, WABBA v Guliani, Index No. 94/106235. Affidavits and Exhibits in support of petition.
efficiency” nor do they specify which agency will be responsible for these analyses. Additionally, the Task Force protocols do not define what standards, health or environmental, will be used “to determine the effectiveness of these operations.”

h) The Protocols do not specify what standard will be used for the continuous air monitoring and “visible inspections.” The protocols fail to specify how and by whom waste paint will be disposed. The protocols rely on city agencies and community organizations to notify residents of a violation, but there is no requirement for the city to notify residents directly or through local physicians, hospitals, clinics or schools.

Based on these arguments, the WABBA called for an immediate cessation of all bridge sandblasting and for an environmental impact statement to be performed by the City. In addition, they recommended that an “independent body of multi-disciplinary experts” monitor the city’s bridge painting operations, and help ensure worker and public health and safety. Using the video-tape Inez and Cari made in the first few days of the sandblasting as part of their testimony, the WABBA argued that the city was irresponsible and could not be trusted to oversee the work alone. The lawsuit claimed that “in light of the City’s past record, the public should have little confidence that City officials will place health and safety over costs and efficiency.” Finally, the group recommended that technological and engineering alternatives to sandblasting be explored and evaluated and, no matter the paint removal technology chosen, “containment technology should be the most advanced and meet the highest engineering and safety standards” (Rosen 1994:15).

5.e. Professional Response to Community Knowledge

The city rejected the claims made in the community’s lawsuit and denied that the Task Force protocol would inadequately protect public health. According to Virginia Maher, a Mayoral appointee to the Task Force and analyst with the Mayor’s Office of
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Operations, the community was correct in noting that the city “had no comprehensive set of procedures for lead paint removal prior to the development of the Task Force Protocol,” but the Task Force “accomplished its goals by developing the bridge work Protocol and a plan for blood lead screening of children living near the Williamsburg Bridge and for cleaning-up areas potentially affected by the release of lead dust from the abrasive blasting” (quoted in Maher 1994).

Believing they had done enough with the Task Force Protocols, the City resumed sandblasting on the bridge. However, State Supreme Court Justice Martin Schoenfeld’s ruled on October 6th 1995, that the city must halt operations on the bridge because the community’s claims were valid. The judge ruled that the Task Force guidelines should have been subject to public hearings and an environmental review. In his decision, the justice wrote that the videotape shows "a dust cloud emanating from the work area on the bridge and what are arguably sloppy waste collection procedures."59 The judge also stated that “there appears to have been a very good faith effort to draft a set of procedures that will minimize the escape of lead dust into the atmosphere, but I have neither the authority nor the expertise to judge the aforementioned procedures” (quoted in Stout 1996).

Community knowledge played a role in the WABBA’s case convincing the Supreme Court that the city was negligent. The judge ruled for the community coalition largely based on numerous affidavits from residents describing the “careless sandblasting work” and video of the construction work taken by Inez and Cari. The judge did not

overturn the Task Force guidelines, but merely agreed with the community that all of the city's work should be subject to a full environmental review.

The city appealed the ruling and the appeals court refused an emergency motion by residents to stop the resumption of sandblasting work while the appeal was heard, so blasting started again (Van Natta 1995). Then, in June of 1996, the Appellate Division of State Supreme Court ruled that the Supreme Court had ruled correctly in October of 1995, halting the blasting and requiring an environmental impact statement and associated public hearings. "By all accounts," the appellate justices unanimously agreed, "the project was a public relations and public health fiasco" (quoted in Stout 1996).

However, unclear wording of the Appellate Division’s ruling left an opening for the city to continue work on the bridge. In its ruling, the Appellate Division had ordered the city to either conduct an environmental review or issue a "negative declaration;" that is, an assertion that the paint-removal work would have no significant environmental impacts. The community assumed that in order to issue a negative declaration, the city would have to perform an environmental review. However, the city interpreted the ruling as either an environmental review or a “negative declaration (NegDec): a ruling that a project is exempt from an environmental impact statement because, for example, the work is considered “normal maintenance.” Since the City had already issued a “NegDec” when it approved the bridge-work in 1992, they interpreted the court’s ruling as a green-light for them to resume sandblasting, which they did in the summer of 1996.

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60 “The job site is entirely encapsulated, which prevents anything that is sandblasted from the bridge surface from escaping into open air” Allan Fromberg, a Transportation Department spokesperson noted in the New York Times. The city called the accusations that the sandblasting represented a health risk “hyperbole” and did not give any prior public notice before re-starting the blasting (Van Natta 1995).
The community, thinking they had won the case, was shocked to see sandblasting operations resuming on the bridge (Pasher 2000). The WABBA returned to the Appellate Division in July as the work on the bridge continued, and asked that the language of the June ruling be clarified. The justices agreed to review the language, but did not halt the sandblasting work. Finally, in October 1996, the Appellate Division issued a revised decree clarifying the June ruling. The decree halted sandblasting only on the Williamsburg Bridge and required the city to comply with state environmental review requirements. The city contemplated an appeal for a month and then, on November 7, 1996, entered into a Stipulation of Settlement ending the lawsuit and ending the city’s right to appeal. The community continued to argue that the bridge work presented a health risk to local children, while the city stated that they agreed to the EIS because, according to Jane Earle, assistant corporation council for the city, “it looked like that would be the fastest way for us to get back to work” (quoted in Stout 1996). In the settlement, the city agreed to perform an environmental impact statement that included a public health analysis (they refused to call it a risk assessment) and hold all required public hearings. A key piece of the settlement was that the city must finance the WABBA to hire experts of its own choosing to help them comment on and participate in the EIS and public health analyses.

5.6 Community Discourse over the EIS

In the EIS, the city tried to be clear that the public health assessment should not be considered a typical risk assessment. The EIS notes:

A public health assessment done as part of an EIS differs from the more common use of risk assessment to evaluate sites requiring remediation. As described in the Introduction to this EIS, the purpose of an EIS is to evaluate a set of future actions, including the “no action” alternative, in terms of a defined goal or
objective. While it is necessary to understand existing conditions, a complete analysis of conditions or quantification of environmental conditions that produced the existing public health conditions is not necessary to an EIS. This differs from a risk assessment conducted, for example, at a Superfund site, where the goal of the risk assessment is to identify present conditions that cause current or future public health threats, and recommend remediation goals. An EIS does not assess current conditions or develop remediation goals (NYC DOT 1998: 10-1).

The community, however, was under a different impression (Pasher 2000). The group called a series of meetings to both understand the different aspects of the EIS and to formulate a coalition position. The group hired Berger, Lehman Associates, P.C. (BLA) who subcontracted with the Hunter College Center for Occupational and Environmental Health (COEH). The key contact person at Hunter was Dan Kass, the Director of the COEH and someone with a history of working with community organizations in G/W. Dan had helped the community convince the DEP in 1991 to fund the first health study of the neighborhood through the Environmental Benefits Program. Under Dan’s direction, the COEH was helping the Watchperson Project participate in the BAEL project and working with the community group to develop a community geographic information system (GIS). Dan had also volunteered to lead trainings in epidemiology for El Puente’s community health workers. In short, Dan was a recognized and respected academic in the eyes of most community groups working on environmental health issues, and this was the primary reason BLA subcontracted with him (Swanston 1999).

The Draft EIS concluded that there would be no significant additional health risk of lead poisoning, since the DOT would institute new containment procedures for the abrasive sandblasting work on the bridge. Since the proposed paint removal procedures would not result in the release of significant amounts of fugitive materials into the surrounding environment, increases to blood lead levels would also not be significant.
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Even under the worst case scenario, which the city determined to be the “no action alternative” because lead paint would “flake-off in an uncontrolled manner due to weathering and deterioration,” no significant blood-lead increases would occur (DOT 1998: S-15). Some of the key public health assessment conclusions included:

1. Blood lead levels studied on both sides of the Williamsburg Bridge were not related to proximity to the bridge.62
2. Maximum worst case scenario releases without mitigation were projected to result in a long-term increase in child blood lead levels of 1.14 µg/dl for 0-1 year olds, 1.6 µg/dl for 1-3 year olds, 0.98 µg/dl for 2-3 year olds, 0.85 µg/dl for 3-4 year olds, 0.53 µg/dl for 4-5 year olds, and 0.43 µg/dl for 5-6 year olds.
3. Maximum worst case scenario releases without mitigation would result, among children most exposed, in a long-term increase in the percent of children considered “lead poisoned” (>20 µg/dl) by a maximum of 1.3%, but generally by about 0.1%.
4. Short-term increases in child blood lead levels resulting from unmitigated maximum worst-case release scenarios are far greater than projected long-term changes, as is the percent of children whose blood lead levels would be elevated to the point requiring immediate medical attention (45 µg/dl).

5.g. The City’s Lead Exposure Models

The City came to these conclusions after modeling potential lead exposure and uptake. They used three EPA models to estimate the probability of community lead exposures and human uptake of lead. One model, called the Integrated Exposure Uptake Biokinetic (IEUBK) Model, was normally used for estimating blood lead uptake from lead-paint exposure in the home and for designing remedial action in a home, building or an area as large as a city block. The second model, called Bower et al., was used for

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61 The only two alternatives studied in the EIS were, (1) lead paint removal activity with proposed containment and (2) no paint removal activity but paint weathers and releases into the environment (DOT 1998: 20-2).

62 The Draft EIS stated: “While a handful of data outlier points may have a substantial visual impact, they contribute little to any qualitative measure of an association between bridge proximity and blood lead levels. The EIS uses accepted statistical techniques (regression analysis) to objectively check for the presence of such a trend and none was found. In fact, as stated in the EIS, blood lead levels near the bridge are slightly lower than blood lead levels measured at locations further away on both sides of the bridge” (DOT 1998:20-49).
estimating lead releases and dispersion rates from bridge work (DOT 1998: 10-2). The IEUBK model estimates steady-state blood lead levels reflecting exposure to lead in multiple media (diet, drinking water, air, soil, and dust) over an extended period of time, and the City chose a 25 year period to model exposures. A third model, called the O’Flaherty Model, was used to estimate short-term acute exposures and their impact on blood lead levels in both children and adults.

The IEUBK model used data inputs from the NYC DOH, which recorded blood-lead measurements from children around the city between ages 0-6. The model used over 56,000 individual blood-lead measurements for model inputs representing, according to the city, a spatially and demographically representative sample of city children (DOT 1998: S-12). These data acted as the baseline blood levels for children and the model estimated the likely uptake of lead for all children around bridges, including those in Williamsburg. For adults, the Bowers et al. model used blood lead data from the National Health and Nutrition Evaluation Survey (NHANES) (DOT 1998:10-2).

Both models generate probabilities of lead uptake based on a known exposure. However, the city claimed that they did not have accurate lead emissions information from sandblasting, so the EIS ran the risk models “backwards.” In other words, the EIS started the models by inputting estimated blood-lead levels in children (based on the data described above), modeled an increase in blood lead to “safe levels” (10 μg/dl was chosen as the default value), and then, based on these two estimates, the model generated the concentrations of lead in different media (air, soil, water, etc) that would be admissible for blood-lead to remain under the “safe levels.” The city claimed that using
the models this way, while unconventional, would generate overly conservative lead emissions requirements (DOT 1998:10-2, 4).

In addition, the EIS stipulated that the bridge sand blasting would be contained in a sheath and the “stringency of containment” would be based on the proximity of bridge-work to residences. In industrial areas the containment would be less strict than in residential areas. Finally, an environmental consultant would be hired to monitor all lead paint removal activities, would be under the direction of the city DOT, and would be instructed to inform the City of any violation of containment procedures.

5.h. Debating Whose Evidence Should Count

The community reacted to the EIS by holding a meeting of the WABBA with its new consultants. The WABBA met at least two times with Dan and other public health professionals, who helped walk the community members through the EIS, the health assessment, and the implications of the findings. During one WABBA meeting in July 1998, Dan and Dr. Joseph Graziano from Columbia assisted the group. Dan was leading the discussion and began by reviewing a memo that he had written to the group summarizing key findings of the Draft EIS. From the outset, Dan noted that the findings were “not good” and that the risk assessment had revealed little new information about potential risks. Dan and Joe, two of only a few white males in the room of mostly Latinos and African-Americans, suggested that the group might not want to get “bogged-

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63 Other expert consultants that the community employed were Dr. Joe Graziano, Mailman School of Public Health, Columbia University; Dr. Rae Zimmerman, NYU; Dr. John Rosen, Motefiore Hospital. I was an observer at two of these meetings. The following comments come from my observations and field notes. They also come from written documentation issued at and after the meetings and interviews with key participants. I cite the documents and interviews as relevant. My personal observations are also noted throughout the discussion.

64 Head of the Division of Environmental Health Sciences, professor of public health and pharmacology, and Director of the Center for Environmental Health in Northern Manhattan at the Mailman School of Public Health.
down” in the messy science of the health assessment and instead might concentrate on the monitoring and public notification aspects of the EIS. He reminded the group that the monitoring and procedural issues were most convincing for the judge and led to the order for the city to perform the EIS in the first place (Kass 1999).

There was an awkward silence before some residents began leaning over and whispering to one another. “We came here to find out if our kids are at risk. Do you know what it is like to have a lead poisoned child?” shouted someone in the group. Dan acknowledged the concern and affirmed their worries: “I have the same concerns as you do.” And, he added, the best way to ensure that local kids are safe is to press the city to do the work properly and get them to allow residents to monitor and stop the work if any apparent violations occur. Again, he did not suggest that the group should challenge the lead-exposure findings.

Samara Swanston from the Watchperson Project told the group that the EIS didn’t consider any alternatives other than “no action” and sandblasting. “The process was designed up front to ensure their [the City’s] scenario was the only viable alternative,” noted Swanston. Brenda, an African-American woman, asked why the group wasn’t “focusing on the real issue; lead poisoning and whether the work should go ahead at all.” Her comment immediately shifted the focus of the meeting. Heads in the group began to nod and the sounds of “um hmm,” “uh huh” and “you go girl” echoed throughout the room. Brenda turned toward the group. After a pause, she rhetorically asked the group their opinion by letting out a long, drawn-out, “right?” as if it had two syllables.

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65 Since the speaker has requested to remain anonymous, I have used a pseudonym.
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Throughout the meeting, Dan and Joe had asked residents to “hold-off” their questions about the lead risk assessment. Dan later explained to me that he wanted the group to have a discussion about whether spending hours or even days pouring through the risk assessment and model assumptions was a good use of their time (Kass 1999). Another WABBA member spoke out and accused Dan and the consultants of being patronizing to the community by ignoring its key concern: lead poisoning.

