Fall 1-31-2001

An examination of discourse concerned with PCB remediation in the Hudson River

Jennifer M. Coffey
New Jersey Institute of Technology

ABSTRACT

AN EXAMINATION OF DISCOURSE CONCERNED WITH PCB REMEDIATION IN THE HUDSON RIVER

by
Jennifer M. Coffey

Remediation of PCB contamination in the Hudson River is an issue hotly contested within local communities, the media, and between government agencies and corporate entities. In recent years, the EPA has decided to revisit their 1984 no-action decision for the Hudson River and in December 2000, issued a Feasibility Study recommending partial dredging of the 200 miles of the Hudson floor deemed a Superfund site. The EPA's reevaluation of their 1984 decision has spurred an enormous amount of literature from corporate, non-profit volunteer, and government agencies.

The rhetorical theory of social constructionism and the ethical theory of environmental pragmatism are used to analyze the often conflicting and contradictory governmental, corporate, and non-profit discourse concerned with PCB remediation in the Hudson and to demonstrate both effective and ineffective examples of environmental rhetoric. The theories of social constructionism and environmental pragmatism have been found very useful in suggesting methods for constructing discourse as well as evaluating environmental rhetoric.

AN EXAMINATION OF DISCOURSE CONCERNED WITH PCB REMEDIATION IN THE HUDSON RIVER

by
Jennifer M. Coffey

A Thesis
Submitted to the Faculty of
New Jersey Institute of Technology
In Partial Fulfillment of the Requirements for the Degree of
Master of Science in Environmental Policy Studies

Department of Humanities and Social Sciences

January 2001

APPROVAL PAGE

AN EXAMINATION OF DISCOURSECONCERNED WITH PCB REMEDIATION IN THE HUDSON RIVER

Jennifer M. Coffey

Dr. Robert Friedman, Thesis Advisor — Date
Research Professor of Information Technology, NJIT

Dr. Eric Katz, Committee Advisor — Date
Associate Professor of Philosophy, NJIT

Dr. Daniel Watts, Committee Member — Date
Executive Director, Otto York Center for Engineering and Environmental Science, NJIT

BIOGRAPHICAL SKETCH

Author: Jennifer M. Coffey

Degree: Masters of Science in Environmental Policy Studies

Date: January 2001

Undergraduate and Graduate Education:

- Master of Science in Environmental Policy Studies,
  New Jersey Institute of Technology, Newark, NJ, 2001

- Bachelor of Arts in Communication Studies,
  Richard Stockton College of New Jersey, Pomona, NJ, 1998

Major: Environmental Policy Studies

Grants and Awards:

- Teaching Assistant, New Jersey Institute of Technology,
  September-January 2001

- Research Assistant, Preparing Modern Intermodal Freight Infrastructure to Support Brownfield Economic Development: Transportation, Community, and Systems Preservation Grant, New Jersey Institute of Technology/North Jersey Transportation Authority, July 1999-August 2000

- Research Assistant, Sustainable Green Manufacturing Project, New Jersey Institute of Technology, October 1998- May 1999

In loving memory of
my father, friend, and kindred spirit

Richard Coffey
1956-2000

ACKNOWLEDGEMENT

I would like to express my deepest appreciation to Dr. Robert Friedman, who not only provided valuable advice and direction, but also encouragement and support throughout the many versions of this thesis. Dr. Eric Katz and Dr. Daniel Watts deserve special thanks for their service as committee members. I would also like to extend my thanks to the many NJIT faculty and staff members who offered their support and encouragement especially throughout the past year.

A special thanks is extended to my fellow graduate students, Leena Raut and Stacy McCormack, who helped me to work through several impasses and frustrations during many a late night. Also, of course, thanks to all of my friends and family, especially my mom, dad, and sister, for their love and support.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1

INTRODUCTION

The goal of this thesis is to assess and explain how language and philosophical theory can indicate the effectiveness, or lack thereof, of governmental, corporate, and public efforts towards polychlorinated biphenyl (PCB) clean-ups for the Hudson River. Governmental, corporate, and public non-profit discourse pertaining to remediation efforts for Hudson River are analyzed using the theories of social constructionism and environmental pragmatism. Various outreach efforts are examined to determine the rhetorical strategies used in governmental, corporate, and public clean-up efforts including, but not limited to, Environmental Impact Statements, press releases, newspaper articles, meetings, speeches, brochures, videos, and other publications. Established rhetorical and ethical theories are used to explain the effects of governmental, corporate, and public clean-up efforts on the actual Hudson River remediation projects, for both those completed and those currently in progress.

Through the lenses of social constructionism and environmental pragmatism, the discourse and publications of three distinct sectors of society concerned with Hudson River PCB contamination are analyzed. Publications and speeches delivered by authorities of the United States Environmental Protection Agency (EPA) are examined as examples of government involvement. EPA literature produced at the time of the agency's no-action decision for the Hudson, namely the Final Environmental Impact Statement (FEIS) published in October 1982, and EPA's new interest in PCB abatement for the Hudson River as demonstrated in the speeches of Carol Browner, EPA Administrator are also highlighted. The publications and speeches of General Electric

(GE) and its officials from the time of the 1982 FEIS publication to the present day represent the corporate sector. The publications and discourse of the non-profit organizations Clearwater Sloop and Scenic Hudson represent the third sector of society whose discourse is analyzed.

This research is beneficial to the field of Environmental Policy Studies because it will aid in determining which outreach efforts are most and least influential in achieving soil and water remediation, particularly for PCB contaminated sites. The conclusions of this thesis can be used to assist in expediting the remediation of PCB contaminated sites. The research initiated from this thesis may aid in reducing the amount of time taken to reach a clean-up agreement for a PCB contaminated area and decrease the total amount of funds dedicated to the process of reaching an agreement. If governmental, private, and public efforts can become more efficient with their time and funds, they will be able to remediate more PCB contaminated areas then they have been able to in the past. This research will also be able to suggest effective ways to use social constructionism and pragmatism in other areas of environmental discourse.

CHAPTER 2

LITERATURE REVIEW

This literature review is concerned with the assessment and method of governmental, corporate, and public efforts towards PCB clean-ups in the environment. There are three major themes in this review. First materials pertaining to background information regarding PCB contamination in the Hudson River are surveyed. The second grouping of literature is concerned with the governmental, corporate, and public efforts towards PCB clean-ups. The final section of this literature review addresses established rhetorical and ethical theories used to assess the governmental, corporate, and public efforts towards remediation.

Three-dozen newspaper articles have been printed in The New York Times and The Wall Street Journal alone within the past five years regarding PCB contamination in the Hudson River. Those articles trace the recent history and efforts of the EPA, General Electric (GE), and public non-profit organizations, such as Scenic Hudson and Clearwater Sloop, to reach a clean-up agreement, and provide accounts of the Hudson River's PCB levels within recent years. One such article reads:

> A Federal environmental study has found that 'hot spots' of PCB contamination in the upper Hudson River are not being buried in protective layers of silt, as some scientists have contended, but instead are disgorging fresh streams of the industrial PCB pollutants into the water, where they could accumulate in fish and pose a cancer threat to people who eat the fish (NYT, 7/24/98).

Hot-spots are areas with PCB concentrations of up to 381,000 parts per million (ppm), such as the Thompson Island Pool (TIP) where one GE plant is located. The EPA has set a threshold of 2ppm for PCB contamination in water (http://www.epa.gov/hudson).

The most highly PCB contaminated area of the Hudson is the six mile-long Thompson Island Pool (TIP), which is consistently referred to when speaking of hot-spots in the Hudson. Newspaper articles have followed studies of the PCB levels in the TIP and approximately three dozen other hot-spots in the Hudson including the water surrounding the two GE plants, located in Fort Edward and Hudson Falls, NY, where the company once used and disposed of PCBs. Another article states, "A Federal environmental study...concluded that most of the 36 patches of badly contaminated river bottom were being regularly scoured by currents and that those in one stretch of the river had released several tons of PCBs into the water over a 10-year period" (7/24/98).

Newspaper articles over the past five years have tracked PCB contamination in the Hudson as well as various PCB studies and the chemical's effects on wildlife. For example, The New York Times reported on the chemical's impact on bald eagles:

> The body of a young bald eagle killed along the upper Hudson River contained high concentrations of PCBs...[the finding] is significant, [New York State environmental] scientists said, because similar levels of PCBs in eagles or eagle eggs from [PCB] polluted areas of the Great Lakes have been linked to reproductive problems and deformities in the birds (NYT 9/17/97).

The article also states that the eagle was only 16 weeks-old and within its short life span had ingested enough contaminated fish so that the "fat of the bird tested 71 parts per million of PCBs," which was "higher than the average level of PCBs found in fat in the three deformed fledgling eagles from the Great Lakes that were studied by Federal wildlife biologists in 1993" (NYT 9/17/97).

In addition to animal studies, the risks to human health from PCBs have been explored extensively. There are two traditional exposure routes through which humans come in contact with PCBs. The first possible means of exposure is absorption through

the skin, which, in the case of the Hudson River, is unlikely since most of the sections of the PCB contaminated waters are closed to swimming. The second and most significant route is ingestion of either contaminated water and/or PCB contaminated fish swimming in the Hudson waters. However, recently, a third route of ingestion is thought possible. "New Studies by Federal and New York State scientists have found that the coating of PCBs on the shores and bottom of the Hudson River is not being cleaned up by natural processes...and that substantial amounts of these toxic compounds are evaporating from mud flats and wafting in the air" (NYT 2/22/97). The research from this Federal and NY State study indicates that PCB air contamination could be contributing to the already elevated PCB blood levels of community members living near the Hudson, particularly for individuals in communities surrounding hot-spots such as the Thompson Island Pool.

The second portion of this literature review addresses the governmental, corporate and non-profit efforts towards PCB clean-ups. In October 1982, the EPA issued a Final Environmental Impact Statement (FEIS) on the Hudson River PCB Reclamation Demonstration Project. The FEIS resulted in a no-action decision from the EPA in 1984. It was the opinion of the EPA, at that time, that the PCBs in the Hudson would be naturally covered with clean sediment and therefore taken out of the biological cycle, thus eliminating PCB exposure to both humans and animals. Since that FEIS over 17 years ago, the EPA has revisited its no-action decision and appears to have changed its opinion, at least as seen through the actions and words of Carol Browner, EPA Administrator. In a speech delivered to the NY State Assembly on July 9, 1998, she states, "EPA's latest analysis shows that more than 20 years after PCBs were last produced, the environment cannot simply heal itself. High levels of PCB contamination

are still being found in the Hudson." She affirms EPA's commitment to PCB removal from the river and continues her speech on a passionate note stating:

> The Hudson River is priceless to the people of New York. And it is priceless to every American – from the art it has inspired, to its landscapes that are etched indelibly into all our imaginations. I am here today to pledge my commitment to return the Hudson River to the people once again healthy and whole (Browner 7/9/98).

Five months after Browner's speech to the NY State Assembly, however, the EPA issued a press release announcing its decision regarding Hudson River PCBs, and again, it was a no-action decision (www.epa.gov/region02/epd/9817.htm). The reasons supporting the more recent no-action decision was not based on the same premises as the decision derived from the original 1982 FEIS. There is a distinct difference between the EPA's no-action decision based on the FEIS in 1982 and their no-action decision in 1999. The no-action decision in 1982 was considered final and the EPA concluded in 1984 that the Hudson would naturally cleanse itself of PCBs via silt accumulation resulting in PCB burial. The no-action decision in 1999, however, is by no means considered a final decision. The EPA intends to further investigate dredging technologies and areas of PCB contamination in the Hudson in order to make a more informed decision in the near future regarding remediation. An EPA press release quoted Regional Administrator Jeanne M. Fox stating, "While we remain deeply concerned about the availability of PCBs in the Hudson River environment, we were not able to identify a feasible and appropriate interim action that would have a significant impact" (www.epa.gov/region2/epd/98171.htm). The release then stated, "The Agency (EPA) pledged to continue to focus its full attention and resources on completing the ongoing

Hudson River PCBs Reassessment so that a proposed plan can be presented to the public" (www.epa.gov/region2/epd/98171.htm).

The EPA demonstrated proof of its ongoing activities with the Hudson in a press release dated January 6, 1999. "PCB's in the Hudson River, including the fundamental finding that Thompson Island Pool (TIP) sediments are the primary source of the PCBs to the fresh waters of the Hudson River.... In fact, estimates of the amount of PCBs entering the water as the river flows through TIP are higher than those originally reported by EPA" (www.epa.gov/hudson/99001.htm).

The EPA is not the only agency generating discourse concerned with animal and human PCB related health risks and clean-up efforts in the Hudson River. GE's quarterly publication called River Watch (cited as RW) states that "GE's goal is a cleaner Hudson" (RW Winter '99:5). River Watch outlines the clean-up activities that GE has performed in the Hudson. "GE has successfully removed more than 131 tons of PCBs from the Hudson Falls plant site area; installed more than 230 wells around the plant site and treated 108 million gallons of water. GE cleaned out an abandoned riverside mill near the plant site and capped 60 acres of shoreline to prevent PCBs from reaching the river" (RW Winter '99:2). The same issue of River Watch continues, "As a result of these and other clean-up efforts by government and industry, the river is cleaner today than it has been in 20 years" (RW Winter '99:5). GE's position is that the Hudson is being naturally cleansed of PCB contamination and that humans can do nothing more than what GE officials are currently doing, i.e. capping shorelines and performing abatement measures at the worst hot-spots in the Hudson. (Capping is a form of remediation in which a

contaminated site is covered with clean sediment to prevent the contaminants from escaping into the air, water, and surrounding soil.)

GE's web-site for providing information on the Hudson states "dredging will not improve river conditions significantly faster than is already occurring naturally" (www.hudsonwatch.com/dredging.html). GE also proposes some pragmatic reasons to avoid dredging. The company's Hudson website states that dredging "would require a massive hazardous waste landfill, to which local residents in the upper river area are vigorously opposed" (www.hudsonwatch.com/dredging/html).

The rhetoric of the non-profit organizations Clearwater Sloop and Scenic Hudson presents views drastically different from those of GE concerning actions that should be taken to abate PCBs in the river. Clearwater holds the stance that dredging is needed to improve the quality of the Hudson and thus secure the health of both humans and animals.