Dan sensed the tension among the group. He calmly explained that risk assessments rarely find a connection between an environmental exposure and health outcomes, even when such connections seem obvious to those living nearby. Some WABBA members looked confused. After all, they had spent years in court arguing for the EIS and now they were being told their work may have been in vain. Another resident, in a raised voice, offered her opinion: “How could they admit to releasing lead into the air and ground and then say it will not have any ‘significant’ health impacts? I mean we got test results from our own kids. Lets use ‘em. We didn’t come this far to let ‘em [the city] get away with this!”

The views of these WABBA members were supported by Dr. Rosen. He told the group that the risk assessment models the city used were flawed and that was the reason they didn’t find any health impacts from the sandblasting. "I find this to be unconscionable," said Dr. Rosen. "This whole chain of events indicates to me that the city has already disregarded the health and future growth potential of thousands of kid, who may be impacted severely and negatively by high lead exposure."

Most of the consultants assisting the WABBA agreed that the lead-exposure models were “junk science.” Yet, Dr. Rosen was the only professional adamant about
challenging the models. He stated: “The city is doing magic tricks with the risk assessment and sweeping under the rug the real possibility that this work will result in elevated blood-lead in neighborhood children.” The consultants engaged in a debate as WABBA members watched. Dr. Graziano reiterated that the EIS was not a formal “risk assessment” and the community was not likely to convince the city to generate the kinds of public health information they wanted. Dan agreed with Dr. Graziano, and again suggested that the best way for the group to protect children from lead poisoning might be to focus on aspects of the EIS where they could achieve “tangible gains” such as outlining a monitoring and oversight protocol with community oversight (Kass 1999).

As the professionals disagreed, the WABBA also seemed to splinter. A contingent of community members wanted to challenge the city’s assessment by exploring the details of the model, following Dr. Rosen. They insisted tackling the model was the best thing to do because, “even if we get better monitoring procedures, we can’t trust them to follow ‘em anyway.” This group was intent on challenging the models on the grounds that they did not use actual blood-lead levels and soil measurements from the community. Another group within the WABBA argued that the risk assessment, no matter how much tweaking was done, would never prove that the lead paint released from the sandblasting contributed to elevated blood lead levels in the community. This group wanted to follow Dan and demand new community monitoring and oversight protocols.

The first group argued out loud that the WABBA had fought for the EIS, the risk assessment and even got financial resources from the city to critique the process, so they had an obligation to all residents to ensure the project and the assessment were as good as
they could be. Ignoring the lead poisoning issue now, many suggested, would disappoint the community. Brenda later recalled the exchange with me:

There was no way we was letting the city get away with such a bogus assessment and it seemed like some of our consultants didn’t realize the situation poor people and black folks are facing. We are the ones being poisoned. It was easy for those white men to suggest we focus on something else. As Dr. Rosen and other experts suggested to us, if they even used actual blood lead measurements from neighborhood kids, instead of estimates from city-wide data, the risk assessment would have shown the elevated risk. We needed to change the assessment to show the city what we already knew; that their sandblasting was poisoning us.

Derogatory remarks were exchanged and some members of the coalition suggested that Dan be removed from the consulting team immediately. Another woman stood up and shouted in the direction of Dan and Joe: “‘Y’all gotta listen to us; we don't never get anything made for us right! Don't never get asked...” The woman was pumping the air with her outstretched fingers and moving her head from side to side across her shoulders for emphasis. I noticed that her body was saying as much as her mouth. Dan would later admit to me that he felt disappointed and somewhat threatened at the meeting, especially by the woman’s outburst. Because the woman was (literally) standing tall in a sit-down meeting, and because her body language underlined her strong feelings about the issues at hand, Dan acquiesced to the WABBA’s desires. Dan would later recall, reflecting on the tense moments at the meeting:

Some of us [public health professionals] already had experience with risk models around lead paint and thought the DOT models would never “prove” that the blasting work contributed to elevated blood-lead. After all, it was never designed as a ‘risk assessment,’ but what they called a ‘public health assessment.’ Exactly what that meant, I’m not sure. Nonetheless, we gave the community our honest opinion that the assessment was designed from the outset to not address their concerns and that there was little use trying to develop a ‘better model.’ We recommended they not waste their time picking apart the model and instead focus on improved monitoring, oversight, alternative technologies, soil remediation – stuff that might represent tangible improvements in health, air quality, community control, etc. The most vocal members of the group took our suggestions as
evidence that we were in cahoots with the City and not ‘on their side’ (Kass 1999).

The leadership of the WABBA decided to forge ahead and critique the risk model, in spite of Dan’s suggestions. The primary concern of the community was that the risk model did not use actual blood-lead samples taken specifically from affected residents around the bridge. Instead of using local measurements, the model estimated blood lead “baselines” by using city-wide DOH lead screening data and developed an average “blood-lead level” based on these data. Children’s blood lead concentrations were information community residents felt especially familiar with, since they had spent months worried about their children’s safety after the sandblasting incident. Others noted that the city’s data were especially inaccurate for their community, because people without health insurance, like many in G/W, were less likely to have their children’s blood tested for lead and “show-up” on the city’s data-base. Dan recalled how the group grappled with the data inputs of the assessment:

They wanted the EIS to use real measurements taken from Williamsburg children living around the bridge. This made common-sense. Dr. Rosen was arguing that without the community specific data, the models made no sense. Even though I didn’t agree with the approach, I suggested that it would be unlikely that the city would have enough data inputs using only community measurements. It was just too small a sample size. They needed a control group and from an epidemiology perspective, the city could easily discredit a model using so few samples. But, this suggestion only further alienated group members (Kass 1999).

Dr. Rosen tried to lead in the discussion over the model’s assumptions, taking over for Dan as meeting facilitator. Dr. Rosen encouraged the group to pursue its case against the city that the bridgework still presented a real threat to children’s health, despite what the EIS said. He said it would be a great mistake to allow the work to go forward without convincing medical evidence that the sandblasting was safe. He called the
recommendations of the EIS “cosmetic improvements.” However, by this time many WABBA members had left the meeting frustrated over the group bickering. Additionally, Dr. Rosen, while a strong advocate, was not skilled at facilitating the group discussion. As a result, the group was not able to agree on specific recommendations for the EIS to address either the models or the monitoring procedures. Frustrated himself, Dr. Rosen gave up and decided to submit his own written comments without the endorsement of the WABBA.

In the final EIS, the city agreed to encapsulate the bridge-work with tarps and vacuum equipment, and the monitoring procedures were almost identical to those proposed by the Mayoral Task Force years earlier. The community did not get independent monitors or a role in monitoring compliance, nor did the community convince the city to perform additional testing of children’s blood or neighborhood soils. In fact, since the EIS claimed that there were no significant increases in soil lead concentrations around the Williamsburg Bridge, they concluded that no additional soil remediation should be performed (DOT 1998:S-40). The city did agree to print brochures notifying the community of sandblasting work and distribute these 30 days in advance of work when possible. The sandblasting work began again in August 1999.

5.1. Making sense of the Community Meeting: Knowledge and Discourse Analysis

The WABBA meetings revealed the trouble community members can have articulating their local knowledge, even to sympathetic professional advisors. The WABBA members were unable to translate their attitudes and experiences into what could be regarded as local knowledge. This case differs significantly from, for example, Chapter 3, where professionals recognized and acknowledged that if there really were
anglers fishing from the river, this ought be part of the assessment. In this case, community residents were not able to get across to their own consultant why their knowledge needed to be taken on board. The intermediary that was supposed to assist residents in articulating their concerns acted more as a barrier than a facilitator.

The WABBA members’ fight with their own consultant was primarily about epistemology. The community members were trying to ask their consultants how the city’s lead model, which was imported from outside the community and used data from people outside the neighborhood, could possibly be right for their community? The WABBA members were frustrated that the lead-models didn’t reflect their lived experience and when they looked at the EIS, there was no sign that it reflected their years of struggle with lead poisoning. For instance, when one resident asked how a model that: “didn’t take my blood, soil from my neighborhood, or show any signs of linking-up with my experience that this community is polluted, be trusted?” they were making an epistemological point about the nature of credible evidence. Yet, the community was not making this claim in epistemological terms – by doing such things as challenging the level of statistical analysis or sampling methods used by the city in the EIS. Thus, the meeting reveals the challenges community members face getting their knowledge taken seriously, and how dialogue can breakdown, when residents make epistemological claims that are not couched in epistemological language – even when expressed to sympathetic professional advisors.

The consultants’ reaction to the community members can also be understood in epistemological terms. For instance, when Dan told the group that using actual resident’s blood-lead measurements would be problematic from a public health science standpoint
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because the sample size would be too small, he failed to address the crux of residents’ concerns; namely, that they did not see their experiences reflected in the city’s health study. In other words, Dan did not directly address the group’s primary concern about the lead model and instead shifted into a deficit model of public understanding by trying to educate residents about why their suggestion (i.e., taking samples of residents’ blood for the model) would not be scientifically acceptable. Dan’s reaction is immediately taken as patronizing by some members of the group, particularly when he continued to insist that the WABBA should not address the model directly, but instead ask for more and better monitoring. The WABBA members did not expect their own consultant to discount their concerns. The consultant’s reaction also left WABBA members frustrated that the health assessment would not do justice to their long-standing claims of harm. The community frustration eventually contributed to a lack of trust in their intermediaries and an end to the dialogue.

The community meeting is an example of what can happen when both community members and professional consultants sidestep the question of whose knowledge should count in community health assessments? In this case, the cognitive contribution of local knowledge is largely missing; not because there isn’t local knowledge, but because the community fails to articulate why its local knowledge is important and the intermediaries fail to help the community do this. Local knowledge is also hard to identify in this case because community members fail make their experiences and stories “fit” into one of the epistemology categories outlined in Chapter 1 (i.e., aggregation, heterogeneity, lifestyle, and tacit knowledge). The professionals who might have helped the WABBA members
deconstruct the lead models, such as Dr. Rosen, were too much advocates and not bridge-building intermediaries to enable this translation to occur.

In speech occasions like the one involving the WABBA members and the professional consultants, social actors can also assume roles in face-to-face interaction in order to manage the impressions of fellow actors (Goffman 1959). Moreover, social actors rely on verbal and nonverbal forms or “codes” that are familiar to them (Hymes 1974; Kochman 1981). Goffman’s “performance” framework helps capture the meaning of the situation: actors seek to manage the impression of other actors, not necessarily to manipulate but to maintain a normal, understandable exchange, in other words to “uphold the situation” (Goffman 1971: 23).

One way to understand the communication challenges that surfaced in the meeting was that the professionals and the community each had different scripts they brought with them to the meeting - their expectations as to appropriate behavior, what constitutes emphasis versus threat, and so on - as well as the codes they employed, both verbally and nonverbally. For instance, this was revealed when Dan felt threatened by an African-American woman’s volume and emphatic tone, as well as her nonverbal signals: standing for emphasis, pumping the air with her hands, swaying her head from side-to-side as she looked at the consultants - in other words, by a style of face-to-face rhetoric rooted in ethnicity and social class (Kochman 1981; Gumperz 1982). Other interpretations of the code confusion are clearly possible, but this one fits with informal discussions held with Dan and others attending the meeting. Neither community members nor Dan appeared conscious that there might be a communication problem per
se, or that code confusion could change the outcome of the meeting (Hymes 1974; Wolfgang 1979).

When professionals and other actors in a social setting share life stage, ethnicity, class level, and other social traits, the chance for code confusion and mistaken intentions are reduced: codes and scripts largely coincide in homogeneous settings. But in community planning, still so often conducted by white, middle-class professionals in ethnically diverse, low-income settings, common communication conventions can hardly be assumed. The same is true, of course, when planners must talk "up" to decision-makers who rely on unfamiliar codes or scripts. Code confusion can lead to unwarranted and unproductive assumptions about what local people know, understand, and can learn. Such inferences may confirm the worst fears of residents about the real intentions of experts and/or the institutions that typically retain them. Planners who are able to “code switch,” or to make themselves understood in different settings, bring undeniable advantages to these encounters, but all planners can learn to observe and appreciate these aspects of communication and, armed with a knowledge of the diversity of scripts and codes, to reduce code confusion.66

Finally, while understanding code switching is important, it may only reflect what is happening on the surface of a speech situation and may not address the fact that people who are speaking in codes also have different epistemological assumptions. Clearly,

66 “Going street” or switching from standard American English to a particular group’s preferred informal style, has been described by linguists, sociologists, anthropologists and others (see Anderson 1999). This has become a survival skill for people who must function in two or more social worlds or “speech communities” (Smitherman 2000), each with its preferred patterns of communication. Smitherman (2000) and others point out that people of color are more adept at the skill, on average, than non-Hispanic whites, since historically the former have had to be. One way to think about this is to consider that a Black community member is much more likely to need to function in settings where Kass’ “normal” style of speech is dominant—including workplaces, university classrooms, and other formal institutions—than Kass is to have to “go street,” functioning (through talk) in the community.
epistemological assumptions are only made more opaque by different speech codes, performances and transcripts. Yet, when community members say things like: ‘you can’t be creating reliable, trustworthy or credible evidence about me if you don’t actually look at what I, for many years, have known to be a characteristics about my community,’ they are making an important point about the nature of evidence.

5.j. Professional Uptake of Local Lead-Poisoning Knowledge

This episode revealed the long struggle residents endured just to be heard by professionals and the communication challenges they encountered once they got an opportunity to consult with professionals. In the end, the WABBA coalition largely failed to influence either the city or the consultants they hired that lead paint from the bridge was causing a health and environmental hazard for neighborhood residents. Yet, residents were able to influence professional decision-makers to change practice (e.g., the Mayoral Task Force and the EIS), and how community members accomplished this offers further lessons about what makes community knowledge influential with professionals.

Perhaps most importantly in this case, residents successfully mobilized a coalition that included concerned community members and groups from outside the community sympathetic to their concerns. The coalition proved instrumental for gaining the attention of politicians and other professionals and for sustaining the legal effort challenging the bridge sandblasting. Without the WABBA, the judge likely would not have ordered the city to pay for experts of the community’s choosing. The WABBA was also a coalition that reached beyond the borders of the neighborhood. The group linked the concerns of Williamsburg residents with those on the Manhattan side of the bridge and community
groups across the city that might one day be impacted by bridge paint sandblasting. The WABBA also “hitched onto” the strength of a city, state and national coalition to end childhood lead poisoning. While this coalition was primarily concerned with improving lead abatement laws and enforcement in low-income neighborhoods, the WABBA successfully linked their cause with the childhood lead poisoning concerns more generally to take advantage of the popular attention the lead paint abatement coalition had generated around the issue.

As a result of this linkage, the WABBA gained significant influence with professionals early on in the controversy. The city agreed to soil remediation, street sweeping and the blood-lead screening program and created the Mayoral Task Force after the WABBA organized and made the Williamsburg Bridge sandblasting a public issue. Admittedly, these City’s responses to the WABBA organizing were low-cost responses. The street cleaning and selective soil remediation were highly visible projects but had minimal environmental and health impact. The responses were also used by the City to justify their resumption of bridge sandblasting while the mitigation and studies continued.