> The spread of PCBs throughout the Hudson River ecosystem has resulted in an ongoing and unacceptable threat to the health of local populations, the greatest concern relating to human health impacts associated with the consumption of PCB contaminated fish and water. The dredging of PCB contaminated sediments (with subsequent treatment and destruction) will permanently reduce the transport of PCBs throughout the river, which will reduce PCB levels in fish and the water column. Dredging of PCB contaminated sediment is necessary to reduce human health risks and to restore our environment. (http://clearwater.org/news/fs4.html).

The information published by the above named organizations generally supports dredging, at least for the hot-spot areas of the Hudson. Clearwater and Scenic Hudson cite various scientific studies to support both their anthropocentric and nonanthropocentric arguments for PCB abatement in the Hudson.

The final portion of this literature review provides an overview of the rhetorical and ethical theories used to examine the discourse of the EPA, GE, and non-profit organizations concerned with PCB remediation in the Hudson River. In addition to detailing the theories of social constructionism and environmental pragmatism, the precursors to those theories, including the fundamentals of rhetorical theory and American pragmatism, respectively, are also reviewed.

The formal study of rhetoric is attributed to Aristotle and his communication theories of logos, ethos, and pathos. Logos is a logical or factual means of communication. "A message is most influential when it provides its audience with good reason to believe and to act" (Hauser 71). Ethos is a means of communications that is based on the "listeners' impressions of a speaker's character, intelligence, and goodwill" (Golden 80). Hauser describes ethos as "an artistic mode of expression – an appeal that is deliberate and is based on observed principles. Ethos is not an attribute but an interpretation based on the way a rhetor behaves in presenting an appeal and the manifold of reactions an audience has to these behaviors" (94). In other words, ethos is a form of communication that bases the message on the characteristics and reputation of the rhetor. Rhetoricians use pathos to compose speeches, written documents, videos, and the like to appeal to the audiences' anticipated reactions and past experiences. Pathos is used to evoke sentiment on the part of the listener.

> The essentials for arousing emotions in persuasive appeals are arguments that engage audiences in terms of their experiences. Pathos, properly developed, does not refer to employing loaded language or wild-eyed harangues. It refers to the self-evoking aspects of our total response to the arguments brought before us for our active consideration. (114)

In the book Green Culture: Environmental Rhetoric in Contemporary America, Craig Waddell researches "the rhetoric of environmental policy, in public participation in policy formation, and in the role that pathos plays in this process" (xi). Waddell introduces the theory of social constructionism as a communication model and explains that this model promotes a two-way interactive flow of thoughts, ideas, information, values and emotion from both the public and the technical experts. He describes this model as an "interactive exchange of information during which *all participants* also communicate, appeal to, and engage values, beliefs, and emotions" (Waddell 142). The social constructionist model is considered one of the most progressive and effective communication models in practice. This model allows both the public and the technical experts to teach one another in a co-learning process.

The theory of social constructionism is not a theory that can be neatly wrapped and tied in a few short lines. It is a complex theory concerned with communication and the transfer and generation of knowledge. Social constructionism does in fact have its roots in several disciplines such as psychology, political science, communication, education, and sociology; however, it has also developed into the antithesis of several of those disciplines. Although the components of the theory of social constructionism are multifarious, its objective is clear. "The explicit aims of much of social constructionist research is to analyze the power relations within which people live their lives and thus within which their experience is framed, and to offer an analysis which allows the person to facilitate change," according to Vivien Burr in An Introduction to Social Constructionism (103).

"There is no one feature which could be said to identify a social constructionist position;" however, there are general fundamental ideas of social constructionism (Burr 2). The first basic principle of social constructionism is "a critical stance towards taken-for-granted knowledge" (Burr 3). social constructionism asks society to challenge the idea that "conventional knowledge is based upon objective, unbiased observation of the world" (Burr 3). It asks if emotion, politics, wealth, religious and other factors have not influenced conventional knowledge. Social constructionism also asks society to reexamine why it has created the categories and divisions that it has, such as the dynamics between male/female, black/white, etc. "Social constructionism cautions us to be ever suspicious of our assumptions about how the world appears to be. This means that the categories which we as human beings apprehend the world do not necessarily refer to real divisions" (Burr 3).

Although social constructionists challenge the dominant idea that knowledge originates from unbiased, objective observations, they do have an alternate belief for the origins of common knowledge. Social constructionists believe that people construct knowledge amongst and between themselves by means of their everyday interactions. "It is through the daily interactions between people in the course of social life that our versions of knowledge become fabricated....The goings-on between people in the course of their daily lives are seen as the practices during which our shared versions of knowledge are constructed" (Burr 4). In other words, in the social constructionist view, knowledge and understanding are derived from individual communication and social processes. The social construction of knowledge is the most important principle of the entire social constructionist theory.

The third principle essential to the social constructionist view is the idea that knowledge is historically and culturally specific. "The ways in which we commonly understand the world, the categories and concepts we use, are historically and culturally specific" (Burr 3). Within the time span of only a few short years, culture and can change quite rapidly; therefore, as society and culture changes, perceptions, ideas, and cultural practices creating knowledge, evolve as well. "This means that all ways of understanding are historically and culturally relative....The particular forms of knowledge that abound in any culture are therefore artifacts of it, and we should not assume that *our* ways of understanding are necessarily any better (in terms of being any nearer to the truth) than other ways" (Burr 4).

Finally, according to Burr, social constructionists believe that both "knowledge and social action go together" (5). Because knowledge is constructed through social interactions, and members in society vary, ideas and understandings also differ. Consequently, "each different construction also brings with it, or invites, a different kind of action from human beings" (Burr 5). For example, societal reactions towards drunkenness throughout recent history have changed as knowledge of alcohol addictions has evolved. "Before the Temperance movement, drunks were seen as entirely responsible for their behavior, and therefore blameworthy. A typical response was therefore imprisonment" (Burr 5). In more recent times, alcoholism has been seen as an addiction and therefore alcoholics are not as stringently held responsible for their actions and are not imprisoned simply for being alcoholics. Following the theory of social constructionism, as the notion of drunkenness has evolved to that of alcoholism, so too has societal actions and reactions evolved from imprisonment to treatment. "Descriptions

or constructions of the world therefore sustain some patterns of societal action and exclude others" (Burr 5).

In summary then, the theory of social constructionism embraces four overarching principles. First, conventional knowledge is not based on unbiased, objective observations. Second, knowledge is constructed from the daily individual interactions within society. The third principle is that knowledge is culturally and historically specific. And finally, knowledge and social actions affect and change one another.

Social constructionism is a theory that stems from several disciplines; however, social constructionism contains "a number of features which are in quite stark contrast to most traditional psychology and social psychology" (Burr 5). Social constructionism contains strong themes of both anti-essentialism and anti-realism. First, social constructionism can be said to be anti-essentialist because constructionism holds to the idea that "there are no 'essences' inside things or people that make them what they are" (Burr 5). "Since the social world, including ourselves as people, is the product of social processes, it follows that there cannot be any given, determined nature to the world or people" (Burr 5). This view differs from the psychological view which espouses that environment, biology, and social structures such as marriage and economics contribute to a person's essence. Again, this constructionist view states that there are no essences that determine a person's nature including social status or wealth. In social constructionism, " 'beliefs' or 'opinions'...cannot be taken to be manifestations of some inner, essential condition such as temperament, personality, or attitude. They are manifestations of discourse...They have their origins not in the person's private experience, but in the

discursive culture that those people inhabit" (Burr 50). In other words, societal discourse influences and shapes individuals' beliefs and opinions.

Social constructionism also holds an anti-realist position because it states that knowledge is socially constructed through society and culture and not as a result of objective, unbiased observations of reality. Social constructionism, therefore, holds that there is no one true reality, but that society's view of reality is dependent upon knowledge that is constructed through daily individual interactions. "Within social constructionism there can be no such thing as objective fact. All knowledge is derived from looking at the world from some perspective or other, and is in the service of some interests rather than others" (Burr 6). Social constructionism can therefore be seen as the antithesis of science and the scientific method, which hold that truth and reality are discovered through the process of objective observations.

Additionally, social constructionism bucks the explanations of psychology because constructionists believe that knowledge is both culturally and historically specific. Therefore, "the theories and explanations of psychology thus become time- and culture-bound and cannot be taken as once-and-for-all descriptions of human nature" (Burr 6). If humanity is constantly changing and evolving and varies with time and culture, then the explanation of human behaviors, if any, must also be constantly updated. "The disciplines of psychology and social psychology can therefore no longer be aimed at discovering the 'true' nature of people and social life" (Burr 6).

Once again, social constructionism differs from other disciplines because Constructionism looks away from psychological and sociological explanations such as existing attitudes, motivations, and even broader ideas of prejudice, delinquency,

marriage and economics to explain "social phenomena" (Burr 7). Alternatively, social constructionism "regards as the proper focus of our enquiry the social practices engaged in by people, and their interactions with each other. Explanations are to be found neither in the individual psyche nor in social structure, but in the interactive processes that take place routinely between people" (Burr 7-8). Rather than emphasizing structures and institutions such as marriage, economics, and even personality, social constructionists focus on the interactions between and amongst individuals and society. "The aim of social enquiry is moved from questions about the nature of people or society and towards a consideration of *how* certain phenomena or forms of knowledge are achieved by people in interaction. Knowledge is therefore seen not as something that a person *has* (or does not have), but as something that people *do* together" (Burr 8).

Although social constructionism has its roots in several disciplines and "has emerged from the combined influences of a number of North American, British, and continental writers dating back for more than thirty years", "the cultural and intellectual 'backcloth' against which social constructionism has taken shape...is what is usually referred to as 'postmodernism' " (Burr 9, 12). Postmodernism, like social constructionism, challenges the idea of one true reality. Postmodernism "rejects the idea that the world can be understood in terms of grand theories or metanarratives, and emphasizes instead the co-existence of a multiplicity and variety of situation-dependent ways of life (sometimes referred to as pluralism)" (Burr 13-14). The theories of Postmodernism and especially pluralism are also essential to the ethical theory of environmental pragmatism discussed later.

To fully understand how the theories of Postmodernism and thus social constructionism are applied, the notion of discourse must first be defined. Discourse here refers to the communications or interactions within society that function to socially construct knowledge. "A discourse refers to a set of meanings, metaphors, representations, images, stories, statements, and so on that in some way together produce a particular version of events" (Burr 48). Discourse functions as a tool for society to communicate and construct knowledge. It "provides a frame of reference, a way of interpreting the world and giving it meaning that allows some 'objects' to take shape" (Burr 57). The most extreme form of social constructionism not only believes that discourse is a tool, but claims that "Nothing has any essential, independent existence outside of language; discourse is all there is" (Burr 57).

Whether taken in the extreme view or not, every discourse portrays an event in a different light, i.e. with a different meaning leading to different knowledge and views of reality. Any number of divergent discourses are generated from and surround a single event or happening. Each discourse portrays the event according to one person or group of persons' perspective(s); therefore, every discourse surrounding an event has a claim to stand as the one true story or true reality. "Each discourse claims to say what the object really is, that is, claims to be the truth" (Burr 49). In society it is quite evident that there are certain "truths" derived from discourse that are more popular and well received than others, such as the roles of women as the care-givers in society opposed to men being seen as primary nurturing figures, and the existence of a God opposed to the idea of life without any higher beings. Certain discourses rise to popularity rather than others for a whole host of reasons including political, financial, religious, etc. "The discourses that

form our identity are intimately tied to the structures and practices that are lived out in society from day to day, and it is in the interest of relatively powerful groups that some discourses and not others receive the stamp of 'truth' " (Burr 55). Science and scientists often dominate environmental discourse while the reality and knowledge of non-scientific community members are often ignored and/or suppressed.

As demonstrated, the major ideas of social constructionism, which are concerned with knowledge formation and society's views of reality, revolve around discourse and daily individual interactions; therefore, language is an essential element for the principles of social constructionism. Most social constructionists believe that language is a both a "pre-condition for thought" and a "form of social action" (Burr 6-7). Language is essential in modern society. It is so imperative that parents begin to instruct their children in the art of language very shortly after birth. Language influences every aspect of culture including the ways in which individuals in society interact, learn, and construct knowledge. "The way people think, the very categories and concepts that provide a framework of meaning for them, are provided by the language that they use. Language therefore is a necessary pre-condition for thought as we know it" (Burr 7). Rather than viewing language only as a means of simply expressing thought and emotion, social constructionism states that language can and is also used as a form of action. "When people talk to each other, the world gets constructed. Our use of language can therefore be thought of as a form of action" (Burr 7).

Language itself does not constitute discourse, however. Rather, language within a context with meaning results in discourse. "Words or sentences do not of themselves belong to any particular discourse; in fact the meaning of what we say rather depends

upon the discursive context, the general conceptual framework in which our words are embedded" (Burr 50). In actuality, a symbiant relationship exists between the spoken and written words and discourse. "Discourses 'show-up' in the things that people say and write, and the things we say and write, in their turn, are dependent for their meaning upon the discursive context in which they appear" (Burr 50).

Having affirmatively answered one of the challenges of social constructionism mentioned earlier, namely the ability of an individual to change society, social constructionism is then faced with the question of whether individuals formulate society or does society as a whole determine the essence of its members. In other words, "do individuals determine society (i.e. bottom-up), or does society determine individuals (top-down)?" (Burr 96). The short answer is that social constructionism holds to the idea that society influences individuals while simultaneously, individuals influence society. "Rather than think of the individual and society as forming opposite sides of a dichotomy, we should instead think of them as inseparable components of a system neither of which can make sense without the other" (Burr 108).

Social constructionism is incapable of viewing the individual versus society dilemma within either the bottom-up or the top-down framework. The bottom-up view is troublesome for social constructionism. According to social constructionism, the fate of neither individuals nor society can be predicted. Within the bottom-up framework, where individuals are thought to determine society, there is no room for a constructionist position that is anti-essentialist. "The view of the individual as a pre-given entity from which society, as a secondary phenomenon, arises is at the heart of the discipline of psychology. The whole enterprise of psychology, which aims to explain and predict

human experience and behavior, is therefore from the social constructionist perspective, based on false premises" (Burr 97).

The top-down framework pictures discourse as a for key societal organizations such as governmental and religious sectors to influence the masses. The top-down framework is almost as troublesome for social constructionism as the bottom-up model because "the top-down structure leaves discourse as a side-effect of social structure, and it therefore cannot be the focus for social change" (Burr 96). Social constructionism therefore leds to viewing the individual and society within a system, each influencing one another. The individual/society system solves the debate over whether society arises from individual influences and preferences, or if society molds its members; the answer is that both dynamics occur simultaneously. In fact, there can be "only a *system*, which Bateson calls the 'ecosystem'. This system comprises both the organism and its environment, both the individual and its society" (Burr 108).

Social constructionism must therefore take into account the process of knowledge formulation from individual daily interactions where individuals are inextricably involved in a system that they both influence and are influenced by, as well as the importance of language, culture, and historical perspective in discourse. As mentioned earlier, scientific discourse tends to be one of the dominant discourses in modern society, and many social constructionists have taken to analyzing its construction. Social constructionism builds "into our new practices of scientific enquiry our understanding of how the 'knowledge' produced within the traditional scientific paradigm is a function of a power imbalance between researchers and the objects of their study. Above all, our new research practices must take language as their focus of interest, since the uses and

effects of language are of central importance to social constructionists" (Burr 159). Social constructionism realizes that the scientific method of discovering knowledge through observations is but one of many discourses. "Within a social constructionist framework, the 'objectivity-talk' of scientists becomes just part of the discourse of science through which a particular version (and vision) of human life is constructed" (Burr 160). There is no such thing as true objectivity; humans are incapable of completely separating themselves from their emotions and viewing anything outside of their realm of experience. "No human being can step outside of her or his humanity and view the world from no position at all, which is what the idea of objectivity suggests, and this is just as true of scientists as of everyone else" (Burr 160). Social and scientific researchers then have a new challenge: to recognize that they as humans are incapable of completely separating themselves from their own perspectives and incorporating that variable into their results. "The task of researchers therefore becomes to acknowledge and even to work with their own intrinsic involvement in the research process and the part that this plays in the results that are produced" (Burr 160).

The next step in the process of analyzing the rhetoric concerned with PCB contamination in the Hudson River from a social constructionist position is to examine how discourse, and thus knowledge, about the environment, specifically, is communicated. Niklas Luhmann addresses the topics of discourse, societal interactions, and the natural environment in Ecological Communication. "So, the question is how, as an operatively closed system of meaningful communication does society communicate about its environment?" (Luhmann 28).

The first point is that the natural environment is unable to communicate its own problems, vulnerabilities, thresholds, intricacies, etc. to human society. "Communication is an exclusively (human) social operation" (Luhmann 29). In other words, the natural environment cannot speak for itself. In terms of communicating news of ecological danger, physical, chemical, or biological facts "create no social resonance as long as they are not the subject of communication" (Luhmann 28). These environmental facts alone cannot have an influence until they are taken up into discourse and therefore knowledge. "The environment can make itself noticed only by means of communicative irritations or disturbances, and then these have to react to themselves" (Luhmann 29). Just as there are several discourses surrounding any one event that continue until one is dominant and thus branded as the 'truth,' according to social constructionism, so too must environmental discourses or irritations react to one another.

Just because society possesses knowledge, through discourse, of ecological intricacies, dangers, thresholds, etc., does not mean that effective communication has been established. According to social constructionism, the process by which a dominant discourse comes to be seen as knowledge must be examined rather than the specific knowledge itself. "Whatever 'ecological awareness' may occur empirically within a consciousness, it is still a long way from this to a socially effective communication" (Luhmann 29). The daily interactions between and amongst individuals and society construct knowledge; this knowledge is changed and reconstructed as discourses challenge each other.

> Only when ecological communication is set in motion and begins to co-determine the autopoiesis of social communication can one expect the themes of this communication gradually to become conscious too. This simply means that social communication changes its environment, in this

> case mental states. What follows from this for society can be grasped only through an analysis of the social system's capacity for resonance (Luhmann 30).

Essentially Luhmann is describing the processes of discourse, knowledge formation, and overall social constructionism using the natural environment as his subject. Discourses formulate knowledge and influence society as social communication influences mental states. Alternative discourses may then continuously challenge the dominant one seen as knowledge or truth. "The threshold of possible and possibly understandable or even possibly successful communication works in a highly selective way, i.e. rejects whatever cannot find resonance" (Luhmann 30). "Knowledge now has to be understandable in itself. It has to present itself as differentiated and thereby increasingly exposes itself to comparison and corrections" (Luhmann 34). In other words, even discourses that are branded as the 'truth' undergo changes when challenged by other discourses.

Knowledge according to Luhmann, and true to the theory of social constructionism, is constructed through social processes. As society has become more complex, so too do the processes that formulate information and integrate it into society. This more detailed description of the increasing complexities of knowledge formation is what Luhmann calls 'function systems.' "Today, each of the most important subsystems of society is directed to a specific and primary function that pertains to it alone. The formative principle explains the enormous growth of modern society's performance and complexity. At the same time it reveals the problems of integration, i.e. of the negligible resonance capacity among the subsystems of society as well as the relation of society to its environment" (Luhmann 35). As society separates into more and more function

systems, communications become even more difficult because these function systems operate independently and rarely interact with one another.

This seemingly ever increasing complexity of society and communication leads to the question: "How can environmental problems find resonance in social communication if society is differentiated into function systems and can react to events and changes in the environment only through these?" (Luhmann 36). One theory is that with a function system, only two, rather than many discourses can exist. For example, with function systems there is only right/wrong or legal/illegal. "The most important function systems structure their communication through a binary or dual-valued code that from the viewpoint of its specific function, claims universal validity and excludes further possibilities" (Luhmann 36).

The idea of a binary code functioning in communication processes is not, however, essentially anti-social constructionist. According to social constructionism, there are any given number of alternative discourses surrounding any one event. It is with the daily interactions of individuals and the exchange of this multitude of discourses that knowledge is constructed. After knowledge has been constructed and a certain discourse has been branded as the 'truth', the idea of binary coding comes into play. "Binary codes are duplication rules. They form within the communication process when information acquires value and is exposed to a corresponding counter-value. The reality that is treated according to the code is singular. But it is, as it were, duplicated fictively so that every value can find its complement and be reflected" (Luhmann 37). Once knowledge has been established, right/wrong, legal/illegal paradigms can exist, at least until the conventional knowledge is challenged by other discourses.

When one function system or group in society reacts to ecological issues and influences or changes common knowledge, it not only impacts the group's own dynamics but influences other groups and society as a whole.

> Functional differentiation triggers an enormous *internal dynamics* within the function systems which combines intense resistance with very specific sensibilities to irritations and disturbances. The subsystems are environments for one another. They can produce a process of resonating disturbances when one subsystem reacts to environmental changes and alters the social environment of the other subsystems (Luhmann 49).

Society, then, needs to be analyzed on two levels. "On one hand, resonance is conditioned by society's differentiation into function systems...On the other, it is structured by the different types of codes and programs of the subsystems that affect one another according to the general model of system and environment" (Luhmann 48-9).

In review, society can be seen as divided into subsystems or groups. When one subsystem alters the discourse branded as the 'truth,' it influences its own system as well as that of others. In addition to individual populations having their own views, they may also have their own phrases or words that are group-specific. According to social constructionism, it is essential to consider language when examining communication processes, discourse, and conventional knowledge. "All groups have a particular perspective and use a specialized language developed specifically to describe and stimulate the practices characteristic of their particular outlook on the world" (Killingsworth & Palmer 6). Logically, language, which forms discourse that in turn constructs knowledge, would necessarily be culturally specific. Language is not only culturally specific in terms of different national origins, such as English and French are different, but they can differentiate within the same origin, but between regions,

communities, and sectors of society. For example, scientists could be said to speak a different language than factory workers.

The next step, then, is to examine how the ideas of social constructionism, including discourse and language, daily societal interactions and knowledge formation, etc., are or are not exhibited in the worlds of science, government, media, and activism. The aforementioned topics parallel the various discourses examined in the following section including that of PCB research studies, a governmentally produced environmental impact statement and public outreach meetings, newspaper articles, and non-governmental activist organizations.

The scientific community is an example of what Luhmann calls a subsystem. Science "is read and written from a different perspective with a different agenda for action and a different set of values. The communal destiny and communal values with which scientific rhetoric is concerned are the destiny and values of the scientific community itself" (Killingsworth & Palmer 105). Social constructionism inherently challenges the goals of scientific writing to produce unbiased, true knowledge based on objective observations. According to social constructionism, truly unbiased research and writing does not exist because no humans, including scientists, can of separate themselves from their own humanity, their own perspective of the world.

> For writing to be scientific, it must do science. That is, it must perpetuate a research program and have no interest in influencing actions that lie outside of that research program – no interest in the kinds of social and ethical actions that form the object of environmental impact statement, no interest in the entertainment value of science news, no interest in the aesthetic or poetic value of the reality it portrays...'Objective' is the compliment paid to the work of a researcher who is 'one of us, doing what we do in the way we want to do it (Killingsworth & Palmer 106).

Scientists may in fact occasionally be guilty of considering the effects of their research on humanity and/or the non-human natural world, or contemplating governmental or media reactions "but only within the limited realm of actions certified by the scientific community" (Killingsworth & Palmer 106). Indeed, there are, however, some distinctions with which different scientists view objectivity. For basic research scientists, objectivity requires separation from all of humanity. It is not the goal of basic research scientists to provide grounds for human action. Alternately, applied research is concerned, at least on a surface level, with humanity. "Thus for basic researchers, objectivity means distance from general human interest; for applied researchers, objectivity means the refusal to privilege one human perspective over another in advance of the research act" (Killingsworth & Palmer 121). Applied research still does not provide advice to society, but "produces open arguments, leaving the conclusions to engineers and policy-makers 'down the line'" (Killingsworth & Palmer 121). "The main differences between basic and applied research lie in the rhetorical approaches to their materials, the tendency to develop closed, tightfisted arguments in basic research as opposed to the tendency to produce open-ended arguments in applied research" (Killingsworth & Palmer 123).

Government officials, engineers, and the media tend to focus on applied research more perhaps because of its open arguments. Rhetoric produced by government officials and the like based on applied research can be referred to as "gray literature" (Killingsworth & Palmer 123). "Gray literature includes government documents, open-file reports, and in-house documents of various kinds" (Killingsworth & Palmer 123).

There are also variances of science, "cold science" and "warm science", within the scientific community that differ in the types of knowledge, or facts, that they claim to produce (Killingsworth and Palmer 113). "Cold science" deals with the notion of settled indisputable facts. "Warm science" then deals with theoretical questions and problems that remain unsolved. As scientists move to work in the ever-expanding area of "warm science," they are required by their own scientific community to distance themselves from the social and political ramifications of their research. "This distancing, one of the major factors in the modern construction of objectivity, casts doubt on the immediate usefulness of the conclusions and assertions of 'warm science' in decision making about environmental questions" (Killingsworth & Palmer 113). Scientific research that examines the unsolved problems of today's environment, "warm science," that fails to consider its own usefulness may in fact be an exercise in futility.

"Warm science" addresses current environmental dilemmas, such as the fate of PCBs in river water, and tends to use more common, as opposed to technical, language than "cold science." There are both pros and cons to writing in common language. First, common language allows the text to read more easily and thus is accessible to more people. However, scientists tend to anthropomorphize scientific and ecological processes for the sake of brevity when they use common language. "The familiar term becomes a shorthand expression for a series of events which scientific readers will grasp immediately but which lay readers are likely to puzzle over" (Killingsworth & Palmer 114). One of social constructionism's major principles is that language is a pre-condition for thought (Burr 6). The ways in which people think is embedded into the language that they speak. If lay readers, i.e. non-scientists, are confused or misled by the

anthropomorphic common language that "warm scientists" tend to use, then the knowledge resulting from daily discourse will in fact be based on false premises.

Society can utilize discourse in several different ways. "Narrative discourse deals with ordinary human actions in a communal setting" (Killingsworth & Palmer 126). Narrative is a common form of discourse in communities and, like all other forms of discourse, it involves a speaker, listeners, and subject matter. The speaker is qualified to do so because he or she is simply a member of the community. Narrative discourse evolves within a community setting and arrives at accepted truths that then become known as common knowledge. Scientific discourse, however, is not as collaborative as narrative discourse.

Scientific discourse "is denotative rather than narrative...The subject matter is, at least theoretically, determinable equally by all participants, but the speaker (or writer) asserts a special claim on the truth and is able to furnish proofs of that truth. The listener is, in theory, the equal of the speaker but can become so in practice only by being able to provide the same kind of proof provided by the speaker" (Killingsworth & Palmer 127). Scientific discourse then effectively excludes lay community members from its discourse because it requires the same scientific proofs of its listeners, in order to respond, as it requires of its speakers. These proofs "are established by the rules of the scientific community, by methods and theories approved in advance and agreed upon by a consensus of experts" (Killingsworth & Palmer 127). The main difference between narrative and scientific discourse is that in narratives, truths are established from within the community, and with scientific discourse, truth is established through method.

Once scientific discourse is introduced and incorporated into society, it evolves into yet another form of discourse. "Once released into the public at large, the pedagogical discourse of science comes under the influence of another form of discourse, which Lyotard calls *metanarrative*" (Killingsworth & Palmer 128). Metanarratives are distinguished from both narratives formed in communities and scientific discourse formulated through method. The metanarrative brings together both narratives and scientific discourse under one umbrella. "It aims to bring other discourses under the control of its broad explanatory power and thereby to influence the use of such discourses in a community that includes smaller communities...Metanarrative assumes the general shape of the simple narrative but shares with science the concern with legitimation" [sic] (Killingsworth & Palmer 129). Using the theory of social constructionism, metanarratives could be seen as a natural progression of discourse on the path to knowledge construction. Metanarratives are in fact the merger of different discourses surrounding any one event that has resulted in a new discourse branded as the 'truth.'

Government rhetoric, on the other hand, is unfortunately often a cumbersome and incomplete compilation of community narratives and scientific discourse. As previously mentioned, what can be termed "gray literature" is produced when government officials produce documents based, sometimes loosely, on applied science. This "gray literature," however, more often than not fails to effectively incorporate community narratives including community concerns, fears, and wishes.