Ultimately, this case was a mixed success. The broad-based coalition residents formed was successful in gaining political attention to their concerns, the creation of the Mayoral Task Force and eventually winning the lawsuit. However, the community’s knowledge and organizing efforts did not help them achieve their other goals: stopping the sandblasting; convincing the city to conduct a blood-lead study; instituting a health improvement program; and, widespread soil remediation. The community was unable to get the city to admit that the sandblasting might have caused dangerous lead exposures in
the community and was cause for public health intervention. The case also highlighted that when disadvantaged groups try to influence professionals with their knowledge, they will face challenges articulating their experiences as “local knowledge.” Finally, professional intermediaries may not always be capable of helping community members articulate their local knowledge in a way that facilitates professional uptake.
CHAPTER 6: Air Pollution & the Mapping of Local Knowledge

Tell me, I forget.
Show me, I remember.
Involve me, I understand.
-anonymous.

This chapter reviews how young people and community groups in G/W used maps and other visual techniques to organize and present their local knowledge about air pollution to professional decision-makers. I argue that visual representations are an important means for disadvantaged populations to transcribe what they know and share this information amongst each other and with professionals. The chapter traces the progression of local environmental map-making in the G/W neighborhood from the free-hand renderings of students to sophisticated computer-aided geographic information systems (GIS) maps produced by a team of community activists and academic partners. The chapter reveals that the ways residents express their local knowledge can help organize residents around a particular problem and aid in developing a shared community-vision of environmental hazards. Although they have been powerful tools within the community, I will show that community maps have had mixed success influencing professionals.

6.a What Maps Do

In this chapter, I will show that maps perform at least three political functions in relation to knowledge. First, maps always aggregate and select data and how they do this can lead to enormous differences in interpretive outcomes. Second, maps are identity forming devices since the symbols used to visually present information give “life” and persuasion to certain representations. Third, maps are always boundary makers by including some information and excluding others.
1) Aggregation

How maps aggregate information for visual presentation may lead to enormous differences in interpretive outcomes. The maps and images that are used as standard ways of seeing a problem (think of the photograph of the earth suspended in space) can tell us something about whose vision matters, what should be rendered visible and what should be made invisible. Maps are also always made for certain purposes, such as to convince an audience of a certain point of view, and provide rules for real world decisions. A particular map "wins" or becomes the dominant image of the day by resonating with those in political power (Scott 1998). For example, National Geographic is often cited for generating maps during the cold war with an explicitly Western perspective; the Soviet Union was portrayed as a large land mass compared to Europe and the United States. Similarly, maps of the world have often portrayed Africa as smaller and less prominent compared to Europe and North America (Monmonier 1996).

Yet, the power of maps for (mis)representing reality remains a contentious subject in planning, science and policy-making. Harley (1989) notes that maps represent hypothetical generalizations and are always, to some degree, inaccurate. They are used to model a reality known to be more complex than any map can portray. Yet, at the same time, maps exert a compelling persuasiveness; they are designed to look real – particularly to those beyond the map-making community (Monmonier 1991).

A recent example of the power of aggregation and interpretation in environmental map-making occurred after the release of the Environmental Sustainability Index (ESI). This index attempted to measure the overall progress towards environmental sustainability of 122 countries based upon a set of 67 underlying variables (CIESIN
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2001). The ESI is the result of collaboration among the World Economic Forum's Global Leaders for Tomorrow Environment Task Force, The Yale Center for Environmental Law and Policy, and the Columbia University Center for International Earth Science Information Network (CIESIN). The developers of the ESI claim that the “index permits cross-national comparisons of environmental progress in a systematic and quantitative fashion and represents a first step towards a more analytically driven approach to environmental decision making” (CIESIN 2001). The final analysis of the ESI produced a map of the most and least sustainable countries. The map reveals that many of the most industrialized nations in the world are the most sustainable while the poorer nations are the least (Figure 6.1). The report notes that “ESI scores correlate positively with per capita income…and that decisions about how vigorously to pursue environmental sustainability and how to promote economic growth are in fact two separate choices” (CIESN 2001). However, the publishers of the Ecologist Magazine took issue with the ESI analysis and, using the same 67 variables but analyzed differently, came up with different conclusions. The Ecologist editors along with Friends of the Earth, came up with a map with almost the opposite conclusions of the world’s “sustainable countries” (Ecologist 2001: 44-47). I raise this example not to delve into the details of how each map was created, but rather to highlight how the aggregation and selection of data for map making can lead to enormous differences in interpretive outcomes.
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Figure 6.1 Different Interpretations of Sustainability

Sources: CIESIN 2001; Ecologist 2001.
2) Boundary Making

Visual images can be powerful tools for representing scientific knowledge (Latour 1988). For example, Gieryn (1995) notes how maps can act as a powerful metaphor for understanding scientific knowledge. Science is often portrayed as an “empty map” that gets filled in by certain groups or institutions in order to have influence over a particular audience (Lynch and Woolgar 1990). The “map-making” of science is the decision to include and exclude certain information, and thereby create boundaries around what counts as science. In other words maps, like scientific information, always show a limited representation of a complex reality, are provisional, contextual and amendable (Gieryn 1995: 406).

The legitimacy and credibility of a map often comes through both its physical rendering and the trustworthiness of the cartographers. Maps can encourage viewers to “see like the state” or suggest some other imagined vision (Anderson 1991; Scott 1998). As Harley notes, maps must be scrutinized since:

All maps strive to frame their message in the context of an audience. All maps state an argument about the world and they are propositional in nature. All maps employ the common devices of rhetoric such as invocations of authority and appeals to a potential readership through the use of colors, decoration, typography, dedications, and written justifications of their method. Rhetoric may be concealed, but it is always present, for there is no description without performance (Harley, 1989:11).

The map-making “performance” Harley (1989) refers to is also always selective. Thus, another way to frame the discussion is that no description comes without some

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67 Latour introduces the idea of the “immutable mobile” which is an image, such as a map, that is a fixed display of information and is used in different times and contexts to represent ideas or facts. One common example is the picture of the earth suspended in space, which has come to represent such things as environmentalism, holism, peace, and a number of other things. The meaning of the image, how it was produced and by whom is often “taken for granted” or ignored when it is used.
selection. Maps are always used to further a political agenda; they are windows into the society that shaped them as much as they are windows into the world itself.

3) Identity Forming

Ultimately, while maps are models of reality, they also shape that reality. For instance, in environmental planning, maps reflect the views of scientists and policymakers about what knowledge and whose perspectives are authoritative, whether one or a plurality of plausible interpretations are legitimate and at what scale (i.e., local, state, federal) a problem ought to be addressed. For example, land use maps are often de facto “base maps” used to describe the attributes of a place, implicitly suggesting that making physical changes to the land use of a place is the principal means to address local issues (Hayden 1995). Peter Hall (1994) argues that the widespread acceptance of land use mapping has helped keep a “functionalist” view of city planning, which he describes as the demarcating and separating of land uses in zones classified by their function, as the dominant paradigm in the 20th century.

One of the most common tools to model reality in environmental planning is geographic information systems (GIS). GIS is a means of integrating spatial and non-spatial information into a single computer system for analysis and graphical display. The reliance on computer-generated maps has been criticized for raising obstacles for public participation in and understanding of the planning process. For instance, lay publics, especially those from disadvantaged groups, may have limited knowledge of or physical access to computers. Since the assumptions underlying the computer map production are buried within the computer application itself, GIS may further hinder lay understanding of the planning process. Yet, at the same time, the increased availability of computing
power might also lead to the democratization (or at least accountability) of map-making, precisely because citizen groups may be able to offer their own computer-generated maps. One clear result of the “GIS revolution” in environmental planning is the almost unfettered trust in quantitative information as the basis for generating spatial maps and characterizing hazards (Porter 1995).68

Community map-making has always been an integral piece of the work of planning (Hayden 1995; Lynch 1960; Spirn 1984). Increasingly, planners are trying to incorporate technology such as GIS into participatory and collaborative planning efforts (Aberley 1993; Healey 1998).69 Attempts are also being made to incorporate local knowledge into GIS (Craig & Elwood 1998). Much of this work involves students and draws from the intimate knowledge young people have with their neighborhood (Spirn 1984).

This chapter follows the map-making work of students and other community activists in three different environmental planning conflicts. I begin with an episode describing how young people used maps to organize local residents into a coalition to oppose the siting of a proposed incinerator in the neighborhood. In the second episode, community activists develop a GIS to produce environmental hazard maps and use these maps to challenge the permitting of a large waste transfer station in the neighborhood. The final episode tells how a community group mapped environmental pollution data and

68 Monmonier (1996) notes that error, inaccuracy, and imprecision are inherent in GIS. The irony is that the problem of error devolves from one of greatest strengths of GIS: the ability of a single system to collate and cross-reference many types of data and discrete datasets by location – called “geo-coding.” Unfortunately, every time a new dataset is imported, the GIS also inherits its errors. These may combine and mix with the errors already in the database in unpredictable ways.

69 See: Project Varenius Specialist Meeting: Empowerment, Marginalization, and Public Participation GIS, Santa Barbara, CA [www.ncgia.ucsb.edu/varenius/ppgis/].
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used this information to highlight gaps in an EPA air toxics dispersion model being conducted in the community.

6.b. Students & the Mapping of Neighborhood Knowledge

The *Toxic Avengers*, founded in 1988, were a group of G/W high school students who organized themselves to raise community awareness about environmental pollution. Their name came from a comic-book of the same name, whose characters were crusaders against toxic waste. The students were from the El Puente Academy high school and the community organization’s program on community health, youth service and leadership. What began as a science class project designed to foster interest in environmental issues turned into an organization that raised environmental awareness in the community and helped galvanize a community coalition that would be instrumental for taking action against neighborhood environmental hazards.

The young people who formed the Toxic Avengers were part of a science class doing a unit on understanding the neighborhood environment. The science class researched local hazards by gathering readily available information from local, state and federal environmental agencies on the environmental performance of facilities in the community. They discovered, for example, that the Radiac Corporation—a storage and transfer facility for toxic, flammable, and low-level radioactive waste located in the neighborhood, was the only facility of its kind in the entire city. The students also searched through newspaper archives to find references to environmental pollution in their neighborhood.

The class instructors, with the help of local environmental activists and agency professionals, organized environmental “tours” of the neighborhood. Students visited the

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local sewage treatment plant, natural gas tank farm, waste transfer station, scrap-metal recycling facility, Superfund site, a depot for sanitation trucks, and other locally noxious industries. Environmental professionals and activists often led these “toxic tours.”

Students also visited the “green” spaces in the neighborhood, such as McCaren Park. On the tours, the gravity of each environmental insult was often felt immediately because of fumes, odors or noise levels. While on the tours, students took photos and recorded their observations, feelings and perceptions about each site.

The students returned to the classroom and were tasked with developing a “community risk map.” Community risk mapping is a process adapted from the practices of labor organizers, often in farm-worker and other industries, where potential health and safety risks exist in the workplace (Hesperian Foundation 1998; Labor Occupational Safety and Health Program 1996). In workplace risk mapping, workers identify, categorize, and then represent risks they face on maps of their work environments. Workers are encouraged to use symbols and other non-traditional mapping devices to display the locations of areas or tasks in the workplace where they have experienced or perceived dangerous or noxious conditions (Aberley 1993). Community risk mapping emulates the workplace mapping process and generally involves a group brainstorming session to list hazards, coding and symbolizing hazards and then mapping the hazards on a large poster-board, which is also done in a group session. The process is often used in communities where residents may be uncomfortable with technical information, are not fluent in English and seek a means for creatively expressing how they perceive the place they live (Aberley 1993).

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The Toxic Avenger group used what they learned in the science class to develop a map of the community for the explicit purpose of organizing residents. After learning that an upcoming public hearing was going to review the operating permit of Radiac, the young people decided to use their map of the neighborhood to draw attention to the poorly maintained and, in their eyes, dangerous facility. The risk mapping process created more than a new image of the community, but some of the ‘non-argumentative’ aspects of learning suggested by Forester (1999:126), such as “building new networks, creating new organizational forms, and...an emphasis on the creation of fora in which participants can meet to consider the challenges in front of them and the disputes entangling them.”

The Toxic Avengers came up with a map that affectionately became known as the “skulls” map (Figure 6.2). The map was turned into a poster and used to publicize the Radiac hearing throughout the neighborhood.
Figure 6.2 The Toxic Avenger’s Skulls Map
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The skulls map describes the neighborhood as “NYC’s toxic nightmare.” It portrays skulls describing numerous local hazards using graphic visuals and text. The background or base-map is a photocopied tax surveyor map that was made to look like an x-ray, enhancing the sense of urgency that pollution is compromising personal health. Photographs of industrial facilities are also used on the skulls map and they are used to identify the location of a particular polluter. The photographs allow residents to identify with the map since they could recognize pictures of the facilities. However, the pictures were slightly “whited-out” to look almost ghost-like.

The Toxic Avengers brought the map to Luis Garden Acosta, El Puente’s founder and Executive Director, in an effort to encourage him to personally invite the neighborhood’s Hasidic Jewish population to the Radiac hearing. After seeing the map, Acosta was convinced that all the community’s ethnic groups would need to work together to improve environmental conditions (Hevesi 1994). According to Acosta:

It was nothing but confrontation [with the Hasidim] before young people from the Toxic Avengers came to me and said, ‘Isn’t it time to ask the Hasidim to join forces with us in reclaiming our environment?’ It was their request and their graphic map gave me the ‘ah ha’ that we all breathe the same air.

After the request of the Toxic Avengers, Acosta sent an invitation to Rabbi David Niederman, the Executive Director of the United Jewish Organizations (UJO) of Williamsburg to come to a planning meeting for the Radiac event. Rabbi Niederman agreed to come meet with El Puente and bring other Hasidim with him after El Puente agreed to hire police to guarantee their security. As Acosta recounts those events in May 1991:
It was a historic moment when a Hasidic rabbi, a leader of the Satmar, walked through the doors of El Puente. We were planning a march to a hearing on Radiac emergency procedures, and Rabbi Niederman volunteered to help lead that march through Latino streets. I can't describe what a change that meant. It was a clear act of courage on the part of David Niederman (quoted in Shaw, 1996).

The multi-ethnic march raised interest in the issues and over 200 people attended the hearing. The success of the event encouraged the two groups to organize an “environmental town meeting” to raise awareness about local hazards and specifically to educate residents about a proposed municipal waste incinerator in the Brooklyn Navy Yard (Grieder 1993).