> The government experts require huge compilations of information, from which base they are able to assert their own authority (ethos). They have preserved the scientific interest in inductive reasoning and in the generation of data, but have otherwise ignored the procedures of scientific learning, especially the rules of tight argumentation (Latour) and the rules for the social construction of knowledge – the need for peer review and

> careful comparisons of data with research standards developed from the work of other researchers (Killingsworth & Palmer 164).

Governmental officials claim that in generating documents concerning the environment, specifically the Environmental Impact Statement (EIS), the concerns of the community are paramount. However, EISs are written much like the discourse of basic scientific researchers in that the listeners (or respondents) must generate the same types of proofs as the speaker (or writer) to have their comments or concerns considered valid. In many circumstances, community members lack the educational training to respond to government officials using scientific methods or governmental language. Although government officials claim that public comments are instrumental in the decision-making process, and they are incorporated into documents such as the EIS, such comments and concerns are often largely ignored and are non-influential in the decision-making process. "Those whose worlds are most deeply affected are systematically excluded from participation in the process, even while their rights to be heard are ostensibly maintained" (Killingsworth & Palmer 170).

The EIS is meant to include and react to community concerns regarding a proposed action; however there are no subsequent processes available to respond to community concerns encountered in the EIS. "The original legislation, therefore, fitted out the EIS as a vehicle of communicative action. But it made no provisions for restructuring or re-funding the agencies involved so that this possibility could be realized" (Killingsworth & Palmer 170).

Many claim, including Killingsworth and Palmer, that decisions are made in government prior to beginning an EIS and that EISs are often used as justification for an action rather than an actual investigation of it.

> Instrumental documents are not really interested in interpretation or in persuasion; they attempt to create, for the purpose of maintaining the system, a narrow path of action that has been chosen or created in advance of the document's production by hierarchically arranged powers. And though they may be drawn upon the conventions of a democratic discourse that is open to information from diverse sources, the aim of instrumental documents is never to treat deviant discourses with respect but always to take note of them, to record them, and ultimately to treat them as 'noise' in the system, which needs to be ignored or expunged (Killingsworth & Palmer 166).

Social constructionism, and even metanarratives, require decisions and knowledge to emerge from the interactions of the many discourses surrounding an event, not the exclusion of discourses that are not parallel with certain, in this case governmental, ideas.

The language used in EISs is often obscure and cumbersome and alienates many community members. Because, again according to social constructionism, the way people think and thus generate discourse is intimately linked to the language they use, community members face yet another disadvantage when they are presented with an EIS. If community members are unable to understand the language and complexity of an EIS, they will not be able to respond appropriately. In addition to flamboyant language, EISs contain a plethora of acronyms sufficient to confuse even the most savvy government employee. High-density graphics are also popular in many EISs. These graphics are loaded with information, but can be difficult to interpret. "The EISs therefore compile information economically without communicating it effectively. An ordinary reader is quickly saturated and easily frustrated by the resulting prose" (Killingsworth & Palmer 175).

With ostentatious language and without the inclusion of community concerns that represent themselves in the forms of varying discourses, government decisions will continue to be flawed. "As a consequence, they [government agencies] lag behind in

developing a public discourse that meets the public's demand for change" (Killingsworth & Palmer 168).

Non-governmental organizations (NGOs) and environmental activists, on the other hand, tend to utilize the common language of the people in their discourse. Common language, here, is acceptable and even preferred not only because it is more accessible to general society, but also because activists and NGOs are, for the most part, not speaking of scientific methods and findings. Most NGOs and activists are at least partially in sync with the social constructionist theory and have challenged the concept of objective science. Even many respected scientists, such as Aldo Leopold and Rachel Carson, have often dropped the notions of objectivity when addressing the research of applied science. Applied science is partially geared towards assisting humanity with future decisions. It is impossible to be objective about the future not only because it is impossible for humans to be completely objective, but also because it is impossible to be certain about a time period that has not even existed yet. "Facts do not exist in the future, only probabilities and projections. That is why, as Aristotle knew, deliberative discourse – that which debates the course of future action – always involves rhetorical appeals and can never be strictly descriptive and objective" (Killingsworth & Palmer 68).

Writers and speakers in the field of activism often rely on pathos, evoking emotion from the listener/reader, to convey their message. Carson was denounced not only for using pathos, but also for challenging her fellow scientists' objectivity. "By dropping the signs of objectivist identity, Carson created a new image of science in the public mind and taught the scientific community that it was not a happy family and that it must confront its internal differences before it could hope to offer advice on national

policy" (Killingsworth & Palmer 66). Carson's ideas run parallel to those of social constructionism by challenging both the objectivity of science and the authority of scientists to provide answers, i.e. knowledge. Social constructionism rebuts the idea of objectivity and claims that science alone cannot offer knowledge, but it must be constructed through the daily interactions of discourses.

Finally, the news media plays a significant role in facilitating the daily interactions of discourse in society. The news media focuses on "warm science" rather than "cold science" simply because it is tends to be more interesting to the general public, and the media's main objective is to capture and hold the public's attention. "When the issues of 'warm science,' scientific research and theory have not yet attained the cold solidity of fact, are brought into contact with the overheated rhetoric of public debate on issues like environmental degradation, the conditions for controversy are complete" (Killingsworth & Palmer).

The news media varies widely in its portrayals of science, activism, objectivity, etc. Generally, the media tends to show science as objective and activists and community members as emotional. In other words, it shows science as basing its argument on logos and the public's on pathos. As previously demonstrated, science cannot be based purely on logos, that is, objective fact. Likewise, the lay person in society is at a severe disadvantage in responding to scientific and governmental reports because community members more often than not lack the methodological proof and language to respond to the reports in scientific terms, the only means of responding to those reports effectively. The media, therefore, should be viewed as only providing a snapshot of any given story. "The media now produce a continuing discourse that significantly shapes the public

character of environmental consciousness. Despite its broad appeal and its potential influence, however, the discourse cannot carry the full narrative function of the growing environmentalist movement of American culture....the news media must sacrifice deep coverage for breadth of coverage" (Killingsworth & Palmer).

Language is instrumental in all forms of discourse including scientific, governmental, activist and the media. Language is also key to the idea of social constructionism because as people talk to one another, knowledge is constructed. Additionally, language provides the structuring and categories that influence the very way people think. Greenspeak: A Study of Environmental Discourse by Ron Harre et al. also examines the language of discourse as it varies in different cultural settings in addition to how it is used by both technical experts and the public.

Harre et al. focus on ecological language which they describe as language that has "functional relationships with and being part of a wider ecology" (Harre et al. 1). Ecological language retains the same imperative role as other discourse: constructing knowledge. "It is not only in language that global concerns take shape, but it is language that has the prime role in how they are discussed, negotiated, and used for various social and political interests" (Harre et al. 4).

If scientists, government officials, and the public are all attempting to communicate, but are speaking and listening using different criteria, communication fails, as demonstrated through the work of Killingsworth and Palmer. General criteria or guidelines do exist, however, for establishing language that allows scientists, government, and the public to communicate effectively with one another. "The criteria that language planners appeal to, in a rather coarse-grained fashion, include referential

adequacy, systematic adequacy, social adequacy, and environmental adequacy" (Harre et al. 22).

"A language is referentially adequate if it has the lexical resources to discuss a given topic in sufficient detail, 'sufficiency' being relative to the task at hand" (Harre et al. 22). As mentioned in the discussion of Killingsworth and Palmer's work, scientists have a tendency to anthropomorphize ecological events, which accomplishes brevity, but also often confuses the non-scientist. Many ecological words are phrases that are merely intended as metaphors not as definitions, and some are plain euphemisms. For example, the metaphor of the earth's climate functioning as a greenhouse has evolved beyond that of a comparison and into a definition, for most of society. "The crucial question for policymakers – namely, what is the degree of similarity between this image of the world and the real world? – tends to be lost sight of as the metaphor comes to take on the trappings of a direct description" (Harre et al. 23).

Other eco-words and phrases are misleading and lead readers/listeners to believe that some actions may be beneficial for the natural environment or at least benign. The phrase 'land reclamation' is often used when referring to draining wetlands, for example. Land reclamation brings forth the notions of cleaning up the environment, or perhaps preserving land for wildlife. To average community members, land reclamation hardly conveys the idea of draining wetland forcing out native wildlife, and building residential, work, or sport complexes. Common language, metaphors, and other broad catch phrases are often misleading to many and therefore are not referentially inadequate.

Systematic adequacy, on the other hand, refers not to capacity, but to the efficiency of language. "Central concepts should be morphologically less complex than

noncentral ones" (Harre et al. 31). Now, which concepts are central or most important will vary from culture to culture. Whatever concepts are most important to a group or culture need to be explained in plain language without being verbose while also maintaining referential adequacy.

The third language criterion for planners is social adequacy which means that "language should be acceptable to a maximum number of speakers in the target community, promote social unity and intercommunication and cater to present as well as anticipated future social needs" (Harre et al. 22). Harre uses the increase of human population to explain the importance of social adequacy in language. The phrase "population control belongs to the paradigm: birth control, pest control, weed control, and bug control. However, the proximity of such terms already suggests some problems regarding social adequacy. One would not like to see population control in the same light as poisoning pigeons or other vermin" (Harre et al. 35).

Finally, environmental adequacy "means that a language should enable its users to talk about environmental matters in an informed manner and promote the well-being of its speakers and nonhuman nature" (Harre et al. 22). Environmental adequacy is inextricably linked to the three preceding forms of adequacy. "If language is referentially, systematically, and socially adequate, it is...likely to be environmentally adequate. The last is not an independent kind of adequacy but is achieved by the satisfaction of the three basic adequacy requirements for discourse whose topic is 'environment', forging and honing a set of tools to discuss and facilitate the management of our lives in relation to the world" (Harre et al. 42).

Social constructionism asserts that language is both culturally specific and structures the ways in which people think. "Communication depends very much on 'how you take' what is said or written, and this in turn depends on the circumstances in which it is being produced and/or interpreted, by whom, for what purpose and so on" (Harre et al. 44). Science, also circumstantial, can be a very powerful tool in communication and decision-making; however it is only a tool, and society must be wary of considering scientific facts as omnipotent. First, science is not truly objective because human beings are incapable of being completely unbiased. Second, but related to the former, science is based on assumptions. "Part of the persuasive power of science comes from the assumptions that lie behind seemingly objective descriptions and explanations of the phenomena of interest" (Harre et al. 56). Just as metaphors in language are not always adequate representations of real-life situations, such as in the example of the greenhouse metaphor, science is not always a true reflection of reality. If a scientific model "is to serve as the basis of a program of action, it is obviously of great importance to know whether it is being used as an aid to thought or whether it is an adequate representation of how the world really is" (Harre et al. 56).

Science then, can be used in decision making as either a tool to supplement a rational argument already supported by other strong factors, or it can be used to influence a decision whose support is either lacking or incomplete, such as is often the case with "warm science." "Rhetorical devices play two different persuasive roles in lay and scientific discourse. In some cases, the rhetoric persuades one of a conclusion for which, in a more generous exposition, a rational argument could be provided. In other cases...model-based rhetoric is used to close a gap in the discourse, for which at the time

no bridge could be established" (Harre et al. 61-2). The latter appears to be the case with the rhetoric of PCBs in the Hudson River.

Scientists, more often than not, present their findings as "cold science" rather than as unresolved and unsettled 'warm science' because cold, hard facts are seen as indisputable and therefore more powerful communication and decision-making tools than unsettled, emerging possibilities. The scientific community often works to discredit those who oppose or challenge the voice of science, including environmental activists and community members. Opposing views are often seen as unreliable, and unable to make declarations without the authority of science, and therefore are seen as rhetoric that should not be taken seriously (Harre et al. 86). Conversely, environmental science in general is "warm science'; it is complex and ever-evolving.

Environmental discourse, like environmental science, is also dynamic. Environmental discourse reflects science, political, sociological, as well as temporal dimensions. It embraces not only the individual human lifetime concepts of time, but also ecological and societal time frames. "To talk about the environment is to talk in temporal terms. A static and unchanging environment would hardly stir our interests, let alone our passions" (Harre et al. 120). Essentially, environmental discourse can be discussed in terms of the three time scales: natural, cultural, and individual time (Harre et al. 122). Natural time or ecological time is the broadest of the three timelines, and it refers to time in terms of star and planet formations and evolution. Cultural time explains time in terms of cultural and historical conditions. Finally, individual time addresses discourse from the perspective of one human lifetime. Individual time is, of course, influenced by both natural and cultural time since it is both a shorter period of time and

encompassed within the two larger scales. Temporal dimensions are an issue with PCBs in the Hudson River because currently there is an unsettled debate that questions the length of time that PCBs will persist in the natural environment barring any human intervention.

The philosophical theory of environmental pragmatism is also used in the following section, in addition to the rhetorical theory of social constructionism, to analyze the literature and other media related to PCB remediation in the Hudson. Pragmatism is a new chapter in the discipline of environmental ethics, proving itself as a useful theory in moving towards effective environmental policy decisions.

> Pragmatic necessity implies that any analysis of water problems that does not facilitate the formation of broader community and action to address problems is philosophically flawed. An analysis that freezes disputants into fixed positions has just failed to get at what is important about water, and about environmental problems in general. Pragmatic deconstruction is the pedagogical tool for ending moral gridlock, and beginning the reconstruction of community. (Thompson 205)

The theory of environmental pragmatism aids in examining and determining effective and ineffective rhetoric of the EPA, GE, and non-profit organizations concerned with PCB remediation in the Hudson. In summary, "a pragmatic approach, not the vindication of any particular theoretical doctrine, will be necessary to solve real-life environmental problems" (Thompson 193).

The book Environmental Pragmatism contains several essays that address various environmental problems and then assesses how pragmatism can be of use in those situations. The theory of environmental pragmatism is a practical version of environmental ethics that takes environmental philosophy out of the ivory towers of the universities and brings it into the communities where decisions are and should be made.

environmental pragmatism does not attempt to establish a cookie-cutter ethic into which every problem must fit, but it draws on the uniqueness of individual situations and is largely based on what is known as moral pluralism. "Environmental pragmatism is a new strategy in environmental thought: it argues that theoretical debates are hindering the ability of the environmental movement to forge agreement on basic policy imperatives. This new direction in environmental philosophy moves beyond theory, advocating a serious inquiry into the practical merits of moral pluralism" (Light & Katz i).

In order to understand the concepts of environmental pragmatism, its roots in the philosophical idea of American pragmatism must first be examined. After the principles of American pragmatism are discussed here, the subject of the natural environment is introduced, which then leads to the ideas of environmental pragmatism. American pragmatism developed in the early twentieth century as philosophers explored if and how the disciplines of ethics and philosophy could work to address and assist in alleviating the problems of society. As society progressed onward into the later twentieth century, many of its problems became increasingly focused on environmental issues. Several American pragmatists were greatly influenced by the impending environmental dilemmas and thus emerged with the concept of environmental pragmatism.

American pragmatism embraces concepts that run parallel to and stem from the same roots as the theory of social constructionism. Most notably, American pragmatism shares an anti-realist perspective with social constructionism; both theories deny the existence of one true reality and the idea of absolute true knowledge. "Pragmatic epistemology is a radical form of empiricism, highly critical of any notion of absolutes in either knowledge or metaphysics" (Light & Katz 7).

Just as many social constructionists may disagree on the finer points or details of the theory, so too do many American pragmatists; however, there are general overarching principles of American pragmatism on which most would agree. First, pragmatism refutes the existence of absolute true knowledge. It claims that knowledge is conditional upon the society and temporal context within which it is situated. Knowledge that is marked as the 'truth' is labeled as such because that knowledge is plausible in its given time and context. "There are no innate beliefs, institutions or other indubitable 'givens' upon which our knowledge is built, or in terms of which the truth or meaning of concepts can be analyzed. To say that a belief is true...is to say that the belief succeeds in making sense of the world and is not contradicted in experience" (Parker 22).

If knowledge is not static and grounded in unshakable truths, it must be derived from an evolving source; for pragmatists, that source is experience. American pragmatism asserts that knowledge emerges from individual human experiences. Experience "can at any time espouse our settled beliefs as false, or reveal an unsatisfactory vagueness or confusion in our concepts. Knowing is thus an open-ended quest for greater certainty in our understanding" (Parker 22). Human experiences, however, differ between individuals, cultures and communities, and over time. Therefore, as human experiences differ and evolve, so too does knowledge. " 'Knowing the world' is not a detached activity. It is, rather, a mutual transaction between the organism and its surroundings" (Parker 23).

Individual experience is able to alter or disprove knowledge branded as the 'truth' only because individuals are aware of that knowledge in the first place. If individuals do not possess or are at least aware of any knowledge, then there is nothing for experience to

disprove; additionally, it is ludicrous to suggest that a human of virtually any age could lack any and all concepts of society or conventional knowledge. Because individual experience does not occur in a vacuum devoid of any and all concepts of the knowledge that is considered the 'truth' at any given point in time, experience and knowledge must logically be bound together in a system. If bound together in a system then, experience can alter knowledge, but in turn, knowledge can and does then influence experience. "The process of reconstruction transforms *both* the knowing subject *and* the known object... knower and known are inextricably twined together" (Parker 23).

Similar to the social constructionism individual/society system, pragmatism asserts that the entire knowledge/experience system must be considered rather than attempting to examine either component exclusively. "Since it is impossible to comprehend any individual except in a context of relations, however, the individual is always to be seen as an integral part of many communities" (Parker 27). Human experience then must also be considered in conjunction with existing societal knowledge. "The characteristics and activities of any organism are always understood in light of the organism's relations to its environments. The human capacities of thinking and knowing are no exception" (Parker 23).

In summary thus far, according to American pragmatism, knowledge is constructed, altered, and replaced by individual human experiences. However, knowledge also influences individual experiences because knowledge and experience are two components of the same system. Individual experiences change over time as knowledge is altered and vice versa. Therefore, knowledge at any given point in time, at any certain place, culture, community, etc. is subject to change. There is no known

absolute true knowledge because in order for knowledge to be absolutely true, it would have to be capable of standing true against every individual human experience at all times – past, present, and future. "Any reconciliation between self and world in the act of knowing is tentative and fallible. To say that knowledge is *true* means only that the reconciliation is satisfactory. To say that it is *absolutely* true means that it will never stand in need of readjustment – something we can perhaps accomplish, but can never judge with certainty to be the case" (Parker 23-4).

The next, but inextricably related, principle of pragmatism is the idea of moral pluralism. Moral pluralism is simply the idea that different individuals have different reasons and methods for making decisions and that many or all of those methods are valid. Sometimes individuals will arrive at the same decision for different reasons. For example, deep ecologists and extreme sport enthusiasts may both want to preserve any given mountainous terrain. The deep ecologists will want to save the land because they believe the ecosystem and its inhabitants have inherent value and the extreme sport enthusiasts because the mountain provides challenging cycling and hiking trails. The result is that both the ecologists and the sport enthusiasts can work together to save the mountain region from development while using different reasoning.

Traditionally, philosophy has worked to establish absolute ethical concepts for decision-making. However, no two individuals are the same, therefore, logically they will differ in the ethical reasoning they employ. "Pragmatism maintains that no set of ethical concepts can be the absolute foundation for evaluating the rightness of our actions" (Parker 26). Additionally, no set of ethical concepts can be absolute because ethical concepts are at least partially based on knowledge that is ever evolving alongside

individual experiences. If there is no one set of concepts with which to guide societal and individual actions, then deductively, there must be more than one or none at all. Guidelines are necessary, however, because obviously not all individuals agree, and decisions must be made in society.

Moral pluralism is the idea that multiple ethical guidelines can and do exist simultaneously to guide an ever-evolving society. "There is an irreducible *pluralism* in the world we encounter. There is the idea (supported by contemporary physics) that *indeterminacy* and *chance* are real features of the world. *Change*, *development*, and *novelty* are everywhere the rule" (Parker 25). Pluralism obviously cannot provide a distinction between right and wrong because of its many variables; however it can provide guidelines to distinguish between the many shades of gray. "The aim of ethics is not perfect rightness, then, since there is no absolute standard for reference, but rather creative mediation of conflicting claims to value, aimed at making life on the planet relatively better than it is" (Parker 27).

According to pragmatism, because knowledge and ethical guidelines are constantly changing, social institutions so too must evolve so that they are able to best serve society. "Social arrangements need to be constantly re-evaluated and reconstructed to ensure that minimal requirements of the organisms-in-environment are met" (Parker 27). Pragmatism holds that society functions best when it incorporates the knowledge and experiences of its individuals into its policies. Pragmatism "emphasizes the necessity of these many diverse individuals, actively coming together in the public sphere, to present their demands, offer their insights, and hammer out their differences....

Ultimately, that society works best which makes best use of the diverse intelligence and experience of its citizens" (Parker 26-7).

The premises of American pragmatism were in large part molded by John Dewey who in turn was greatly influenced by the works of his predecessors Charles Sanders Peirce and William James. In his essay "The Development of American Pragmatism" reproduced in The Essential Dewey, Dewey outlines the thoughts of Peirce, James, and his own works in relation to the evolution of American pragmatism. Dewey credits Peirce, who he asserts was influenced by Kant, with the origins of the concept of pragmatism. Dewey defines Peirce's pragmatism as a method that is concerned "in the art of making concepts clear, or of construing adequate and effective definitions in accord with the spirit of scientific method" (Hickman & Alexander 3). Dewey saw the most outstanding aspect of Peirce's pragmatism in the connection between thought and purpose. In speaking of pragmatism, Peirce wrote:

> the rational purport of a word or other expression, lies exclusively in its conceivable bearings upon the conduct of life; so that, since obviously nothing that might not result from experiment can have any direct bearing upon conduct, if one can define accurately all the conceivable experimental phenomenon which the affirmation or denial of a concept could imply, one will have therein a complete definition of the concept (Hickman & Alexander 4).

As already discussed, it is quite impossible to know *all* of the situations throughout time within which an expression, or anything else could be utilized or known – to do so would require omniscience. Dewey believed that Peirce's view of pragmatism was very linear and thus limited in its applications to society. "Peirce's effort was to interpret the universality of concepts in the domain of experience in the same way that

Kant established the law of practical reason in the domain of the a priori (Hickman & Alexander 4).

Dewey also claims, however, that Peirce's views on pragmatism establish strong foundation concepts for the idea. Peirce believes that pragmatism is a concept that can be applied in every situation not only under special circumstances. " 'It is, according to the pragmatist, that form in which the proposition becomes applicable to human conduct, not in these or those special circumstances, nor when one entertains this or that special design, but that form which is most directly applicable to self-control under every situation, and to every purpose' " (Hickman & Alexander 4). Peirce continues to espouse the idea of pragmatism as a procedural method, and writes that " 'the pragmatist does not make the summum bonum to consist in action, but makes it to consist in the process of evolution whereby the existent comes more and more to embody generals...' " (Hickman & Alexander 4).

Dewey sees Peirce's ideas as not only fundamental, but encompassing and conclusive in refuting the two major critiques of pragmatism, namely that pragmatism "makes action the end of life" and that it "subordinates thought and rational activity to particular ends of interest and profit" (Hickman & Alexander 4). Although Peirce's views do entail, or at least acknowledge the role of action, that action is only an "intermediary," according to Dewey (Hickman & Alexander 4). Peirce sees action not as an end, but as the link to arriving at the true significance of an idea. "In order to be able to attribute a meaning to concepts, one must be able to apply them to existence. Now it is by means of action that this application is made possible. And the modification of existence which results from the application constitutes the true meaning of concepts"

(Hickman & Alexander 4). Peirce, therefore, refutes the criticism that pragmatism is a philosophical thought that justifies action for its own sake, but rather it provides a method to discover the meaning of concepts.

Dewey also points out that concepts can have a variety of different applications and meanings. Meanings can also change over time and between different cultures. Dewey writes that there is a "scale of possible applications of concepts to existence, and hence a diversity of meanings. The greater the extension of concepts, the more they are freed from the restrictions which limit them to particular cases..." (Hickman & Alexander 4).

In The Development of American Pragmatism, Dewey also describes the ideas of James regarding pragmatism which were based on those of Peirce. James' concepts simultaneously expanded and limited the concepts of pragmatism. James wrote, "The ultimate test for us of what a truth means is indeed the conduct it dictates or inspires. But it inspires that conduct because it first foretells some particular turn to our experience which shall call for just that conduct from us. And I should prefer to express Peirce's principle by saying that the effective meaning of any philosophic proposition can always be brought down to some particular consequence, in our future practical experience" (Hickman & Alexander 5). Dewey believed that in altering Peirce's method, James managed to expand the scope and relationship of pragmatism to human events by highlighting the importance of particular consequences. On the other hand, Dewey also believed that James, by emphasizing particular consequences, limited Peirce's concepts of pragmatism by limiting its application. "In one sense one can say that he (James) enlarged the bearing of the principle by the substitution of particular consequences for the

general rule or method applicable to future experience. But in another sense, this substitution limited the application of the principle since it destroyed the importance attached by Peirce to the greatest possible application of the rule, or the habit of conduct – its extension to universality" (Hickman & Alexander 5). James was therefore concerned with the impact that philosophical debates, because they lead to action, attitude, conduct, etc., have on society.

As James shifted the focus of pragmatism to particular consequences of philosophical thoughts for society, he inevitably encountered the concepts of monism and pluralism. James saw monism as a strict formula that allowed for absolutely no deviation from its principles. Monism, in James' view, was not in any way a reflection of the diversity of beliefs in human society, and therefore a grossly inadequate premise on which to base decision. According to Dewey, James demonstrated in his lectures on pragmatism in 1907 that "monism is equivalent to a rigid universe where everything is fixed and immutably united to others, where indetermination, free choice, novelty, and the unforeseen in experience have no place; a universe which demands the sacrifice of the concrete and complex diversity of things to the simplicity and nobility of an architectural structure" (Hickman & Alexander 6).

Since James shunned the idea of monism, he therefore endorsed the idea of pluralism. James believed that pluralism was better tailored to reflect the diverse views of both individuals and groups in a changing society. Not only can pluralism, as opposed to monism, better convey the validity of diverse views, but it also allows for innovations in thinking and thus the evolution of ideas. In those same lectures in 1907, James presented his ideas on pluralism, and according to Dewey, conveyed the idea that

pluralism "leaves room for contingence, liberty, novelty, and gives complete liberty of action to the empirical method, which can be indefinitely extended. It accepts unity where it finds it, but it does not attempt to force the vast diversity of events and things into a single rational mold" (Hickman & Alexander 6).

Obviously then, Peirce and James hold different views of the concepts of pragmatism and even philosophy in general. "From the point of view of Peirce, the object of philosophy would be rather to give a fixed meaning to the universe by formulas which correspond to our attitudes or our most general habits of response to the environment" (Hickman & Alexander 6). James, on the other hand, was more concerned with the consequences of philosophical thought. "Peirce was above all a logician; whereas James was an educator and humanist and wished to force the general public to realize that certain problems, certain philosophical debates have a real importance for mankind, because the beliefs which they bring into play lead to very different modes of conduct (Hickman & Alexander 5-6).

In establishing pluralism as an integral feature of pragmatism, James not only acknowledged and lent credence to the diverse and divergent views of society, but he also recognized that those views and beliefs are subject to change. James then established a concept that he called the theory of the right to believe, which stated that knowing the consequences of a certain belief will in fact influence the belief itself (Hickman & Alexander 7). "The discovery of the fundamental consequences of one or another belief has without fail a certain influence on that belief itself" (Hickman & Alexander 7). The belief itself and the knowledge of that belief's consequences are then bound together in a

system influencing one another, much the same as the dual influences of the individual/society system in the theory of social constructionism.

James, therefore, confirmed each individual's right to believe not only in what can be proven scientifically or otherwise, but in what has not or cannot be proven. For example, through his theory of the right to believe, James would have supported an individual's belief in their God. James "claimed the right of a man to choose his beliefs not only in the presence of proofs or conclusive facts, but also in the absence of all such proof" (Hickman & Alexander 7). Dewey suggests that in order to explain the crux of illusive concepts such as God, justice, and the like, one may simply have to live according to the principles of such. "It may be that, in order to discover the proofs which will ultimately be the intellectual justification of certain beliefs – the belief in freedom, for example, or the belief in God – it is necessary to begin to act in accordance with this belief" (Hickman & Alexander 7).