The incinerator was supposed to be a cost-effective way for the city to dispose of its municipal solid waste. In the 1980’s, after closing all but one landfill and most of its incinerators, NYC feared a garbage disposal crisis. The possibility of a crisis made headlines in 1987 when a garbage barge called the “Mobro,” carrying 32,206 tons of New York refuse, left Islip, N.Y., on a six-month journey in search of a place to unload. The barge was turned away by several states and three countries, eventually returning to New York, with most of its garbage burned at the Southwest Brooklyn incinerator (Miller 2000). Soon thereafter, the City of New York devised a Comprehensive Solid Waste Management Plan which would close the 22 city-operated incinerators and the over 1,200 private apartment building incinerators. In order to handle its waste, the city planned to build eight new incinerators and the Williamsburg, Brooklyn, facility was planned as the first and largest (Miller 2000).

The Brooklyn Navy Yard incinerator was proposed as a “state of the art” facility that could burn nearly one-third of the city’s daily municipal waste (approximately 3,000 tons per day at the time of the proposal) and was supposed to ease the burden on the only
operating landfill site in the city, Fresh Kills on Staten Island (City of New York 1985; EDF 1984; Miller 2000). At the time of the proposal, the largest incinerator in the city was burning 550 tons per day. Neighborhood residents, along with city, state and national environmental groups sued the city to stop the proposed project based on the increased truck traffic and unsafe air emissions (Liff 1992; Sullivan 1995). Barry Commoner emerged as a vocal opponent of the project and claimed that dioxins from the incinerator would poison local residents (Commoner 1992:109-119). The town meeting was held to educate and organize residents to oppose the incinerator.

The town meeting brought together community leaders representing different issues and ethnic groups to speak about hazards in the community and the need to organize together to stop the incinerator. The Toxic Avengers developed another map of the community for the town meeting title “Our Town” (Figure 6.3). The “Our Town” map was intended to show that the community was under multiple environmental stressors, not just the proposed incinerator. Like the “Skulls” map, the “Our Town” map used graphic displays of death and danger to portray the neighborhood. The young people used skull and cross-bones to label toxic storage sites, a large nuclear symbol to identify the Radiac facility, and black smoke coming from stacks to identify the incinerator sites. The “Our Town” map was also filled with descriptive information about the amount of pollution emitted from local facilities.
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Figure 6.3 “Our Town” Community Map

Excessive local Incinerators are burning 8% of NYC trash. Proposed new Incinerators will raise this figure to 33%.

Air pollution from incinerators, playing factories, planks, auto-paints, industrial solvents, B.Q.E. and industrial traffic contribute to bronchitis, emphysema, lung cancer, asthma and heart attacks.

I'm having chest pain.

Over 1,200 residents attended the meeting. The theme became protecting “our town” and the meeting ended with a commitment from leaders of the Latino, Hasidic, African-American and Polish communities to form the Community Alliance For the Environment (CAFE) (Greider 1993). The first action the CAFE planned was a multi-ethnic march over the Williamsburg Bridge during rush hour to protest the proposed incinerator (Hevesi 1994). The Toxic Avenger’s map helped educate and organize the new multi-ethnic environmental coalition. The 1992 march has been credited as one of the key turning points that eventually convinced the City to mothball the incinerator proposal (Sullivan 1995).

Both the Skulls and Our Town maps reveal the creativity and awareness young people can bring to an environmental issue. They suggest that, as Mumford (1938: 359), noted, that the planning process often begins “with a dynamic emotional urge, springing out of a sense of frustration on one hand and a renewed vision of life on the other.” The maps acted as powerful representations of a “dying neighborhood” and one inundated with hazards. On each map, almost no space was left for viewers to see what else was in the neighborhood besides polluting facilities. The maps help “pattern attention selectively,” or reveal what some residents’ value, publicly express allegiances and prepared residents – “more or less well – to recognize new issues and attend creatively and responsively to particular struggles at hand” (Forester 1999:139). Designed for the purpose of organizing residents, the maps accomplished their mission and helped galvanize an important multi-ethnic environmental coalition in the neighborhood.

72 The main players in the multi-ethnic, multi-racial anti-incinerator coalition were El Puente, UJO, and the Polish and Slavic Center (PSC).
73 The march was called “CAFÉ con LECHE” because the Brooklyn CAFÉ coalition marched over the bridge to Manhattan to meet another community coalition opposing the incinerator called, Lower Eastside Coalition for Health and the Environment (LECHE).
Students were able to combine local knowledge and professional data into powerful visual information. Visualizing local knowledge, whether through community maps, murals or theater, is a method for local people to express what they know, share it with other community members in a way that is understandable for all, focus discussion (as in the “Our Town” map), and propose options for action. As tools for educating community members, sharing experiences, and mobilizing action, maps can be as or more important than local knowledge as text, particularly in communities with disparate levels of formal education, common language, symbols and traditions. But, as the student maps showed, mapping local knowledge can be more important for influencing within the community than at the professional level.

The student maps made a cognitive contribution by powerfully highlighting how resident’s perceived local pollution, how pollution was impacting different groups within the neighborhood and their lifestyles. The student maps also gave “voice” to those previously silent about environmental hazards. However, the maps did not help extend professional science. The maps did link with a larger social movement aimed at blocking the incinerator and this contributed to the success of the maps as organizing and educating tools. The student map-making also stimulated further community interest in developing visual portraits of neighborhood air pollution.

6.c. Contested Images: Community and Professional maps

The student maps were low-tech images that contained a lot of detail but were cartoon-like. The community groups realized during the incinerator battle that they would have to start generating maps to compete with technical experts in order to make their point of cumulative environmental impacts in the neighborhood (Swanston 1999).
Soon after the CAFE was formed, the Watchperson Project was created. Part of the Watchperson Project’s charter included the development of a geographic information system (GIS) accessible for community members (ICLEI 1993; Sweeney et al 1994). Beginning in 1993, the Watchperson Project partnered with Hunter College to gather electronic data to enter into a community-based GIS. A key goal for the community was to use the GIS for analyzing the proximity of polluters to residents and to develop sophisticated and “official looking” maps (Anderson 1994; Hanhardt 1999). The Watchperson Project initially used the GIS to produce maps to display the relationship between hazards and residents, schools and other sensitive receptors. One of the first published maps displayed the proximity of the Radiac facility, an electroplater and a sugar factory to a school, day care center and neighborhood playground (Figure 6.3). During a public hearing over the permitting of a controversial waste transfer station in the neighborhood the community first used the GIS to challenge a city-backed project.
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Figure 6.3 Watchperson Project GIS map depicting selected facilities North of the Williamsburg Bridge
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6.d Community Hazards versus Professional Land Use Maps

In April 1998, the City’s Department of Sanitation (DOS) and the New York State Department of Environmental Conservation (DEC) approved the siting of the largest waste transfer station in the city’s history.\(^{74}\) The transfer station, which was permitted to process up to 5,000 tons of waste per day on the Kent Avenue site known as Eastern District Terminal, was going to be operated by the USA Waste Services Corporation (Saltonstall 1998).\(^{75}\) The 60,000 square foot facility was approved by the City DOS and State DEC without an assessment of potential environmental, traffic and public health impacts. The agencies granted the facility a “Negative Declaration,” declaring that the facility posed “no potential significant impact on the community.” A coalition of community organizations sued the state claiming that the size of the facility required an environmental impact statement (EIS).\(^{76}\) A public hearing, the required final step in the permitting process, was held in April after the facility’s approval.

Representatives from a number of community groups testified against the proposed facility. From restaurant owners who said the noise, dust and smell of the facility would destroy their business to community leaders, such as Rabbi Niederman, who claimed that the trucks and pollution would put all community residents at risk. Testimonials of over 200 residents occupied almost the entire hearing which lasted well

\(^{74}\) Under a 1991 court order, DEC and DOS share responsibility for review of solid waste transfer stations under the State Environmental Quality Review Act. DEC leads in review of natural resource issues and DOS in issues of social and economic impact.

\(^{75}\) USA Waste Corporation was later acquired by Waste Management Inc. and the transfer station proposal was also pursued by Waste Management.

\(^{76}\) See: Howard S. Golden, et al. v. Michael Carpinello, et ano, Supreme Court of New York, Index Number 42723/98. Some of the community groups included Neighbors Against Garbage (NAG), Organization of Waterfront Neighborhoods (OWN), El Puente, New York City Environmental Justice Alliance, The Watchperson Project, Organizations United for Trash Reduction and Garbage Equity (OUTRAGE) and Boroughs Allied for Recycling and Garbage Equity (BARGE). The case was submitted by the New York Lawyers for the Public Interest and Brooklyn Legal Services.
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past midnight. An administrative law judge presided over the hearing. Samara Swanston, Executive Director of the Watchperson Project, presented a series of maps showing the areas in the community that would be impacted, such as those along truck routes. The maps also showed the number of existing waste transfer stations and their proximity to low-income and populations of minority groups. According to Swanston:

We tried to make the case that not only was this mammoth facility going to hurt business, it was also part of a pattern of environmental injustice in the neighborhood. When community folks start talking about environmental justice, regulators tend to cringe, and that is what the DEC did. But, the ALJ (administrative law judge) was more open. I think he hadn’t really heard of the issue before. When we put up the map of the cumulative hazards and I asked him if he’d want his kids to live here, he kind of did a double take.

The cumulative hazard map showed the truck routes, the locations of the neighborhood’s transfer stations, school and park properties, and sites where toxics were used and released (Figure 6.5). The map also plotted the locations where elevated lead levels were found in neighborhood children, an oil plume underneath the neighborhood and the sewage treatment plant. According to Heather Roslund, an activist with Neighbors Against Garbage (NAG), the map was significant because:

It gave us legitimacy. We not only gave our testimony, but we showed them [DEC and DOS] that we also did our homework and had technical skills. The community maps showed that we were not just about NIMBY, but that this was a much larger issue about environmental hazards. We showed that we were prepared and could go head-to-head with the city, state and even a big corporation like USA Waste.

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77 I attended the hearing as a member of the NYC DEP, but was not involved in the review of the facility. The following account of the meeting are from my notes and observations unless cited otherwise.
Figure 6.5 Cumulative Environmental Impact Map by the Watchperson Project

Map: 01
Cumulative Environmental Impacts
Greenpoint / Williamsburg, Brooklyn
The City DOS countered the community’s presentation with maps of their own. The DOS argued that this was a siting case, that these facilities were necessary to avoid a garbage disposal crisis. The issue, according to the DOS, was about available appropriately zoned land. The city displayed a map of the neighborhood’s zoning and land use. The only other environmental features on the map were truck routes and the location of existing transfer stations (Figure 6.6). The city argued that the only legal location for transfer stations was in areas zoned for heavy manufacturing, labeled “M-zones,” and G/W happened to have more of this land than almost any other community district in the city. According to James Doherty, Sanitation Commissioner at the time:

> The only clustering we might see of transfer stations is because these facilities are limited to industrial areas and these tend to be concentrated in certain parts of the city. In fact, we even exempted the light-industrial, M-1 zones, which tend to be closest to residential areas. We [Department of Sanitation] have no control over where these things get sited. They go where the zoning allows them to go (quoted in Martin 1998).

The City’s maps were used as a justification for the permitting of the waste transfer station and were used to deflect concerns about unfairness and whether G/W was a community already overburdened with hazards.
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Figure 6.6: New York City, Department of City Planning Zoning Map of Brooklyn Community Board #1: all transfer stations
In the eyes of most community members, the maps were an indication of city’s refusal to acknowledge the cumulative toxic burden facing the neighborhood. The city’s maps became affectionate known by residents as the “toxic donut” maps. They were called this because the maps showed the oval-shaped community surrounded on all sides by manufacturing land uses and industrial zones, with residents living in the center of the industrial ring.

The administrative law judge overseeing the hearing ruled that the community’s case was compelling and required USA Waste to provide more information to show that their facility would not have a significant environmental impact on local residents. The judge ruled that it seemed “unreasonable” for a facility of such a size to not have some impact on the community, and, in light of the background environmental conditions in the community, more information would be necessary before any permits granted (Shin 1999). In June of 1998, the New York State Assembly and Senate both passed bills (S7610/A11084), introduced by Brooklyn Representatives, requiring USA Waste to perform an EIS. And, just two months after the hearing, on June 23, 1998, Governor Pataki signed the Bill and announced that the State would require USA Waste to prepare the environmental assessment.78 However, after a year of study, the EIS concluded that there would again be “no significant impacts” from the facility and, at the urging of Congresswoman Nydia Velazquez, the White House Council on Environmental Quality and the EPA began an examination into whether G/W had been targeted for transfer

78 State of New York, Executive Chamber, Press Office, June 23, 1998. “Governor Pataki, Mayor Giuliani Announce Environmental Review for Brooklyn Transfer Station.” Governor Pataki notes in the announcement: “Given the location of both these actions under consideration by the State and the City, and after hearing the community’s concerns about this project, we are requiring the preparation of an environmental impact statement.”
stations because residents were poor and minority (Shin 1999). According to Brad Campell, an Associate Director at the CEQ:

"The problems we see here have a huge influence on policy and legislation. We were very disappointed that the City Housing, Sanitation and Environmental Protection departments are not joining us in this effort. The best chance for solutions is when we have a partnership between federal, state and local governments (quoted in Shin 1999)."

As the federal investigation went ahead, the city DOS granted the waste transfer station its permit. It wasn’t until May 2000, after the NY Lawyers for the Public Interest (representing the community) convinced a Manhattan Supreme Court Judge to block the permit, was the facility finally stopped from operating (Liff 2000).

By combining agency data with resident’s experience of hazards, the community hazard map was attempting to extend the work of professional science. The community map also tried to shift the debate from facility siting and zoning to cumulative impacts and environmental injustice. However, the city perceived the map as a threat and countered that it was “irrelevant” for siting decisions that were based on zoning. The map did help residents gain attention from the environmental justice movement, and this visibility played a significant role in getting the federal government and eventually the ALJ to pay attention to the community’s claims. Community mapping played a key role organizing attention, but ultimately only supplemented the legal arguments that influenced professional action.
6.e. Mapping Small Source Air Polluters

As environmental justice claims continued to surface in the neighborhood, community groups continued expanding the capabilities of the GIS. The Watchperson Project used the GIS and its mapping technology again during the EPA’s Cumulative Exposure Project, the same project that assessed risks from subsistence fish diets discussed in Chapter 3. This time, the community mapped polluters that an EPA exposure model in the community was going to overlook.

While the relationship between air pollution and public health has long been studied (Dockery et al 1994; Am. Thoracic Society 1996; 2000; Holgate et al 1999), definitive conclusions about air pollution’s effects on urban residents are limited. In addition to gaps in understanding the biologic mechanisms responsible for the morbidity and mortality associated with increased air pollution, a lack of consistent ambient monitoring in urban areas has prevented scientists from capturing pollution at the local or micro-environment. Yet, high concentrations of air pollutants are suspected of being common in many poor urban neighborhoods. The lack of micro-environment air monitoring has also prevented study of intra-urban or neighborhood differences that might also help better understand distributions of health effects associated with urban air pollutants. Additionally, combining point, area and mobile sources to characterize pollution in micro-environments has also proved difficult. Thus, dispersion models are used to estimate micro-scale urban pollution.

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79 In 2000, Congresswoman Nydia Velazquez filed a Title VI Civil Rights complaint with the EPA, asserting that G/W residents have been targeted for transfer stations. She has also introduced the 2001 Community Environmental Equity Act (HR 4939), which prohibits disproportionate exposure to hazardous substances based on race, color national origin or economic status. See, www.house.gov/velazquez/PressReleases/2001/pr010420.htm.
The first task of the air toxic exposure assessment of the CEP involved gathering data inputs for the hazardous air pollutant (HAP) dispersion model called, Assessment System for Population Exposure Nationwide (ASPEN). The ASPEN model estimates long-term outdoor concentrations of 148 of the 188 HAPs listed in the Clean Air Act of 1970 for every census tract in the contiguous United States, based on 1990 data (totaling 60,803 census tracts) (EPA 1999a; Rosenbaum et al. 1999; Woodruff et al. 1998). The CEP uses ASPEN, a Gaussian dispersion model, to estimate outdoor concentrations of HAPs on the basis of emission rates of the HAPs, frequencies of various meteorologic conditions, and effects of atmospheric processes such as decay, secondary formation and deposition.

The EPA planned on using the ASPEN model in G/W and adding any relevant local emission sources. However, the agency was content on basing the model on pollution data from the one state air monitor in the neighborhood and the fifty Toxic Release Inventory (TRI) sites registered with the EPA (EPA 1999a). During meetings presenting the project to the community, EPA heard from residents that their proposed methodology, particularly the census tract aggregation and the reliance on state and federal data, was going to miss some potentially hazardous exposures. According to Maria Zoraida Morel, a local resident at one meeting:

If you just walk around here you can see that we’ve got polluters mixed in with residents; some small and other large factories. To tell us that everyone in the census tract was exposed more or less the same missed the variations on the street.

During the same meeting, representatives from the Watchperson Project noted that the air dispersion model was going to miss hundreds of potential polluters because they did not show-up in any state or federal air quality database, but they were regulated
by the NYC DEP. The community group also noted that the census tract aggregation of the ASPEN model was going to “wash-out” the block-to-block pollution differences that existed in the neighborhood. Additionally, the community group noted that the air toxic model made no mention of indoor air pollution, specifically perchloroethylene (“Perc”), a known carcinogen suspected of affecting residents living above dry cleaners (Swanston 2000).

In making their case to the EPA, community residents once again developed their own set of maps. The Watchperson Project used their GIS to develop maps comparing the EPA and state hazardous sites used as data inputs for the model and the City DEP regulated air polluters that the model was slated to ignore (Figure 6.7). The Watchperson Project had spent over two years trying to obtain environmental information from the City, including air permit information, environmental complaints records and parcel-by-parcel tax information from the City’s Department of Finance. The DEP data was from the Bureau of Air Resources Administration Management Information System (BARAMIS) and included permit data on over 3,000 facilities in the neighborhood that were required to file for an air emission permit, but were not regulated, such as apartment building boilers, auto-body paint shops and printers. The Department of Finance data set included details about the history of every land parcel in the neighborhood for tax assessment purposes, and included information such as building type, property value, fire department inspections and property owner. After a lengthy battle with the city, including numerous Freedom of Information Act requests, the community group obtained the electronic data (Swanston 1999). The Watchperson Project was the only community organization in the city that obtained these disparate data sets and, since these data were
not housed at any one city agency, no agency had compiled this information into one computer system capable of graphically displaying the information (Hanhardt 1999). With the help of computer specialists from Hunter College, the group began manipulating the data in their own GIS.

The Watchperson Project’s map showing the block-by-block variation of air polluters was aimed at convincing the EPA that their model’s aggregation was not fine-grained enough to accurately characterize air pollution in the neighborhood. According to Robert Lewis, Director of the Watchperson’s Office GIS project:

To capture data only by census tract or block group averaged-out significant localized emissions. A data-set that aggregated by census-tract or even block would miss important distinctions between city blocks and even within one block. We had the data to show this. So we produced maps of the entire neighborhood and presented them to EPA showing just how many small-sources there are in the neighborhood and how the state and federal databases missed all these.

The Watchperson Project mapped 15,167 distinct land parcels in the community and produced maps comparing the facilities used in the EPA model with facilities regulated by the DEP but which the dispersion model was not going to include (e.g. Figure 6.7). The group found over 1,000 potentially toxic air polluters that EPA was going to miss in its census-tract level assessment (Swanston 2000).
Figure 6.7 Community-Generated Block-by-Block Map Comparing EPA & DEP Modeling Sites
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The Watchperson Project’s maps were convincing to EPA scientists, but the agency struggled with how to treat the information in their dispersion model. According to one EPA scientist:

The community maps made sense, especially after some of us had toured the neighborhood with some residents. We had a sense there were lots of small sources, but we didn’t realize the full extent until we saw the community’s maps. We struggled for a long time considering what to do with their data set. We tweaked the model some but we just couldn’t aggregate all those sources at a block-by-block level without losing accuracy in the dispersion model. What we did do, however, was take the area sources we could get enough data for, plot them, and model them as point sources. 80

The community-generated map forced EPA to rethink whether its dispersion model was an accurate characterization of on-the-ground exposures, but ultimately did not significantly alter the agency’s dispersion model.

A second map produced by the Watchperson Project’s GIS was also used to try and influence the EPA modelers. As part of their GIS program, the community group used volunteer high school students to canvass the neighborhood in teams to follow-up on community complaints of air, noise and odor pollution registered by residents with the DEP. The community group plotted the location of the complaints on GIS-generated maps and students “investigated” the areas near the complaints to look for any obvious sources of pollution that might need attention. One finding from the student’s “street-survey” was that a large number of complaints were coming from residents living in buildings with dry cleaning establishments (Swanston 2000).

After learning about the findings of the student canvass, the Watchperson Project organized a special project focused on documenting the location of all neighborhood dry cleaning establishments and the specific type of buildings in which they were located.

80 EPA scientist interviewed on April 24, 2000, on the condition of anonymity.
The survey found 54 dry cleaners in the neighborhood, with 23 of the 54 performing dry-cleaning in a residential building (EPA 1999a). Using the GIS and census data, the community group estimated that as many as 183 apartments and approximately 550 residents were living above dry cleaning establishments (EPA 1999a). Again the group mapped these findings and presented them to the EPA modelers (Figure 6.8).

Figure 6.8 Community Plots of Neighborhood Dry Cleaners

Exhibit 6-11
LOCATION OF DRY CLEANERS IN GREENPOINT/WILLIAMSBURG

Source: Swanston, Samara F., "Data Validation of Dry Cleaner Presence in Greenpoint/Williamsburg," G/W Watchperson Project, September 1999.
The Watchperson Project’s dry cleaning survey raised a particular concern to EPA since a number of recent studies in New York City had found concentrations of Perchloroethylene (perc) inside apartments, at up to three floors above a dry cleaner in the same building, averaging 150 ppm (parts per million), with some measurements exceeding 1,000 ppm (Wallace et al 1995; NYS DOH 1993).\footnote{Perc is a dry cleaning solvent and at high exposures has been shown to have adverse effects on the central nervous system, liver and kidneys. The US EPA Cancer Benchmark Level for Perc is 1.7ppb. A report by the NYC Public Advocate, \textit{Clothed in Controversy II: The Urgent Need to Protect New Yorkers from Toxic Dry Cleaning Fumes}, March 18, 1997, noted that two flights above a dry cleaner in Tribeca, perc levels were measured at 5-16 times the State DOH guideline. See: publicadvocate.nyc.gov/padcdetail.cfm?id1=7&id2=46.} In one study by the State DOH, 39 of 40 apartments tested above dry cleaners had concentrations of perc in the air exceeding the 100 ppm state guideline for non-cancer effects. One measurement in this study found perc levels at 197,000 ppm. Another study by the Consumers Union found that 24 of 29 apartments above dry cleaners had four-day average concentrations of perc above the DOH guideline and 8 had average concentrations above 1,000 ppm (Wallace et al 1995).

The EPA ASPEN model estimated the expected \textit{outdoor} concentration of perc at less than 2 ppb (part per billion), with a maximum-modeled census tract outdoor concentration of 39 ppb (EPA 1999). According to Fred Talcott, Project Director of the CEP at EPA:

\begin{quote}
The average concentration found in apartments above dry cleaning establishments was on the order of 1,000 times higher than the outdoor concentration of “Perc” as predicted by the ASPEN model in G/W. That to me is an illustration of a micro-level problem that would be completely obscured if you only looked at daily walking around concentration. Without the community group data set, we would have missed this.
\end{quote}
EPA considered performing a separate assessment for this sub-population, but eventually decided to only document the findings in the CEP report (EPA 1999:6-24).

These two examples of community mapping reveal that local knowledge can bring important insights to sophisticated technological assessments. The community GIS organized information that no other agency had compiled and then mapped these data to reveal what daily experience already told most residents: that pollution exposures differ from block-to-block and even along the same block. The community group also combined their computer mapping capabilities with a student survey to find a hazard unanticipated by the EPA: potential toxic exposures from dry cleaners in residential buildings. In both instances, the community mapping technology helped validate what residents were already experiencing (e.g., following-up on air and odor complaints) and helped bring this knowledge to the attention of the EPA. While the community maps failed in the end to significantly alter the EPA air dispersion model, the maps did challenge EPA to address new questions, new sources of data, new exposures and new groups claiming access to the assessment process – all of which had a significant impact on the way professionals viewed their role, if not their final decisions.

By using GIS technology to map both agency and local information, the Watchperson Project’s maps made an epistemological contribution that EPA recognized. The maps plotted pollution sources that the EPA model was going to miss and revealed that the census tract aggregation was not going to accurately characterize exposures, both of which could have extended the contribution of the EPA project. While the maps were not tied to a social movement nor was there a visible intermediary advocating for their uptake by professionals, perhaps the most significant obstacle for professionals to
consider the community information was a lack of low cost solutions. The EPA considered the community information too difficult to incorporate into their model and the maps ended up having minimal influence.

6.f. How Community Maps Influence Professionals

Maps are an important tool for organizing and make publicly visible the local environmental knowledge of communities. The mapping of local knowledge in G/W ranged from student drawings on photocopied street-maps to sophisticated computer-generated GIS outputs. In each instance, maps were used as counter expertise, opposing a noxious facility or challenging professional assumptions about how to assess the neighborhood’s environment. In each case, residents eventually changed the way professionals viewed the environmental issue at stake, although the extent to which the community maps were responsible for these changes was mixed.

The Toxic Avenger’s maps did not directly influence professionals but, by helping organize the community around environmental issues, the student maps helped build an important coalition that played a role in influencing professional decisions. The community’s cumulative burdens map was a key piece of a series of influential testimony that convinced the administrative law judge and other politicians to eventually demand that USA Waste perform an EIS. However, the community’s hazard map was not convincing to the city, as they continued to permit the transfer station even after the federal government intervened. For the City, the issue was appropriate zoning, not cumulative environmental impacts or unfair siting practices. It took successful litigation two years after the initial public hearing to convince the city to revoke the transfer station’s permit. Finally, the GIS maps that the Watchperson Project offered to the EPA
modelers were compelling, even mapping information that no other agency could combine, but did not significantly alter the air dispersion model. Why might the community maps not have directly influenced professionals?

As I noted in Chapter 1, the preconditions that contribute to the successful uptake of LK include: (1) coalition formation; (2) issue linkage; (3) intermediaries, and; (4) low-cost responses. In this case, the student maps helped build a community coalition, but the other maps did not. The student maps also combined understandings from agency databases, environmental pollution information, and local experiences with pollution. However, the maps were more expressions of how a group of local people saw the conditions under which they lived and the “cartoon-like” use of symbols might have contributed to professionals not taking these maps seriously. The community’s GIS generated maps built from electronic information that agencies and scientists were themselves using. The “street” maps both extended the understanding of scientists but also radically challenged professional analyses. For example, the GIS maps that identified small-source air polluters that the EPA model was going to miss, helped fill gaps in the agency’s modeling inputs. The cumulative environmental impacts map radically challenged the fairness of the City’s transfer station siting practices and attempted to shift the discourse from one about zoning to environmental justice.

One key factor that seemed to make the local maps effective was their link to community organizing and a larger social movement. The Toxic Avenger maps were designed to organize local people to attend the Radiac hearing and organize against the incinerator. The cumulative hazard map was also linked to the environmental justice movement. The role of an intermediary may be less significant in this case because
visual images tend to “speak for themselves.” However, the community did not have an intermediary who worked to translate the maps and the information they were displaying for professional decision-making. In some ways, the GIS technology acted as the surrogate intermediary, since the technology was something both professionals and locals accepted as a legitimate means for displaying environmental information.

Perhaps the most compelling reason that the community maps had limited direct influence over professionals was that the local maps radically challenged the way professionals were prepared to address the problems activists were raising. The City had no response to challenges of fairness and justice that the cumulative environmental impact map raised. Even when the federal government intervened to investigate whether waste transfer stations were being targeted for poor and minority neighborhoods, the City refused to participate in this probe. Similarly, the EPA modelers could find no easy solution to the inadequacy of the census-tract level aggregation of their air dispersion model, or that the model was going to miss hundreds of small pollution sources, such as dry cleaners. The EPA was committed to the ASPEN model even when compelling community generated information suggested that it might not accurately characterize local air toxics exposures.

This chapter has shown that maps are common tools local people use to educate themselves, share information and attempt to influence policy-making. Young people making hand-sketches and sophisticated computer generated technology can both produce compelling maps that fuse local knowledge with professional and scientific data to offer a cognitive contribution to environmental policy making. However, the episodes
Chapter 6: Air Pollution & the Mapping of Local Knowledge

Here suggest that maps may not influence decision-makers unless they help suggest ways for professionals to intervene, not just challenge their ways of seeing local environmental conditions.
Chapter 7 - The Fusing of Local and Professional Environmental Knowledge

AND NOW
And now as you read these poems
— you whose eyes and hands I love
— you whose mouth and eyes I love
— you whose words and minds I love—
don't think I was trying to state a case
or construct a scenery:
I tried to listen to
the public voice of our time
tried to survey our public space
as best I could
— tried to remember and stay
faithful to details, note
precisely how air moved
and where the clock’s hands stood
and who was in charge of definitions
and who stood by receiving them
when the name of compassion
was changed to the name of guilt
when to feel with a human stranger
was declared obsolete.