Dewey also acknowledges that James's theory of the right to believe without proof has been the subject of much criticism. Believing without proof and asserting unfounded ideas can lead not only to inappropriate conclusions, but also to dangerous consequences. However, every action has a set of consequences, and every situation requires an action, even the decision not to act is indeed an action. "We are obliged to act in any case; our actions and with them their consequences actually change according to the beliefs which we have chosen" (Hickman & Alexander 7). In the theory of the right to believe, James verified the belief in a cause or concept that lacked evidence. In living according to the ideals of justice and freedom, for example, individuals not only practice the beliefs, but also reshape those concepts, and therefore alter their consequences.

In addition to his views on pluralism and the theory of the right to believe, James also applied the pragmatic method to the problems associated with the idea of truth. Traditionally, empiricists observe phenomena, formulate a theory, test their concepts, and then summarize their ideas and call them knowledge or the truth. There is an essential problem with the nature of truth, especially for the social sciences, a problem with which social constructionism, as well as pragmatism is concerned. A theory can only be proven true or false when tested in the realm of action or experience, known to empiricists as experimentation. "A theory corresponds to the facts when it leads to the facts which are its consequences, by the intermediary of experience" (Hickman & Alexander 8). In order for a theory to be proven absolutely true, it must hold true for all realms of possibility at all times. Since it is impossible to know future conditions because of change and random occurrences, theories cannot be tested in all realms. Therefore, there can be no such thing as absolute knowledge. "Logically, absolute truth is an ideal which cannot be realized, at least not until all the facts have been registered, or as James says 'bagged,' and until it is no longer possible to make other observations and other experiences" (Hickman & Alexander 8).

There is no doubt that pragmatism has some roots in empiricism, but it also contains fundamental differences. Pragmatism is centrally concerned with the consequences and spectra of actions rather than the observation and documentation of past events. In the pragmatic view, "general ideas have a very different role to play then that of reporting and registering past experiences. They are the bases for organizing future observations and experiences" (Hickman & Alexander 8). James' views on pragmatism and the problem with the nature of truth can therefore be likened to a

progressive or altered form of empiricism. In the words of Dewey, "One will understand the philosophy of James better if one considers it in its totality as a revision of English empiricism, a revision which replaces the value of past experience, of what is already given, by the future, by that which is as yet mere possibility" (Hickman & Alexander 9).

Peirce and James' contributions to pragmatism set the stage for a closely related philosophical concept known as instrumentalism. Although James was dedicated to demonstrating the effects of thought on consequences, and vice versa, he never established a complete method for doing so, but rather concentrated on moral aspects, according to Dewey (Hickman & Alexander 9). Instrumentalism, on the other hand, explores such means. "Instrumentalism is an attempt to establish a precise logical theory of concepts, of judgments and inferences in their various forms, by considering primarily how thought functions in the experimental determinations of future consequences" (Hickman & Alexander 9).

Instrumentalism emphasizes understanding rather than simply knowing. It is closely linked to pragmatism in that instrumentalism recognizes that there can be no one true or correct line of thought and that different spatial, temporal, and cultural settings require different modes of thought and thus action. Instrumentalism "assigns a positive function to thought, that of *re*constructing the present stage of things instead of merely knowing it. As a consequence, there cannot be intrinsic degrees, or a hierarchy of forms of judgments. Each type has its own end, and its validity is entirely determined by its efficacy in the pursuit of its end" (Hickman & Alexander 11).

Instrumentalism, like pragmatism, highlights the importance of individuals and individual decisions. Instrumentalism recognizes that actions are not always akin to

thought and that actions contribute to the integrated system where knowledge influences action, and in turn, action influences knowledge. Social actions are therefore key to the construction of knowledge.

> Logic, therefore, leads to a realistic metaphysics in so far as it accepts things and events for what they are independently of thought, and to an idealistic metaphysics in so far as it contends that thought gives birth to distinctive acts which modify future facts and events in such a way as to render them more reasonable, that is to say, more adequate to the ends which we propose for ourselves. This ideal element is more and more accentuated by the inclusion progressively of social factors in human environment over and above natural factors; so that the needs which are fulfilled, the ends which are attained are no longer of a merely biological or particular character, but include also the ends and activities of other members of society (Hickman & Alexander 11).

Finally, instrumentalism also challenges the concept of objectivism and recognizes that human thought is influenced by many factors, including personal, political, and monetary. Humans are only capable of thinking within their own realm of experience; therefore, completely objective human thought cannot be possible. James writes, " 'The popular notion that "Science" is forced on the mind *ab extra*, and that our interests have nothing to do with its constructions, is utterly absurd' " (Hickman & Alexander 10).

Now, with the basic premises of American pragmatism outlined, the concepts of the natural environment can be incorporated into the philosophical thought and referred to as environmental pragmatism. Since American pragmatism views experiences as the basis for knowledge, it evolves naturally into the thought of environmental pragmatism, which sees the environment as the most fundamental experience. "We cannot talk about environment without talking about *experience*, the most basic term in

pragmatism....Environment, in the most basic sense, is the field where experience occurs, where my life and the lives of others arise and take place" (Parker 29).

As discussed, pragmatism upholds the importance of each individual experience. Since the environment and experiences are inextricably linked, all environments must therefore also be treated equitably. "In asserting the fundamental relatedness among organisms and environments, pragmatism commits us to treating all environments with equal seriousness. Urban and rural; wilderness, park, and city; ocean and prairie; housing project, hospital and mountain trail – all are places where experience unfolds" (Parker 29).

Humans must not, however, according to environmental pragmatism, convert every environment into settled, easily manageable realms to fund human experiences. To do so, would mean that experiences would be predictable and thus the evolution of knowledge would come to a halt. "If we have our being in the ongoing encounter with environment, then to will that the environment becomes a fully settled, predictable thing, a mere instrumental resource in which there can *be* no further novelty, is to will that we undergo no further growth in experience. The attempt to dominate nature completely is thus an attempt to annihilate the ultimate source of our growth, and hence to annihilate ourselves" (Parker 30). Instead of trying to master the environment, humanity must remember that it too is part of and depends on the environment for both knowledge and survival. "What we must try to do is not to master the natural world, but to cultivate meaningful lives within various environments" (Parker 30).

Environmental pragmatism is a relatively new set of concepts in the world of ethics that can also be seen as new knowledge that has emerged in society. Because

knowledge is constructed through human experience, environmental pragmatism must be a result or reflection of current experiences in society. "The sudden emergence of a new area of ethical inquiry is a signal that something has changed at a very deep level of our collective life" (Parker 30). Although social constructionist theory warns of the simplistic concepts that environmental metaphors may convey, environmental pragmatism views metaphors used to discuss environmental matters as a new and important rhetorical element in society. Through the lenses of pragmatism, environmental metaphors, such as the 'greenhouse effect,' can be seen as society's manifestation of the concept that the human and natural worlds share an intimate connection. "The tendency of environmentalists to rely on ecological metaphors in their thinking has led some to embrace an ethic that recognizes the centrality of relations. This ethic, like that of pragmatism, recognizes the intrinsic value, within and for the system, of all things related" (Parker 31). Recognizing a system's interrelatedness, rather than attempting to view its sub-components separately and then make decisions, will lead to better knowledge and more efficient policy. "From the pragmatic perspective, this emerging ethic of relationships appears to be ontologically more sound than traditional ethical theories" (Parker 31).

Pragmatism, like social constructionism, believes individual experiences and interactions are the sources of knowledge, and society operates with the gestalt that policy decisions are to be based on knowledge. The field of environmental ethics has been associated with policy formation and application, as is clearly evident in the actions of the Sierra Club, and others such as Scenic Hudson and Clearwater Sloop. The purpose of public policy-making procedures, applications of the legal system, and grass-roots

activism, according to the pragmatic view, "is to keep experimenting with ways to restructure our social institutions so that the public has a real voice in determining the kind of environment we inhabit" (Parker 31). Public participation in the decision-making process is essential in the pragmatic view because the theory views knowledge as derived from individuals. Pragmatism "sees individuals as the source of genuine insight into what is needed, and accordingly tries to maximize participation in governing" (Parker 31).

Maximizing public participation in the decision-making process concerning environmental issues will without a doubt lead to some if not many conflicting views about what should be done in any given situation. In the case of the Hudson River PCBs, there are those who wish to remove all the PCBs from the river immediately, those who wish to keep them there and allow the natural ecological processes to continue, and those who wish to remove only some of the PCBs from the water. As previously mentioned, pragmatism espouses the concept of moral pluralism which is the idea that "no single moral principle, or over-arching theory of what is right, can be appropriately applied in all ethically problematic situations" because there are "genuine differences among moral situations, because there are many kinds of entities and possible relations among them. These situations involve a significant variety of values, and hence of kinds of conflict to be resolved" (Parker 31-2). Because environmental pragmatism allows for the usage of various moral principles, it must not only speak in terms of pluralism, but it must also broach two of the major theoretical ideas in environmental ethics, namely anthropocentrism, and the idea that the natural world possesses intrinsic value.

First, environmental pragmatists tend towards the use of moderate moral pluralism rather than extreme moral pluralism. Pragmatism does not advocate radically shifting from one ethical framework to another at will, as extreme moral pluralism would infer. "To shift metaphysical systems at will indeed does suggest shallow commitment to basic beliefs" (Parker 32). Pragmatism does however suggest guidelines within which to work and consider various and sometimes conflicting thoughts and reasons. Two principles assist pragmatists in sorting through conflicting ideas and values. "Pragmatism suggests that the *sustainability* and *diversity* of experiences made possible by a course of action should be promoted wherever possible" (Parker 32). The concepts of sustainability and diversity provide reference points and help decision-makers to evaluate and compare conflicting values.

Second, the concept of anthropocentrism, the idea that human interests and well being dominate moral thought, is accompanied by the concepts of biocentrism and ecocentrism. "Biocentrism maintains that all forms of life, as such are valuable. Ecocentrism emphasizes the value of ecological systems as a whole, including natural processes, relationships and non-living parts of the environment" (Parker 32). Many ethicists, as well as organizations and individuals, although they may not use the terminology, adhere rigorously to either anthropocentrism, biocentrism, or ecocentrism. Pragmatists, on the other hand, would then invoke the use of pluralism and ask "why we should be expected to pledge allegiance to any of these flags *a priori*, and exclude the others" (Parker 32).

Conflict is certain to arise when all three concepts of anthropocentrism, biocentrism, and ecocentrism are given validity; however denying that one or more of

those concepts is worthy of consideration can produce hideous consequences when coupled with decision-making. The conflict must be discussed and most importantly considered within the context of the problem at hand using the principles of sustainability and diversity as guides. "Each situation must be appraised on its own distinct terms" (Parker 33). Therefore, no one moral stance can apply to all situations.

Pragmatism, like all other ethical theories, is anthropocentric in the sense that humans are the ones discussing values. "This is so because human experience, the human perspective on value, is the only thing we *know* as human" (Parker 33). The anthropocentrism that pragmatism inevitably possesses is not meant to suggest that humans know and are the best means of decision-making, it is simply the only means. "We can and should speak on the others' behalf when appropriate, but we cannot speak from their experience....In this sense, the human yardstick of experience becomes, by default, the measure of all things" (Parker 33).

The third and final moral principle discussed here in conjunction with environmental pragmatism is whether or not the non-human world possesses intrinsic or inherent value, that is value of its own outside the realm of its worth to humans. "The main concern is that as long as the non-human world is seen as a stock of resources having only instrumental value, there can be no genuine 'environmental ethic' " (Parker 34). Pragmatism reduces this complex question of the value of non-human environment and its being by reasoning that intrinsic or inherent value cannot be separated from instrumental value. (Instrumental value, however, is not in any way restricted to the human concept of monetary value.) If something has intrinsic value, it has such because of its relationship(s) with another being(s). "The being of any existent thing, human or

non-human, is constituted in its relations with other things in a context of meaningful connections. Thus anything that is good is *both* instrumentally valuable (it affects some good beyond itself) *and* intrinsically valuable (it is good for what it is, a significant entity essential to the constitution of these relations)" (Parker 34).

As pragmatism has embraced pluralism, and thus previously conflicting ideas such as anthropocentrism and biocentrism, it has also been able to shed light on how and why environmentalists of differing convictions can often work together towards the same goal. The concepts of anthropocentrism and biocentrism provide the substance for the classic environmental theories of conservationism and preservationism, respectively, that often divide environmentalists in debate. Conservationism, the concept of wise-use of natural resources for the benefit of humans, evolved from the environmental management practices and ideas of Gifford Pinchot. Preservationism, on the other hand, originating with John Muir, is as the name suggests: the idea that the natural (non-human) environment should be preserved in its own right and protected from human interference. In Towards Unity Among Environmentalists, Bryan G. Norton writes of conservationism and preservationism in terms of environmental pragmatism. "What once appeared as a war between two factions with opposed world-views now appears as two protective strategies that are applicable in differing situations" (Norton 191).

Pragmatism is an ethical theory that has given environmentalists and policy-makers the standing to legitimately utilize moral pluralism in decision-making. Environmental pragmatists need not strictly adhere to the wise-use practices of conservationism, or consider the intrinsic value of non-human nature in every situation, they are able to search for and support a decision that makes sense ecologically,

economically, and morally in accordance with social, cultural, and temporal factors. The pluralist, and hence pragmatist, "can search for value in nature that is reducible in nature neither to the dollars of the economist nor to the rights of wild species. The moral pluralist can look for common ground from which to construct a new, philosophically, culturally, and politically viable worldview that sees humans as integrated into larger systems and that values objects as parts of their human, cultural, biotic, and abiotic contexts" (Norton 200).

Rather than adhering strictly to rigid ethical theories, that as already discussed can often lead to philosophical deadlock and hamper decision-making, pragmatists embrace the different views, aspects, and values of the world in their arguments and utilize different reasons according to the specifics of the case at hand. Using this pluralistic framework, seemingly divergent groups, such as the ecologists and the extreme sports enthusiasts, are able to work together towards a common goal using different reasoning.