This dissertation has argued that community residents can and do generate
important information about environmental health hazards that professionals have great
difficulty acquiring, and that this local knowledge is essential for improving
environmental decision-making. The kind of information lay experts offer varies – from
missing hazard information to detailed cultural practices that influence human exposures
to pollution – but this knowledge is as much “expertise” as the information professionals
offer. The four episodes have revealed that expertise is a crucial political resource in
science-intensive policy disputes, since access to knowledge and the ability to question
the data used to legitimize decisions are essential sources of power and influence. The
four episodes also highlight the importance of “street scientists” – the community groups
and residents who organize to gather local knowledge, formulate hypotheses, test the
credibility of their evidence, and perform the “social work” to get professionals to uptake
their knowledge to improve environmental decision-making. The episodes suggest that political power hinges in part on the ability to manipulate knowledge and to challenge evidence presented in support of particular policies. Ultimately, expertise, whether we call it professional or local, is a political resource exploited to justify political decisions, not an objective truth.

I have not argued that local knowledge is always superior or should replace professional ways of knowing and acting. Rather, I am suggesting that the boundaries placed around problems, the alternatives weighed, and the issues regarded as important tend to determine which “knowledge” is important. I have shown that the fusing of local and professional knowledge is a process of understanding, analysis and action. The challenge facing the knowledge fusion process is not how to decide whether professional or local knowledge is more appropriate, but rather how to recognize that both “street science” and professional science are equally valuable for addressing environmental health problems. The persistence of this challenge, beyond the episodes presented here from one Brooklyn neighborhood, makes clear that these are not unique events. They are part of a significant movement to reassess the priorities and political relationships that shape environmental decision-making.

7.a. Common Challenges to Local Knowledge Research

Studies of local knowledge and community-based practices, particularly in environmental politics, are often challenged for romanticizing local culture and practice and overlooking the structural and global dimensions of problem solving. For example, skeptics might accuse me of being too sympathetic to “identity groups” and in the process, reifying social divisions among groups. This critique claims that by valorizing
identity groups as important sources of knowledge and political claims, I am perpetuating divisions among social groups that are often creations of the state.

A similar critique might label my work “populism” since I challenge elitist notions that ordinary people cannot think or act as rationally as experts. Critics might emphasize that populism is also associated with a reactionary anti-elitism that has been challenged on a number of fronts, including: anti-intellectualism (sometimes undercutting rational debate by discarding logic and factual evidence in favor of following the emotional appeals of demagogues); majoritarian (emphasizing that the will of the majority of people has absolute primacy in matters of governance, often sacrificing rights for minorities); moralistic (evangelical-style campaigns sometimes leading to authoritarian and theocratic attempts to impose orthodoxy, especially relating to gender); and nationalistic (patriotic nationalism often promoting ethnocentric, nativist, or xenophobic fears that immigrants and ethnic and religious minorities bring alien ideas and customs that are harmful to white culture). Populist political movements are also criticized for "get the government off my back" economic libertarianism, xenophobia and ethnocentric nationalism, scapegoating, and for assuming that “the people” are united in rejecting ordinary politics in favor of spontaneous popular revolution (Canovan 1981; Kazin 1995).

Finally, my research into local knowledge might be challenged for exonerating the state’s responsibility to protect those least well off and shifting the burden of information gathering to local people. This same critique suggests that by emphasizing local knowledge, I am ignoring the social, political, and economic structures and institutions that help create the environmental burdens currently facing the poor and
people of color communities. Local knowledge might be understood by these critics as parochial and condemned to “the neighborhood” and this, they say, ignores national and global politics.

These challenges raise a number of questions that I will attempt to address in this concluding chapter, including: Do lay people, by entering into the domains of and engaging with professional science, run the risk of being exploited? What institutional decision-making arrangements are necessary to ensure local expertise is considered appropriately? If local knowledge helps reveal assumptions of professional science, how can we be sure to be equally reflective so that local knowledge is subject to equally intense scrutiny? Do lay people and social movements reproduce the same unequal distribution of knowledge and authoritative claims-making that often plagues professional institutions? How can local groups manage internal tensions that may arise between participating in the construction of scientific knowledge and the requirements of building and maintaining social and political movements? I address these critiques and questions by returning to my two levels of analysis outlined in Chapter 1 and comparing across the four cases.

7.b. Comparison and Analysis of the Four Episodes

The dissertation suggests that for ‘outsiders,’ such as planners, to effectively incorporate LK into their work, they must first understand what residents mean, appreciate the nuances in what residents are saying, and be willing to work with residents in formulating policy responses that take account of both professional judgment and local knowledge. I began by positing that local knowledge can improve environmental policy making on at least two levels – cognitive and normative. The cognitive level asked what
local knowledge contributed to environmental policy, and the normative level asked what accounts for the successful professional uptake of local knowledge? The four cases have provided detailed empirical examples to address both questions. For example, the subsistence fishing episode was my most successful case because the local knowledge of anglers made a strong cognitive contribution and this same knowledge was influential with professionals. The asthma case was also an example where community knowledge made a strong cognitive contribution, but this information was less influential with policy-makers. The lead poisoning case depicted a situation where local knowledge had mixed success making either a cognitive or normative contribution. Finally, the air pollution mapping case argued that community maps made a cognitive contribution, but had mixed success influencing professional decision-makers. To further demonstrate the contribution each case made toward answering my two levels of analyses, I summarize some of the cognitive contributions from each case in Table 7.1.

I also posited that several pre-conditions help explain the successful professional uptake of local knowledge, including: coalition formation; issue linkage; intermediaries, and; low-cost responses. *Coalition formation* hypothesized that professionals are more likely to consider local knowledge when residents organize into a coalition, as opposed to working alone, to gather, share, analyze and disseminate information. *Issue Linkage* posited that professionals are more likely to consider local knowledge when the findings are linked with a social movement outside the local community. The *intermediaries* precondition suggested that boundary spanners or policy entrepreneurs are necessary to translate local knowledge for professionals. The final precondition hypothesized that politically and/or economically low-cost professional responses are necessary for
professionals to seriously consider local knowledge claims. I summarize the presence or absence of each precondition in the four cases in Table 7.2.
# Table 7.1: Cognitive Contribution of Local Knowledge to Environmental Policy

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<td><strong>poisoning</strong></td>
<td>WABBA</td>
<td>No new data to</td>
<td>Residents noted EIS</td>
<td>WABBA</td>
<td>Early resident</td>
<td>Residents wanted lead</td>
<td></td>
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<td></td>
<td></td>
<td>convinced</td>
<td>fill gaps in</td>
<td>did not consider</td>
<td>participated in</td>
<td>information convinced</td>
<td>model to assess actual</td>
<td></td>
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<td></td>
<td></td>
<td>judge that</td>
<td>public health</td>
<td>lived exposures,</td>
<td>EIS</td>
<td>city to perform soil</td>
<td>community exposures, not</td>
<td></td>
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<td></td>
<td></td>
<td>Task Force</td>
<td>assessment of</td>
<td>only modeled</td>
<td></td>
<td>remediation &amp; form</td>
<td>city averages</td>
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<td></td>
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<td>did not</td>
<td>EIS.</td>
<td>ones</td>
<td></td>
<td>Task Force</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mapping</strong></td>
<td><strong>air pollution</strong></td>
<td>TRI data</td>
<td>Residents living</td>
<td>“Our Town” maps</td>
<td>Block-by-block</td>
<td>Students were</td>
<td>Cumulative hazard map</td>
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<td></td>
<td></td>
<td>missed small</td>
<td>above dry cleaners</td>
<td>revealed how</td>
<td>map gave</td>
<td>volunteer data</td>
<td>highlighted distribution</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>sources</td>
<td>shown to be</td>
<td>students perceived</td>
<td>community voice</td>
<td>gatherers</td>
<td>of transfer stations</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>highly exposed</td>
<td>community</td>
<td>in EPA dispersion</td>
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<td></td>
<td>group</td>
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<td>modeling</td>
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### Table 7.2

**Comparing Conditions that Make Local Knowledge Influential with Professionals**

<table>
<thead>
<tr>
<th>Case</th>
<th>Coalition Formation</th>
<th>Issue linkage</th>
<th>Intermediaries</th>
<th>Low-cost responses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subsistence fish diet risks</strong></td>
<td>The Watchperson Project organized residents to survey anglers and work with EPA.</td>
<td>Linked local project to national EJ movement debate over cumulative risk assessment</td>
<td>Watchperson Project translated local knowledge of anglers into EPA assessment. Swanston had legitimacy with locals and professionals.</td>
<td>Adding angler data not require radical alteration of EPA project. No threat of blame on particular actor/industry for hazard.</td>
</tr>
<tr>
<td><strong>Asthma</strong></td>
<td>El Puente mobilized students, concerned residents and others. Community health workers also organizers.</td>
<td>No community-wide, city or national coalitions built. Competition among community orgs. for funding lead to their isolation.</td>
<td>Community self-help focus. No one spokesperson.</td>
<td>Treatment and asthma management focus was low cost to city. Goals consistent with those of DOH program.</td>
</tr>
<tr>
<td><strong>Lead poisoning</strong></td>
<td>WABBA organized locals and outside groups.</td>
<td>Linked to effective local and city-wide coalition, as well as elected officials.</td>
<td>Poor communication with intermediaries. Disagreement among residents and intermediaries.</td>
<td>Got some soil remediation and blood-testing with initial protest/lawsuit. Not able to challenge EIS.</td>
</tr>
<tr>
<td><strong>Mapping air pollution</strong></td>
<td>Maps helped organize first Latino-Jewish environmental coalition, but no sustained coalition.</td>
<td>Toxic Avenger maps linked to community organizing. Cumulative hazard map tied to EJ mvt.</td>
<td>No clear intermediary to translate maps for professionals.</td>
<td>EPA did not see low cost response to incorporate small sources into dispersion model.</td>
</tr>
</tbody>
</table>

From my case analyses, I hypothesize that when there is both a clear epistemological and distributive contribution, and the presence of two or more uptake favoring conditions (i.e. coalition formation and intermediaries), local knowledge is likely to have a strong...
influence on professionals. This set of conditions existed in the subsistence fishing and asthma cases. The cases also seem to point out that when the contribution of local knowledge is mainly the raising of distributive justice issues, and not any combination of uptake conditions, local knowledge seemed to have the least influence with professionals. This was most pronounced in the mapping examples, where community knowledge raised distributive justice issues, but they were not accompanied by more than one uptake condition. This might explain why when community groups make straight justice arguments these claims have not tended to influence professionals. The cases clearly showed that epistemology plus distributive justice or epistemology plus democracy – facilitated by coalition building, issue linkage, intermediaries or low-cost responses – are the conditions under which local knowledge is most likely to influence professionals.

7.c. The Fusing of Local and Professional Knowledge

The successful cases revealed that fusing local and professional knowledge is a cyclical process that begins during initial problem framing and identification, continues during information and data gathering, and does not end with the professional consideration of local knowledge. Rather, knowledge fusion is an on-going process, not a one-shot-deal. Similar to processes of social learning, knowledge fusion involves both professionals and community members engaging in problem framing, information gathering, data analysis and interpretation (Dewey 1938). The fusing process is also similar to hermeneutics, the discipline of interpretation, where a continuous cycle of framing, interpretation and re-interpretation eventually leads to knowledge fusion. In its ideal, policy framing, analysis, intervention strategies and implementation strategies, are all “co-produced” in the fusing process. In this iterative and recursive process,
community members and professionals work to make their insights influential with one another. Fusion occurs when community members use professional methods and techniques to define problems and gather information, as well as when professionals are influenced by community experiences during the prioritizing of problems, choosing particular information to gather, analyzing information, and generating options for action. While the process is open-ended, knowledge fusion is decision-driven, implying that insights are applied to addressing a particular problem but are often re-negotiated as new problems emerge (Figure 7.1).
Figure 7.1  The Knowledge Fusion Process*

7.d. Facilitating the Knowledge Fusing Process

Since the knowledge fusing process requires engagement of community members and professionals throughout problem-solving, and scientists, policy-makers and community members may not be skilled in managing this kind of process, trained facilitators will likely be necessary to mediate knowledge fusion. Even well intentioned professionals committed to involving the public can have the process backfire when involvement is limited to institutionally defined hearings or when professionals operate with a deficit or complementary model of public understanding. Facilitators can help professionals translate their insights for lay people while also creating forums conducive for community insights to be heard and meaningfully considered by professionals. The knowledge fusion process attempts to build consensus among the individuals and groups most directly affected by a problem. Consensus building, which involves identifying and convening stakeholders, managing a public conversation, and negotiating agreements, is one way the fusing of local and professional knowledge can occur (Susskind et al 1999).

One of the first questions in the fusing process is always, “who gets to participate?” A requirement of fusion is to have community members whose welfare is at stake shape and participate in the process. Sustained interaction, if managed and organized appropriately, can raise the likelihood that the members of a diverse group will negotiate an agreement that each is willing to stand behind as fair, efficient, stable, and wise. This places a heavy burden on those in charge of the fusing process to identify relevant stakeholders and get them to agree to participate. Sometimes community groups will “self-select” themselves, but other groups of stakeholders may be difficult to engage because there is no organization through which they can be contacted. Others may
be historically disenfranchised and therefore be disinterested or resistant to participating in a political process. Convenors may need to help such groups coalesce and develop sufficient organizational capacity to choose representatives and keep their constituents informed.

Critics looking to discredit the fusing process or the outcome will look first at who was involved. If significant groups were excluded or not invited, they will have easy grounds on which to raise a challenge. (This is also why it is often preferable to deal with the practical problems of managing a large group rather than the political problems raised by limiting invitations.) An early effort to solicit participation can also prevent problems down the road when new groups seek to join the process in midstream. It is often not feasible to exclude such groups, yet incorporating them can add delays and disrupt working patterns the group has labored to establish. These observations argue for a robust effort to secure broad initial participation.

A next step is to get the group to articulate its goals and translate these goals into an agenda. The power of agenda setting will be clear to participants, as will the fact that broad or encompassing goals cannot be pursued through a narrow agenda. Efforts to shape or preempt discussion by dictating or limiting the agenda, will threaten any progress that has been made in building trust and legitimacy. The interaction through which the goals and agenda are pursued should be shaped by a set of procedural groundrules, decided upon by the parties. The rationale for using trained facilitators becomes even stronger here, as it is hard to imagine the same group of professionals bringing their particular perspective to the debate and simultaneously maintaining legitimacy managing the dialogue.
Managing the fusion process requires a persistent effort to keep the conversation focused and on track, mediating disagreements over technical issues, and ensuring the diversity of perspectives around the table are heard and considered. Facilitators must avoid a conversation of “dueling” experts, require that all participants describe their knowledge in a way that is understandable to all stakeholders, and ensure that all stakeholders have the opportunity to monitor and reshape the conversation as new information emerges. Good process management also requires that non-technical information, such as cultural traditions, values and narratives, hold equal weight in conversations.

7.e. Lessons for Communities

1) **Recognize the Epistemological Contribution of Local Knowledge**

   Communities ought to recognize that their knowledge and information gathering will become more influential if they can articulate the epistemological contribution it makes to environmental policy. Recall that the major failure in the lead poisoning case was the fact that the community could not articulate its knowledge, stories and experience into coherent knowledge, and the intermediaries they hired failed to help them do this. Community knowledge often combines insights from conventional science and the particular and situated knowledge that only those living with and experiencing disease and environmental exposures can offer. To recognize this is to acknowledge that professional understandings always have some local values and, similarly, community knowledge is always influenced by professional scientific methods, tools and findings.

   The subsistence fishing and asthma cases highlight that in order to articulate the epistemological contribution of local knowledge, community groups and professionals ought to seriously consider conducting community-based participatory research (CBPR).
In these processes, community members act as equal partners along-side scientists in problem definition, information collection and data analysis—all geared toward locally-relevant action for social change (Israel et al 1998; Minkler 2000). The inclusion of “participatory” in the term implies that research is performed with, not in, communities, where community is understood as a social and cultural entity in which the impacts of environmental exposures, health and disease are revealed in populations (Schultz et al 1998). Such methods are increasingly popular in public health as the field increasingly moves away from an emphasis on individual level risk factors and towards a focus on an “ecological approach” that recognizes that individuals are part of social, political and economic systems that shape behavior and access to the resources necessary to maintain health (Krieger 2001; Williams and Collins 1995).

One key lesson for communities is that they may need to establish research partnerships with outside professionals. The Watchperson Project partnered with the EPA to develop their angler survey and interview protocol, and the agency helped gather toxicological data and estimate cancer risks from ingestion rates derived from the community research. El Puente partnered with CIET and its epidemiologists to learn how to design and administer a survey, interpret data and train community health workers. In both instances, community residents helped frame research questions, define problems, decide what information would count, and who were credible sources of useful data.

One reason articulating the epistemological contribution of local knowledge is important is to dispel the myths that permeate professional circles that lay people have a “deficit” of environmental health knowledge—requiring education by experts—or that lay people simply “complement” professional technical expertise with value judgments
The "street science" of Brooklyn residents has highlighted how lay people are "co-producers" of environmental health knowledge (Jasnaoff and Wynne 1998). In an attempt to articulate how science might be "co-produced," Funtowicz and Ravetz (1993) call for an "extended peer community" where professionals and publics review evidence and make decisions all aimed at improving scientific knowledge:

When problems lack neat solutions, when environmental and ethical aspects of the issues are prominent, when the phenomena themselves are ambiguous, and when all research techniques are open to methodological criticism, then the debates on quality are not enhanced by the exclusion of all but the specialist researchers and official experts. The extension of the peer community is then not merely an ethical or political act; it can possibly enrich the process of scientific investigation (Funtowicz and Ravetz 1993:752-3). 

The explicit recognition of both professional information and local knowledge – and that neither can ultimately put to rest the uncertainty of environmental health problems – can encourage decision-makers to acknowledge the necessity of renewal, flexibility and adjustment as key elements of decision-making success. Instead of portraying themselves as the "source of certainty," professional decision-makers can highlight the necessity for contingent decisions that must be open to renegotiation as new information becomes available. This means that the professional's role must be

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82 The notion of joint-fact finding is analogous here. Joint fact-finding and data mediation can make an important contribution. These techniques use consensus building and mediation to help the experts resolve their disagreements over the technical facts. In joint fact-finding, the experts and the constituency groups which they represent develop and implement a joint strategy for answering the key policy questions, based upon generally agreed-upon scientific methods. Experts often do not have to reach agreement on every issue. Their primary goal is to clearly separate the issues upon which they can agree from those which are still subject to debate and then report their findings to the parties. Experts must explain their findings in ways which non-experts can understand. Points of agreement can then provide the parties with a more informed basis for resolving the dispute. Points for continuing debate, however, will require the parties to employ strategies for dealing with uncertainty. The goal is to use areas of technical consensus to eliminate options which clearly do not advance the parties interest, and then use strategies for dealing with uncertainty to approach the remaining technical issues (See: Susskind & Cruikshank 1987).
reconceptualized from “guarantor of safety” to “guarantor of recognition” – of new knowledge, new voices, new ideas, new possibilities, and new directions for interventions.

2) Building an Information Movement

The episodes of mixed success, particularly the asthma case, suggest that linking the epistemological contribution of local knowledge to a larger social movement is essential for successful professional uptake and influence. El Puente’s work was one of the strongest examples of community mobilization of local knowledge. The information the group gathered was clearly credible science and helped extend the work of conventional science. However, perhaps ironically, one of the strengths of El Puente’s efforts may have also contributed to its limited success. It’s strong local capacity building and community organizing effort that helped them reach thousands of residents in its door-to-door surveys and focus group discussions, was not accompanied by an effort to build alliances with other community groups performing similar work outside the neighborhood. The lack of an inter-neighborhood coalition turned out to weaken El Puente’s success with influencing professional decision-makers. The lack of a city-wide asthma coalition consisting of low-income people and people of color meant that El Puente and other groups did not significantly shape the City Health Department’s Childhood Asthma Initiative or any New York State legislation.

To be fair, El Puente was committed to organizing both local Latinos and other groups within the G/W neighborhood, but initial reluctance from other ethnic groups prevented a neighborhood-wide coalition from forming. Additionally, building an inter-neighborhood asthma coalition was likely hindered because numerous groups, including
El Puente, were competing against each other for federal funding to perform community-based asthma research. El Puente acted deliberately to keep its asthma project locally focused and distinct from the work of other groups around the city. This was due, in part, to its self-help philosophy but also in order to gain a competitive edge for receiving foundation and federal grants. The lack of any significant linkages between their neighborhood work and a city-wide or national movement to address inner-city asthma, was a crucial factor for the limited success El Puente had influencing professional decision-makers.

The challenge facing El Puente confronts by many local groups seeking to gain standing with local constituents while also committing to knowledge-making with scientists, particularly in the highly uncertain arena of environmental health. Tensions arise when activist groups participate in conventional science because, as a result of the research and discovery process, they may find it harder to frame issues “neatly” for the media or a broader public, to recruit new members, and to maintain a broad-based (e.g., not strictly environmental health focused) coalition. As mentioned earlier, El Puente is an organization committed to a range of activities, from running a public high school to job training to public housing advocacy. The organization wished to remain committed to all these activities, as well as to engage in asthma research and management. As the information they gathered challenged their original hypothesis that air pollution was the primary cause of asthma, the group had to reflect internally about the causal stories it would use in its community organizing efforts. El Puente’s research contributed to new knowledge about local asthma, but it also raised questions about the representations of the disease they were offering in street protests. Community activists will inevitably
confront this dilemma when engaging with professionals in environmental health research and they should be prepared to deal with such internal tensions.

Other conditions contributed to the weak influence El Puente’s work had on city, state and federal professionals. No visible national movement to fight childhood asthma exists today. The group was challenged because no other policy or assessment project, such as the cumulative exposure project, was available for the organization to build on. Additionally, since El Puente’s work evolved over the course of five years, they may have missed “critical moments” in the policy dialogue because their information gathering was still maturing or because they were busy developing local capacity and not focusing on policy-making (Kingdon 1984).

The lead poisoning case revealed the importance of coalition building, and highlighted the internal tensions that can arise when local activist groups engage with professionals (a point I will more fully address in lesson #3 below). In the lead paint poisoning episode, the intra and inter-community coalition building around childhood lead poisoning by the WABBA was a key factor in its initial success influencing professionals. Recall that this community coalition was comprised of local residents, local neighborhood organizations, groups from neighborhoods around the Williamsburg Bridge in Manhattan, and organizations concerned with lead poisoning more generally. The WABBA built on the strength of its city, state and national coalition to end childhood lead poisoning by improving lead abatement laws and enforcement in low-income neighborhoods. As noted in Chapter 5, this coalition was active before the Williamsburg Bridge sand blasting controversy and was still pursuing the New York City government for not enforcing its lead-paint abatement law during the activities in G/W.
Chapter 7: The Fusing of Local and Professional Environmental Knowledge

The lead paint abatement coalition had publicized studies of childhood lead poisoning in the city, built a broad-based coalition, and had tapped into the growing national movement to end childhood lead poisoning. The WABBA “hitched-onto” the popular attention the lead paint abatement coalition had generated in order to gain support for its efforts to address the potential hazards from bridge lead paint flakes.

As a result of this linkage, the WABBA gained significant influence with professionals early on in the controversy. The city agreed to soil remediation, street sweeping and a blood-lead screening program and created the Mayoral Task Force after the WABBA made the Williamsburg Bridge sand blasting a public issue. Thus, one of the strongest lessons from the cases for communities attempting to influence professionals with their information and experience is that gathering “good” information is never enough. Linking the gathering of local knowledge with community coalition building and a broader social movement, if possible, will cause professionals to take the information seriously. However, coalition mobilization and issue linkage involve high transaction-costs for groups often already over-stretched and may be difficult to sustain for long-term problem-solving. Sometimes this requires an intermediary.

3) Use Intermediaries Wisely

Communities should seriously consider drawing in intermediaries. However, using professional assistance may generate internal conflict between such advisors and members of community coalitions. Community groups enlisting intermediaries, especially professionals from outside the community, should recognize that tensions can arise between community group priorities and professional objectives, no matter how sympathetic the professionals are to the cause. Accordingly, groups should develop
strategies ahead of time to manage such conflicts with intermediaries. Responsible intermediaries should be adept at not only helping community groups gather and translate local knowledge for outside professionals, but also at recognizing and managing group conflicts.

While I emphasize the caution groups should use when enlisting intermediaries, each of the episodes highlighted the important role intermediaries can play in the gathering of local knowledge and translating it for professionals. For example, an intermediary proved crucial for convincing the EPA to consider meaningfully the local knowledge of anglers in the agency’s exposure assessment. The lack of a consistent intermediary helped explain why El Puente’s strong local knowledge had relatively little impact on professional decision-makers. The tensions that can arise with intermediaries were most prominent in the lead poisoning episode.

In that situation, the community group argued successfully in court that the City should fund professional intermediaries or advisors, of the community’s choosing, to help formulate a response to the EIS. In making their argument to the court, the WABBA recognized that professionals were necessary to help them understand the science involved and for getting the community’s voice heard in professional circles. After winning the case, the group enlisted professionals who had a prior working relationship with the community and were sympathetic to their causes. Ultimately, however, the intermediaries failed to help the WABBA articulate their knowledge in a way that could be applied to its concerns over the lead exposure modeling in the EIS. While intermediaries can be effective translating local knowledge for outsiders when community groups have developed a clear statement of what they want and what they
have found, they can be detrimental when they offer conflicting advice or when community groups do not have an organized process for managing the tensions that arise.

Admittedly, internal group tension that occurs when organizations enlist intermediaries is not unique to community organizations. However, few situations exists where a politically vulnerable group of lay people is likely to be so dependent on and potentially antagonistic to the same group of professionals. The complexity of this dynamic should not be underestimated. Community groups often recognize their dependence on a group of professionals (e.g., scientists) for helping them solve the problems they face but may also blame this same group of experts for contributing to their predicament in the first place. Such tensions were particularly evident in the lead poisoning episode. The WABBA splintered after conflicts arose with the intermediaries over how to address the EIS. In a sense, the identity of the local group was challenged by this rift. The group was faced with deciding whether it should prove that bridge sandblasting was causing lead poisoning, as some experts were advising them to do, or whether they should focus on getting strict monitoring, oversight and mitigation provisions added to the EIS, as other professionals were suggesting. The group splintered – some members chose to address the dispersion models while others chose to focus on monitoring and oversight. Still others lost interest completely. The end result was a lack of influence with the professionals in decision-making roles. Again, my case studies do not prove that intermediaries are the key to enabling local knowledge to influence professionals, but they do suggest the important role intermediaries play enabling or stymieing the professional uptake of local knowledge.
4) **Link local knowledge to extra-local issues of power**

Several of my cases suggest that local knowledge is most successfully mobilized when tied to “extra-local” issues of power. The Watchperson Project tied the dietary aspect of the community exposure assessment project to larger discussions about cumulative risk assessment, environmental justice, and the economic conditions facing immigrants. The group was successful convincing EPA to let them survey anglers largely because they argued that in order to understand the anglers practices, one first had to understand the conditions of poverty and cultural practices in which fish diets were embedded. The result was people of color, immigrants and non-English speakers interviewing and researching the practices of others with similar backgrounds – a significant challenge to professional research methods. Additionally, the angler survey dignified actual people’s experience, suffering and abilities to act.

Similarly, El Puente was successful in gathering information about home remedies because it challenged assumptions about gendered roles in the Latino community. El Puente hired unemployed women from the neighborhood to perform the interviews. These same women facilitated focus group discussions. During discussions of home remedies, the El Puente health workers gave a prominent role to women folk healers – often elderly women who did not speak English. While these healers are recognized and respected in the Latino community, they are rarely given a public voice. By placing women at the center of their asthma research and intervention, El Puente challenged conventional assumptions about the role of women in the Latino community and also the role of women (including folk healers) in contributing to professional environmental health knowledge.
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The lesson is that the mobilization of local knowledge by residents is more likely to be successful when linked to struggles against social inequalities more generally. Embedded within local knowledge mobilization and research process are opportunities to challenge prevailing hierarchies of power. Local knowledge mobilization has the potential to reveal “the particular experiences of those in social locations, experiences that cannot be shared by those situated differently but that they must understand in order to do justice to the others” (Young 1996). In this way, local knowledge helps “unmask” how individuals in disadvantaged communities experience inequality, and can help those not experiencing inequality but are in positions to alleviate suffering, to better understand the ways this might be accomplished. Local knowledge will not be likely to be viewed as credible in the long run without an explicit link to other social struggles that challenge entrenched assumptions.83

By linking local knowledge mobilization to “extra-local” challenges to inequality, communities can “fuse” their struggle for recognition with other political struggles. In fact, the environmental justice movement has proved adept at this kind of “movement fusion.” For instance, environmental justice activists in California joined with immigrants’ rights groups to influence the Sierra Club when the national environmental group considered opposing immigration on environmental grounds.84 In another example of such a linkage, a coalition called Just Transition has brought together the Oil, Chemical and Atomic Workers Union with environmental justice advocates, in the recognition that steps taken to protect workers also protect the communities that surround

83 The point here is that if the local knowledge of oppressed people is gathered or represents racist or sexist positions, it will ultimately fail to resonate with both local people and professionals.
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industrial facilities – communities that are often comprised of low income people and people of color (Moberg 1999). Linking local knowledge mobilization with the environmental justice movement has increased the likelihood that local knowledge will influence professional decision-making.