Considering that no two individuals are exactly alike, the number of varying thoughts and aspects of reasoning on which to possibly base policy decisions are infinite. Norton, however, cites seven broad categories on which he says environmentalists and others base their arguments (Norton 197). First, he cites Judeo-Christian stewardship that calls for protection and care for the natural world out of respect and obligations to the Almighty Creator. Second, is the thought of deep ecology that sees the natural world and its inhabitants as possessing intrinsic value. Next, transformation/trancendentalism is the spiritual, but not necessarily religious, view of nature that sees the natural world as providing a platform for human experiences. Fourth, economics is very often used to argue both the pros and cons of environmental legislation. Fifth, scientific naturalism is

largely based on the ideas of Darwin and utilizes factors such as biological diversity and population growth as indicators of an ecosystem's health. Sixth is the idea of ecofeminism that claims that the domination and control of nature is actually a reflection and/or an extension of gender domination. Finally, Norton sees pluralism/pragmatism as "useful tools...to aid in the development of a solution to moral quandaries" (Norton 197-8). Pragmatism, however, because of its pluralist nature can, and in fact does, employ all of the previous six arguments.

Norton also recognizes the need for guiding principles because pragmatism considers individuals paramount and embraces a number of modes of thought. "Pluralism can provide guidance in environmental policy only if it includes second-order principles that help to determine which of its diverse first-order moral criteria apply in given situations. A pluralistic system with such second-order principles could be called an *integrated worldview*" (Norton 200). Norton, however does not provide a matrix of an integrated worldview, but does suggest that according to Leopold's land ethic such a view should be based on "the temporal and spatial scale appropriate to the problem at hand" (Norton 201). For the purpose of this research, the guiding principles *sustainability* and *diversity*, suggested in Light & Katz, are utilized.

CHAPTER 3

RESEARCH DISCUSSION

From the late 1940's until 1977, GE held permits for PCB discharge and knowingly released over a million pounds of PCBs directly into the Hudson River. The company used PCBs for insulating its electrical capacitors (RW Winter '99:2). The U.S. Federal Government banned the manufacture and use of PCB's, unless in a totally enclosed system, in 1976 under the Toxic Substances Control Act (Sullivan ed. 265-6).

PCB discharge is now illegal. The chemicals are known to cause cancer in animals and are classified as a probable human carcinogen (http://www.epa.gov/hudson/pcbs-in-env.htm.) Additionally, "Studies show that these chemicals may have profound effects on (human) immune systems, neurological development, and reproduction. And PCBs may pose a special health risk for infants and children," according to Carol M. Browner, EPA administrator (Statement before the NY State Assembly, 9 July 1998). Since GE ceased PCB discharge into the Hudson, the EPA has considered dredging 200 miles of the bottom of the river that has been deemed a Superfund site. GE has historically claimed that living in a PCB contaminated area does not pose a threat to human health, and that left alone, clean sediment would cap the PCBs, and thus the river would clean itself. In October of 1982, the EPA published the FEIS for the Hudson River proposed dredging project and determined that a "no action" decision was appropriate in 1984.

PCBs in the Hudson River has remained an issue of paramount concern for the EPA, GE, citizen and activist organizations surrounding the Hudson River since the 1982 FEIS. This section concentrates on examining the discourse of those sectorss of society

using the theories of social constructionism and environmental pragmatism. The FEIS statement for the Hudson River published by the EPA in 1982, the speeches and newspaper article quotes of the present EPA Administrator, Carol Browner, as well as press releases and other literature posted on the EPA's Hudson River web-site that focus on PCBs are all examined in this thesis. A GE video, information posted on GE's web-site, and a series of GE publications concerned with the status of the Hudson titled River Watch are also analyzed. Finally, a video produced by Clearwater Sloop, as well as web-site information, pamphlets, brochures, and fact sheets produced by the activist groups Clearwater, and Scenic Hudson are discussed.

The first portion of this thesis is concerned with the background and contextual information for PCBs in the Hudson. As already stated, GE is responsible for releasing an estimated one million pounds of PCBs into the Hudson River between the 1940's and the 1970's (www.epa.gov/hudson/welcome.htm). GE owned and operated two plants utilizing PCBs along the Hudson riverfront at Fort Edward and Hudson Falls, NY. In 1973, the dam at Fort Edward was removed from the Upper Hudson releasing large amounts of PCBs into the Hudson (Clearwater Fact Sheet 8). In 1976, "a NYS administrative judge found that GE's (PCB) discharges were in violation of the permits and violated water quality laws" (Scenic Hudson 19:3 9). In 1977, GE ceased using and discharging PCBs into the Hudson River (http://www.hudsonwatch.com/latest6.html). The EPA issued their Final Environmental Impact Statement in 1982 recommending that no-action be taken at that time based on incomplete modeling, dredging, and PCB data . In 1983, 200 miles of the upper Hudson were added to the Superfund National Priorities List (www.epa.gov/hudson/welcome.htm). The EPA then issued an order of "no-action"

into the Record of Decision (ROD) in 1984 based on the lack of dredging technology at the time and the idea that clean sediment may cover the PCB contaminated sediment thus reducing the bioavailablity of the chemicals. In 1991, the "collapse of a wooden gate in an abandoned upper river mill...allowed large quantities of PCB-contaminated material to flow directly into the Hudson" (RW Fall'97:5). GE did not own the wooden gate or the abandoned mill, known as Allen Mill, located downstream of its Hudson Falls plant. PCBs migrated from the GE site and accumulated in the sediment at the Allen Mill site only to be released when the gate broke. In 1993, GE entered into a series of agreements with the State of New York and the EPA to clean-up PCBs in the water and in the sediment surrounding the Hudson River. Since EPA's decision against dredging in 1984, GE has capped some shoreline remnant deposits under a consent decree with the EPA during the time period extending from 1989-1991. Under order of the New York State Department of Environmental Conservation (NYSDEC) in 1995 GE installed a new water treatment plant and recovery wells at the Hudson Falls site to collect seepage (www.epa.gov/hudson/actions-taken.htm).

Community organizations and activist groups have been involved and active throughout the history of PCB contamination in the Hudson River. Clearwater has regularly released news bulletins and fact sheets concerning dredging, PCB migration, and the health effects of PCBs on humans and the Hudson ecosystem and wildlife. Clearwater has also produced a video documenting the history of decisions, future possibilities, and community views of PCBs in the Hudson River. Likewise, Scenic Hudson has produced numerous updates about the EPA's and GE's activities concerning

PCB's in the Hudson, as well as updates on the latest studies regarding the effects of PCB on humans and the environment.

This next section analyzes the governmental, private, and public speeches and publications concerned with PCB abatement in the Hudson. Carol Browner, EPA Administrator, has stated she has a "deep concern for PCB contamination in the Hudson River;" however, despite her pledge to "clean up toxic pollution," the EPA, prior to Browner, has not always applied a clear and concise approach to dealing with PCBs in the Hudson River (Browner 7/9/98). For example, according to Wiesner, "When an environmental impact assessment is undertaken, the project proponent engages technical professionals who collect data on the nature of the site, the project, and local environment. These professionals organize and rank this data, in importance according to the type of development involved, and summarize their findings in an environmental impact statement (EIS)" (19). The Hudson River FEIS, however, is neither organized nor a summary. It appears that the public has been greatly misinformed and the EPA was led to a "no action" decision largely because the FEIS was unorganized and incomplete. Overall, the Hudson River FEIS outlines various studies that could be instrumental in determining environmental and human health impacts of dredging in the Hudson, but the FEIS itself is inadequate in determining those impacts.

The Hudson River FEIS begins with an executive summary that states, "Removal of PCB-laden sediments in the areas to be determined during the pre-dredging monitoring program should demonstrate an improvement of the rate of recovery of the Hudson River under the full or reduced-scale project" (FEIS S-5). However, because the areas to be dredged were not yet determined as of the writing of the FEIS, much uncertainty

remained. The EPA at the time of the FEIS did not define which area(s) they were considering for dredging, or if they were considering dredging the entire 200 miles of the Hudson bottom deemed a Superfund site. The public comments included in the FEIS only begin to skim the surface of the controversy that surrounds the decisions of pre-dredging analysis.

The Army Corps of Engineers (ACOE) writes, "The hot spot areas still remain however, and the first good flood could easily mobilize them by stripping the still thin, clean, sediment cover thus making them available to fish" (FEIS E-3). The ACOE then goes on to advocate dredging the hot spots most heavily laden with PCBs. However, the Natural Resource Defense Council (NRDC) appears to question the ACOE advice when it comments, "many hot spot areas are stable sediments and may be scoured under only the severest flood conditions. Some sediments containing relatively lower concentrations of PCBs appear to scour at a higher rate and could be contributing significantly to the overall PCB downriver flow" (FEIS E-27). The NRDC then goes on to recommend further research into the possibility that so called 'cold spots' may be contributing more PCBs to the Hudson than the hot spots. ('Cold spots' is a term applied to areas in the Hudson where PCB concentration is less than a hot-spot, but the area may be exposed to stronger and/or swifter water currents than the hot-spots.) It is apparent solely from the ACOE and NRDC comments that there is a lack of data pertaining to dredging that was never resolved that could have and did nurture public confusion and misinformation.

The lack of data concerning pre-dredging studies creates both ambiguity and uncertainty. The FEIS does not include which sites or how much material would be dredged. Because this document is supposed to be a *final* statement, it should be

providing clarification rather than further confusion. The NRDC writes, "A document should be published that discusses the results of pre-dredging studies and proposes modifications to the dredging plan based on the information that is uncovered" (FEIS 2-4). The EPA responds, "Such a report will be published by NYSDEC (New York State Department of Environmental Conservation) when the pre-dredging monitoring program is completed" (FEIS 2-4). Without the pre-dredging monitoring report, it was impossible to gauge the impacts that dredging would have on the health of the Hudson River itself as well as the surrounding human and biotic community because the amount of PCBs to be removed, or released for that matter, was unknown. Numerous dredging studies, conducted and sponsored by both GE and the EPA, have been published over the past 17 years since the FEIS; these studies vary in their conclusions of which spots, if any, should be dredged.

The EPA began a more serious approach to assembling reports detailing options and reasons for dredging in the Hudson River when the agency decided to revisit its 1984 no-action decision. The EPA's 1984 decision was largely based on the concept that the PCB contaminated sediment on the river bottom was in the process of being buried by clean sediment traveling downstream from the northern reaches of the Hudson. Although GE currently maintains that contaminated sediments continue to be buried by clean sediment, the EPA found otherwise in its reassessment. According to EPA's Phase II Low Resolution Coring Report, "Analysis of sediment core samples taken from the Upper Hudson River demonstrates that PCBs are not being buried by the natural deposition of clean sediment" (EPA release 7/23/98). The EPA does acknowledge that in some hot-spot areas PCB contaminated sediment is being buried, but not by clean

sediment. "Where burial occurred, it was typically by contaminated sediments, resulting in gain to PCB inventory" (EPA release 7/23/98).

EPA's Phase II Low Resolution Coring Report, which compares samples taken between 1976 and 1984 to samples taken in 1994, established several other conclusions other than the idea that clean sediment has failed to bury PCB contaminated sediment. According to the EPA, hot-spot areas such as the Thompson Island Pool (TIP) are losing huge amounts of PCB that are then being redeposited in other parts of the Hudson. "In the Thompson Island Pool, there has been a net loss of approximately 40 percent of the PCB inventory from 1984 to 1994 in sediments with high PCB concentrations...Three-quarters of the PCBs lost from the Thompson Island Pool entered the water column and were redistributed throughout the Hudson River system" (EPA release 7/23/98). The TIP is not the only area, according to the EPA, that is experiencing a decrease in PCB levels due to redistribution. "Between the Thompson Island Dam and the Federal Dam at Troy, there has been a net loss of PCB inventory from 1976/78 to 1994 in hot spot sediments sampled in the low resolution coring program" (EPA release 7/23/98). Therefore, although PCB contamination levels in some hot-spot areas seem to be decreasing, PCBs are being more widely distributed throughout the Hudson than they have been in the past.

As a result of the EPA's reevaluation, the agency has also discovered much higher PCB contamination levels than previously recorded in certain areas of the Hudson that are unrelated to the idea of PCB redistribution. "The PCB inventory for Hot Spot 28 (located approximately two miles south of the Thompson Island Dam) calculated from the Low Resolution Coring data is considerably greater than previous estimates. This

apparent gain in inventory is attributed to significant underestimates in previous studies rather than new deposition of PCBs" (EPA release 7/23/98).

PCB loss in some hot-spot areas is perhaps one explanation for the discrepancy between the EPA and GE regarding PCB levels over time. GE claims that PCB levels in hot-spot areas are decreasing because clean sediment is burying PCB contaminated sediment, and therefore, because levels are decreasing, the EPA should allow the river's natural processes to continue. However, although PCBs levels are decreasing in selected areas, the river may not in actuality be healing itself, as GE claims, but in fact may simply be redistributing its ailments.

Also with its reassessment of remediation activities for the Hudson, the EPA also revisited the need for a predredging and monitoring report that the agency lacked during the time of its 1982 FEIS and 1984 no-action decision. The EPA release a Baseline Modeling Report (BMR) for the Hudson River Reassessment Project in May 1999 and then released a revised version of the report in January 2000. The EPA's BMR is based on a scenario where no dredging would be performed and is "designed to predict future levels of PCBs in the Upper Hudson River sediment, water and fish for the Hudson River PCBs Reassessment Project" (EPA release 1/31/00). The BMR does not speculate on Hudson River PCB levels if a full scale or partial dredging plan were implemented. The BMR states that PCB levels in the Hudson will indeed continue to decline for several years, as GE has also stated, however, after levels cease to decline, PCB levels in the Hudson will still exceed the 2ppm threshold limit set by the EPA.

> PCB concentrations in the surface sediments will continue to decline for approximately the next two to three decades. During that time, the PCBs in the sediment will control PCB levels found in the water column, surface

> sediments and fish. After that time, if PCB levels from upstream of Fort Edward (originating from the General Electric plant sites) are allowed to continue at current levels, they will begin to control the PCB levels found in the water, sediments and fish. Eventually, the decline in PCB levels will slow substantially and approach a level reflecting the upstream load. At that level, concentration of PCBs in fish will still be at unacceptable levels...Small amounts of annual erosion could expose PCBs that were previously buried in certain areas of the river (EPA release 1/31/00).