5) Contingent and Precautionary Action

A fifth lesson is that the information resulting from community-based efforts will always be limited and fallible. Taking action in the face of incomplete information or uncertainty can also address the powerlessness felt by many low-income populations and communities of color when it comes to improving community health. El Puente’s work provides perhaps the best examples of preventative contingent action – acting with incomplete information and recognizing that actions may have to change as new information is gathered. When they learned that many low-income Latinos did not have health insurance, El Puente enrolled them in a free New York State health insurance program. When later interviews and surveys revealed that whether or not a resident visited a physician for asthma care wasn’t necessarily dependent on the availability of health care but whether residents trusted their physicians, El Puente changed its focus. The group developed a “cultural competency” program for physicians and other professionals at a local hospital and, at the same time, organized focus groups and a new survey to capture more information about physician distrust. The subsequent survey and focus groups revealed the widespread use of home remedies, which often replaced prescribed medications. Based on this finding, the group added another intervention strategy aimed at exploring ways to integrate herbal and home remedies with physician prescribed medications in asthma management plans. Eventually this effort gained

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85 See; http://www.justtransition.org/
resonance with professionals, as evidenced by the fact that El Puente’s cultural
c ompetency training program received funding from the NIEHS.

The lesson is that a host of intervention strategies are always possible and acting
in the face of incomplete information is crucial. Community residents cannot wait for
definitive proof of environmental health threats. Yet, precautionary action is also an
important way to learn about how to intervene more effectively, particularly when social
learning is built into the evaluation of interventions. Under conditions of social learning,
organizations can alter actions as new information emerges. Professionals should
recognize that contingent actions involving local people can also improve policy
implementation success through a process of social learning. Local knowledge that
contributed to social learning can improve implementation for community and
professional interventions as long as it involves frequent assessments of what has been
accomplished and what has gone wrong and a commitment to make appropriate
adjustments in the course of the implementation process itself (Friedman 1987).

Taking contingent action also helps highlight, for both community residents and
professionals, that local knowledge is no panacea for solving environmental health
problems. When local knowledge is included in decision-making debates, it too can be
deconstructed, scrutinized and understood for its strengths and weaknesses. The
subsistence fish diets and asthma cases both highlighted that no one person or groups
holds the local knowledge of a community, can speak for the entire community, or that
community members always agree over how local traditions should be described and
characterized for both insiders and outsiders. The episodes also revealed that local
knowledge was crucial for addressing some problems, such as neighborhood-level
hazardous exposures, but these same problems also required action at a regional, national or international level. Taking contingent action informed by local knowledge emphasizes, perhaps contrary to intuition, that the state must remain a major player in environmental health problem solving. Although local knowledge has its limits, it suggest that the state’s role is enabling, facilitating, supporting, and responding to local initiatives rather than imposing initiatives of their own.

7.f. How Professional Practice Benefits from Local Knowledge

This dissertation has argued that when professionals fail to acknowledge the value local knowledge brings to environmental decision-making, their work misses important information, is less efficient and is less democratic. Yet, local knowledge is not something that professionals will likely be able to acquire on their own, even those that may be committed to fusing it with their professional work. This is so because LK is not merely a set of methods and techniques that anyone can learn with enough attention and practice. Rather, LK is as much a process as it is particular information. Even if professionals were to understand the local knowledge in a particular place or community and how locals gathered it, they could not necessarily export this insight to another “place” or community without going through the processes associated with local knowledge production. The importance of local knowledge is not that professionals are always reluctant to consider its insights, but that professionals alone cannot gain access to the insights of local knowledge without going through the processes of knowledge production. I characterize these processes as the fusing of local and professional knowledge.
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The processes communities use to mobilize knowledge, including gathering and sharing information, assessing options for action, and building partnerships with professionals, all suggest that local knowledge is not something that can ever be ignored by professionals concerned with democratic decision making. For instance, the credibility professionals stand to gain from meaningfully considering LK is a benefit to practice that is likely to be as important as the new or missing information community knowledge often reveals to professionals. Professionals ought to engage in the fusing of local and professional knowledge because the resulting benefits cannot be achieved if professionals alone try to capture these insights.

Fusing the local knowledge mobilization process with the work of professionals can also help build and maintain partnerships that have proved essential for both gathering difficult to reach information and making democratic decisions. Research and decision-making partnerships can improved the legitimacy of professional decisions and the credibility of the decision-makers themselves in the eyes of local people who have often been ignored or inaccurately characterized by professionals in the past (Israel et al 1998; Wynne 1996). When the lived experience of those suffering from disease or living with environmental hazards is ignored by decision-makers, these same professionals are not trusted, their information viewed with skepticism, and their future credibility discounted (Fischer 2000). Ultimately, successful policy making rests on the ability of various societal actors and institutions to create and maintain trust and credibility and professionals should recognize the key role of local knowledge in this process.

Yet, local knowledge is no panacea and not without its limits. Professionals will also want to acknowledge these strengths and limits of local knowledge. The best way
for professionals to reveal the strengths and limits of local knowledge is to subject it to the same public scrutiny as any other knowledge claim, not by characterizing it a priori as inherently weak or superior. By taking the potential insights from local knowledge seriously, professional credibility with the public is only enhanced. The benefits from local knowledge for professional practice are summarized in Table 7.3.

7.g. Street Science and Environmental Justice

The dissertation began by asking how can local knowledge improve environmental health decision-making, particularly for the most disadvantaged groups in society suffering the most from environmental exposures and disease burdens. I have shown that local knowledge of communities can contribute to the overall knowledge base used to make environmental decisions. The dissertation has also emphasized that local knowledge furthers both procedural and distributive justice – a central tenet in the pursuit of environmental justice. Finally, I have shown that local knowledge can improve the efficiency of environmental decisions – whether the decisions are implemented by community groups or professionals.

All of these contributions of local knowledge can help both communities and professionals recognize the importance of and find ways to pursue environmental justice. When local knowledge identifies hazards, raises previously ignored questions, provides hard to gather data, involves difficult to reach populations, and expands the possibilities for implementation alternative and success – environmental justice is pursued. Similarly, when local knowledge is considered by professionals, they are more likely to understand
Chapter 7: The Fusing of Local and Professional Environmental Knowledge

the claims made by the publics they are supposed to serve – and these same publics are more likely to, in turn, trust professional judgments.

Local knowledge can also help community groups pursue environmental justice. I have shown that the mobilizing of local knowledge helps disadvantaged communities organize and educate themselves, as well as increase control over their decisions that impact their lives. Communities also benefit from the mobilization of local knowledge by shifting the environmental discourse from protest and refusal to engagement with problem solving. I have shown that community groups can use local knowledge not as a panacea, but to supplement other actions they may be involved in, such as lawsuits. Finally, local knowledge pursues environmental justice by explicitly valuing the different “rituals of learning” communities use to understand, analyze and act upon the problems they face. I have summarized some of the ways local knowledge contributes to the professional and community pursuit of environmental justice in Table 7.3.
Table 7.3

How Local Knowledge Pursues Environmental Justice

LK Helping Professionals:

- **Identifies Hazards** – reveal some problems that professionals may have missed and raises new questions about hazards that matter most to those most impacted by hazard exposures.
- **Provides Good Data** – some information is inaccessible to outsiders, professional data always partial and sketchy.
- **Improves access to difficult to reach informants/clients** – local knowledge can make reluctant community members, such as immigrants/non-English speakers, participate, and overcome disincentives to participation, such as poverty.
- **Expands Scope of Implementation Alternatives** – “expands the pie” of considerations for interventions.
- **Improves Implementation Success** – by recognizing various actors, perspectives, practices and traditions that influence the effectiveness of local policy.
- **Greater understanding of community claims** – in order to work well with communities, professionals need to understand what residents think, what they do, and what they want, and LK is one way to organize this information.
- **Increases Trust and Credibility** – with skeptical publics.
- **Recognizes the fallibility of local knowledge** – incorporating local knowledge into public debate, opens it up to scrutiny, criticism and testing.

LK Helping Communities:

- **Organizing** – build community coalitions through production and sharing of information, practices, images.
- **Empowerment** – educate, raise awareness and develop self-help strategies through mobilization of knowledge and action strategies.
- **Recognition** – residents have important information, can be trusted, are not ignorant and are not dependent on professionals for problem solving.
- **Improves intra-community decision-making** – provides new information for local groups to help themselves, define priority issues and learn what is important to constituents.
- **Enhance community control** – local knowledge mobilization, organizing and local decision-making are all attempts by disadvantaged groups to enhance control over their own lives.
- **Shifts environmental discourse** – from protest and refusal to positive demands and engagement in problem solving.
- **Supplements Other Actions** – LK can contribute to other problem-solving strategies such as lawsuits.
- **Rituals of Learning** – LK mobilization legitimizes alternative ways of learning about problems, such as through story-telling, visual images, theatrical performance, and community tours.
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This dissertation has contributed to a better descriptive, analytic and prescriptive understanding of local environmental knowledge. More work needs to be done to further describe what local knowledge is, the contribution it can make to environmental policy, and what accounts for the professional uptake of local knowledge. This will not simply happen. Planners and other policy professionals must work to help facilitate the fusing of local and professional expertise. The health of residents in communities such as Greenpoint/Williamsburg hang in the balance. Until this happens, community members will continue to act as “street scientists” – gathering, organizing and acting upon their knowledge – to ensure that professional environmental decisions are more democratic, more just and more protective for everyone.
Appendix A 1995 El Puente Questionnaire

Questionnaire on air pollution and health

This is part of a survey that El Puente Academy is doing on air pollution and health in this neighborhood. No names will be used in our report. If you agree to answer the questions it will only take around 10 minutes.

Note down who is responding (mother, father, grandparent, etc.)

1. How many people live in this household?
2. What is your role in the household?
3. Starting with the youngest, what is the age and sex of each one and how long has s/he been living in NYC?
   <Use a separate page for each person.>
4. Do you think that there are problems with the air quality in this neighborhood?
5. On a scale from 0 to 4, how would you rate the air pollution in this neighborhood? <0=none 1=little 2=some 3=heavy 4=extreme>
6. Do you think the air quality in this neighborhood is getting better, worse, or the same?
7. What do you think are the three main causes of air pollution in this neighborhood — in order of importance starting with the worst?
8. What is the most important thing that can be done to reduce air pollution in this neighborhood?
9. Have you (we) and your (our) neighbors taken any action together to try to reduce air pollution in this neighborhood?
10. If so, what action?
11. On a scale from 0 to 4, how would you rate government efforts to reduce air pollution? <0=poor 1=fair 2=adequate 3=good 4=excellent>
12. Who is likely to be affected the most by air pollution?
13. Does anyone in this household have breathing or respiratory problems? If yes, which persons?
14. Has the person received any treatment for this problem?
15. From whom did s/he receive the treatment?
16. What was the diagnosis?
17. How long has s/he had this problem?
18. (If it was Asthma) How many asthma attacks did s/he have in the last year?
19. Are there any things in particular that make this problem worse? If yes, what are they?
20. How many days of work/study has the person with the problem lost because of this illness in the last year?
21. How many days of work has the person who takes care of him/her lost in the last year?
   <For the rest of this questionnaire, ask about every member of the household 12 years old or more, using the page already prepared for each one.>
22. Does s/he (do you) smoke?
23. (If s/he is a smoker) How long has s/he been a smoker?
24. Does s/he smoke inside of the house?
25. How many cigarettes a day?
26. (Whether s/he smokes or not) What is his/her current occupation?
27. Describe briefly what s/he does on the present job.
28. How long has s/he had the present job?

Thank you. I will bring you the results of this survey in about two weeks. There will also be a community meeting to discuss the results.
APPENDIX B 1998 El Puente Questionnaire

1. Ha oído hablar de El Puente?
2. Algun miembro de este hogar ha participado en actividades organizadas por El Puente? En caso que sí, qué actividad?
3. Cuál es su posición en este hogar?
4. Ha oído hablar de El Puente?
5. Ha oído hablar de El Puente?
6. ¿Cuántas personas viven en este hogar?
7. Ha oído hablar de El Puente?
8. ¿Cuántos años ha vivido en este apartamento?
9. Antes de mudarse aquí, dónde vivía?
10. Cuántos años vivían en el otro lugar?
11. ¿Si menos de 4 años > ¿Dónde vivía antes?
12. ¿De qué viva en este apartamento, ha notado algún cambio en su salud?
13. ¿En caso que sí > ¿Qué cambio en su salud?
14. ¿Considera que su trabajo o su escuela ha tenido algún influencia sobre su salud? ¿Si no, pase a la 15a.
15. ¿En caso que sí > ¿Cómo afecta a su salud?
16. ¿Cuál es el trabajo de la escuela que puede estar afectando su salud?
17. ¿En caso que sí > ¿Qué es la escuela que puede estar afectando su salud?
18. ¿En que trabaja o, si no, escuela existente?
19. Algún vez ha tenido síntomas o algún otro problema al respirar? En caso que no, pase a la 23a.
20. ¿En los últimos 12 meses cuántas veces ha tenido los síntomas o los problemas respiratorios o de asma?
21. ¿En los últimos 12 meses, su cuarto ha sido afectado a causa de los síntomas respiratorios? En caso que sí, cuál?
22. ¿En los últimos 12 meses, ha sido de síntomas o los problemas respiratorios de asma?
23. ¿En caso que sí, cuántas veces?
24. ¿Tiene asma? <Sí, no; ya en el final>
25. ¿Si la persona con asma está presente, intente preguntarle directamente. Si no, sígale preguntar a la persona que contestó a la pregunta>
26. ¿En caso que no, pase a la 30a.
27. ¿Ha recibido una explicación satisfactoria de su condición?
28. ¿Cómo fue la atención recibida: excelente, buena, regular, pobres, pésima?
29. ¿Qué recomienda para mejorar el servicio hospitalario o de emergencia para personas con asma?
30. ¿Cuándo fue la última vez que visitó a un médico o una clínica por motivo de asma?
31. ¿Ha recibido una explicación satisfactoria de su condición?
32. ¿Cómo fue la atención recibida: excelente, buena, regular, pobres, pésima?
33. ¿Qué recomienda para mejorar la atención de personas con asma en las oficinas médicas y en las clínicas?
34. ¿Cuánto tiempo hace que no tomó medicación para asma?
35. Durante los últimos 30 días cuántos días no pudo ir a trabajar o a la escuela debido al asma?
36. ¿Cuándo es el primer día que hace que cuando siente que va a tener un ataque de asma?
37. ¿Qué es el primero que hace que cuando siente que va a tener un ataque de asma?
38. ¿En su opinión, cuál es la mejor manera de enfrentar un ataque de asma?
39. ¿Considera que la información que le dan sobre manejo de asma/a su problema respiratorio es suficiente?
40. ¿En caso que sí > Donde le recibió?
41. ¿Si no > Donde le recibió?
42. Gracias por su tiempo y paciencia. Recibirán un volante resumiendo los resultados. Su identidad quedará confidencial. Pero, si quiere participar en un grupo de discusión sobre el asma, o si quiere recibir más información sobre el proyecto contra el asma o sobre El Puente, nos gustaría anotar por separado su nombre y número de teléfono.
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