In other words, EPA's BMR indicates that unless PCBs are removed, presumably via dredging, from hot-spot areas, such as those around Fort Edward, PCB levels for Hudson River water, sediment and fish will fail to meet attainment levels in the future.

Most recently the EPA has issued a proposed plan for remediation of Hudson River PCBs. On December 12, 2000, the EPA released their preferred clean-up plan along with a feasibility study. "The Agency's preferred remedy includes dredging targeted areas in the Upper Hudson River between Fort Edward and Troy, totaling 2.65 million cubic yards. The dredged material will be shipped to existing licensed landfills outside of the Hudson River Valley for disposal. The estimated cost is $460 million. It is planned that the construction will take five years" (http://www.epa.gov/hudson/whats-new.htm). The EPA's preferred clean-up plan is not a final decision, but public meetings also began on the twelfth of December 2000 and additional public forums are scheduled for January 2001.

Most of the discourse generated by the EPA is in the form of scientific discourse and cloaked in technical language. Occasionally, however, the EPA produces literature with language that is more accessible to the general public. On their Hudson River PCB web page, in addition to providing links that detail the specifics of scientific studies and the differences in chemical classifications, the EPA provides the history of PCBs in the Hudson as well as the potential adverse effects of the chemicals in common language. "It

is estimated that more than one million pounds of PCBs were discharged into the Hudson River from two General Electric (GE) capacitor manufacturing plants in Fort Edward and Hudson Falls, New York over a 30-year period ending in 1977. PCBs cause cancer in animals and probably cause cancer in people, and also pose a number of serious non-cancer health risks...cancer risks to humans who eat contaminated fish caught in the Upper Hudson River is 1,000 times greater than what EPA considers acceptable. Non-cancer risks were found to be 100 times higher than EPA's level of concern" (http://epa.gov/hudson/welcome.htm). Although GE disagrees with the latter half of the aforementioned quote, there can be no argument regarding the EPA's intended message.

Occasionally, the EPA also releases materials that are based on something other than their usual technical, scientific discourse, or logos. Carol M. Browner, Administrator, U.S. EPA, delivered a speech on July 9, 1998 to the Committee on Environmental Conservation New York State Assembly concerning the abatement, and human and ecological health effects of Hudson River PCBs. Browner primarily bases her speech on logos; however she also artfully incorporated elements of both ethos and pathos. She cites several studies on PCBs conducted by various organizations including the EPA, the International Agency for Research on Cancer (IARC), and even GE. Browner states, "Preliminary research indicates that PCBs may disrupt human endocrine systems, potentially causing abnormal growth and development in children. And yet more research is providing further evidence of a link between PCBs and malignant melanoma, non-Hodgkin lymphoma, and other cancers." Browner has clearly stated the facts, and in her next paragraph she says, "...Clearly the science has spoken: PCBs are a serious threat to our health, a threat to our environment, a threat to our future." Later she

adds, "It is precisely these concerns about human and environmental health that have driven our activities in and along the Hudson." Browner simply cites the studies that indicate PCBs are harmful to humans and the environment and then logically deduces that PCBs need to be removed from the Hudson River for the safety of the surrounding communities. When a rhetorician utilizes logos, "we may find ourselves principally influenced by the reasoning of the arguments themselves" (Hauser 79). In her argument, Browner primarily allows the facts speak for themselves and persuade her audience.

Browner also invokes the use of pathos several times throughout her speech and does so to further engage her audience on a more passionate and personal level. Even if dredging PCBs from the Hudson River was justifiable based purely on logos, Browner strengthens the impact of her argument by including elements of pathos because:

> Practical matters are not solved entirely on their intellectual merits. Though some people may consider whether the propositions advanced are supported by fact and related in a logically valid fashion, such tight inspection is rare. First, a rhetorical argument comes in bits and pieces, requiring us to fill in the blank spaces with common knowledge, ideological commitments, values and goals, and the like. Second, our preferences, needs, desires, and values enter into our evaluation in important ways (Hauser109).

Browner uses pathos when she speaks against GE's suggestion for continuing no-action and says that further no-action "flies in the face of every decision this country has made in the last quarter century to protect human health and the environment." Here Browner appeals to her audience's sense of national pride and intelligence. She is relying on the idea that her statement will evoke condescending feeling towards GE when she likens them to a company who may oppose time honored national decisions for such noble goals as the protection of human health and the environment.

Browner also manages to incorporate a bit of ethos based rhetoric into her speech that provides further authority to her arguments beyond that of the cold hard facts, i.e. logos. She says, "Rest assured, when it comes to addressing imminent danger to public health, we will not hesitate to take strong and immediate action." She can promise this action only because of who she is.

Finally, Browner indicates in her speech that the EPA is attempting to initiate steps that may lead to a process similar to the social constructionist model for activities involved in the Hudson River PCB decision-making process. She states, "a decision that is not rooted in sound, accurate, credible science – a decision that sidesteps the citizens who must live with it – simply prolongs the process, leads to costly litigation, and puts us back where we began – a polluted river, fish unsafe to eat, fishermen out of work, little hope for a lasting solution." Browner continues and states that "the best way to meet our goal, is to work together – the State of New York, General Electric, and concerned citizens – to protect the health of people along the Hudson River." Working together, as Browner states it, and acknowledging each party's input is the epitome of the social constructionist model which acknowledges that "the values, beliefs and emotions of experts in science, engineering, industry, and government also play a significant part in risk communication and environmental policy formation. Furthermore, technical information also flows in both directions; thus the distinction between 'expert' and 'public' begins to blur, as does the distinction between audience and rhetor" (Waddell 142).

Browner, however, in the summation of her speech does not call for an interactive communication model, but a one-way flow of information frm the so called expert to the

public. "I call upon General Electric to work with us to provide the public with full and accurate information and help finish the job of cleaning up the Hudson River." This one-way flow of information leads to inefficient communication, faulty decisions and indeed ultimately excludes the participation from the citizens who must ultimately live with the decision. This one-way communication model that Browner calls for not only acknowledges that "the public has the right to participate in decisions that affect its well-being and/or that of larger ecosystems, but that it should be empowered to do so, simply and unproblematically, through a one-way transfer of expert knowledge" (Waddell 142). As discussed later in this thesis, the public does not accept a one-way transfer of knowledge and insists on being heard, as it always does. If Browner and the EPA had begun with an interactive communication model, the EPA would have saved time and thus money and would have been able to reach a more complete, holistic policy with greater ease and efficiency.

Browner's call for the EPA and GE to inform the public, a one-way communication model, also works against the ideals of environmental pragmatism. "Community is needed because community is the method of science, and the basis for a pragmatic theory of truth" (Thompson 203). Browner fails to speak about listening and learning from community members and incorporating their ideas into policy; instead, in her speech to the NY State Assembly, she speaks of educating the public. "Pragmatic necessity implies that any analysis of water problems that does not facilitate the formation of broader community and action to address problems is philosophically flawed. An analysis that freezes disputants into fixed positions has just failed to get at what is important about water, and about environmental problems in general" (Thompson

205). In the language of her speech, Browner "freezes" community members into the position of a student rather than presenting community members with the opportunity to act as both students and as teachers, as is suggested by both the theories of social constructionism and environmental pragmatism.

Approximately a year and a half after Browner's speech to the NY State Assembly, the EPA posted their method for public participation in the Hudson River PCB decision-making process calling it their "Community Interaction Program (CIP) for the Hudson River PCBs Site Reassessment" (see figure1) (www.eps.gov/hudson/public-participation.htm). The EPA's public participation plan states, "the public needs to be informed of study findings, site activities, and the decision-making process. In turn, the EPA needs to hear public opinion and to address the questions and concerns of all interested parties" (www.eps.gov/hudson/public-participation.htm).

Again, this model aims to educate the public, hear the public, but not to really listen and learn from the public. According to both pragmatism and social constructionist theory, it is impossible for the EPA to arrive at a holistic, truthful decision without establishing an interactive dialog and learning curve between the public and the government. "The theoretical position is that truth is *for* and by a community of inquiry" (Thompson 203). Therefore, without the exchange of ideas and knowledge as well as the incorporation of policy ideas from community members, the EPA will ultimately conclude with a flawed policy for the Hudson River.

The EPA further describes its CIP as a "tiered process composed of six working groups at three levels. The foundation consists of four Liaison Groups: Governmental, Environmental, Citizen, and Agricultural...All public concerns, issues, and questions are

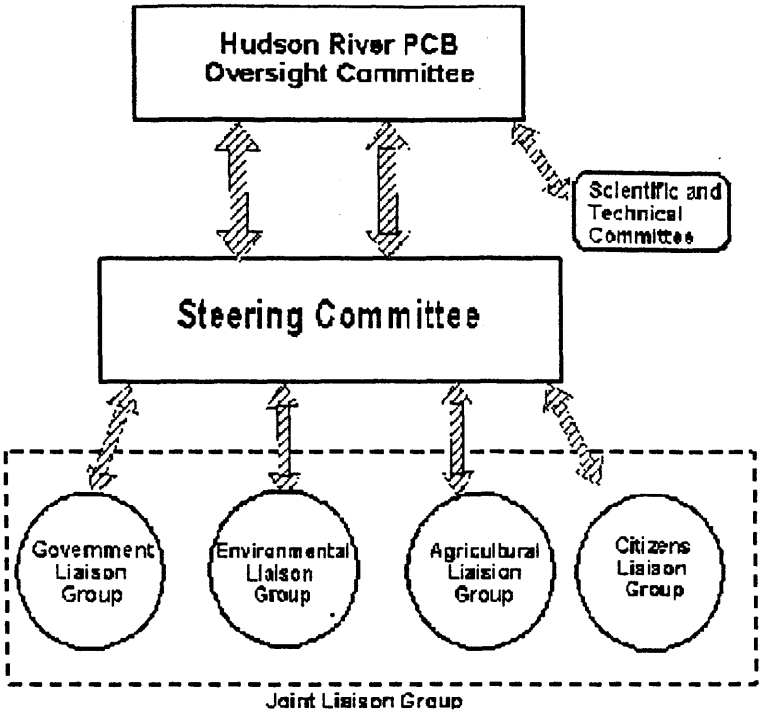

Figure 1
EPA, Community Interaction Program for the Hudson River PCBs Site Reassessment

initially presented in the four Liaison Groups and flow from there upward to the Steering Committee" (www.eps.gov/hudson/public-participation.htm). The EPA's CIP, as it is further described, may at first appear to mimic the social constructionist model. However, the CIP only contains two of the four elements required for socially constructed policy including public comment reflecting community values and emotions and the flow of technical information originating from the experts, in this case the government and GE. The CIP also lacks two criteria necessary for completing the social constructionist model. First the CIP fails to acknowledge that the values and emotions of technical experts constitute a variable in the communication and decision-making process. Secondly, the CIP largely ignores the input of information originating with the

public, specifically those who reside in PCB contaminated areas, who because of their years of living in close proximity with the chemical, may posses valuable information.

"Environmental historian Samuel Hays has pointed out that 'In our own day, environmental affairs have evolved so that the expert thinks of the political context as one of 'us' and 'them,' of the knowledgeable and rational experts and the uninformed and emotional public" (Waddell 147). The EPA's CIP is working in the manner in which Hays describes, and it more closely resembles that of a two-way communication model in which technical information originates from the experts and flows to the public, and values and emotional concerns originate from the public and are sent to the experts to be addressed.

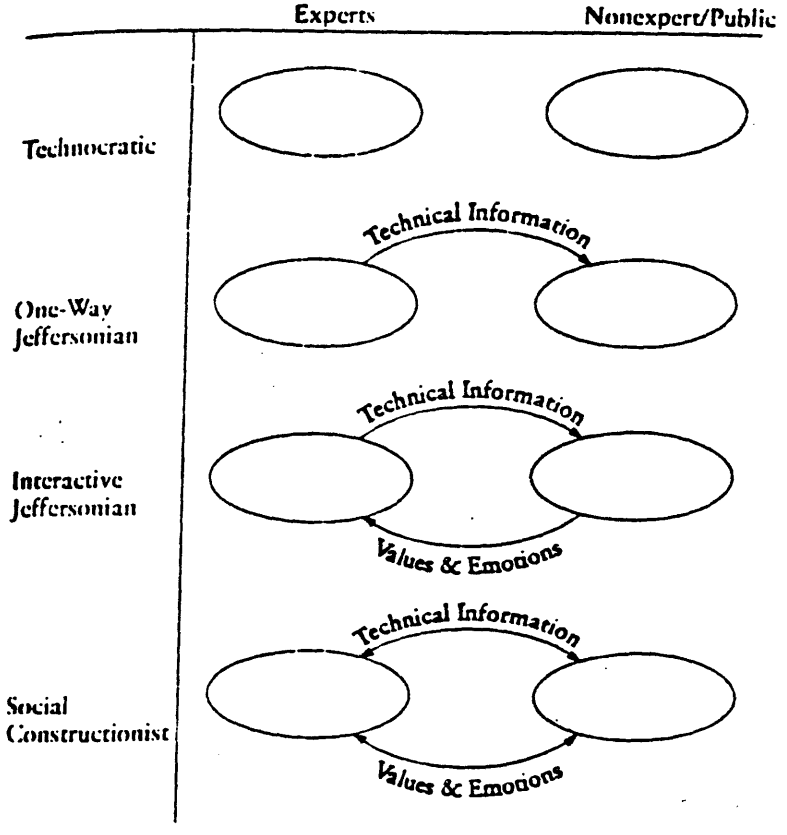

Figure 2
Four Models of Public Participation

The EPA continues with its two-way communication model throughout its CIP. The next levels of individuals participating in the EPA's CIP above those in the Liaison group are the members of the Steering Committee and the Oversight Committee. "The Steering Committee is charged with ensuring that issues of public import presented by the Liaison Group are heard, and that all opinions are considered. Issues and concerns that cannot be addressed at the Steering Committee are sent as action items to the Hudson River PCB Oversight Committee (HROC)" (www.epa.gov/hudson/public-participation.htm).

The upper levels of the CIP are merely two additional tiered levels of the two-way communication model between the Liaison group and the public; the concerns of the public are simply filtered up through the Steering and Oversight Committees. Because the EPA is not providing a forum to incorporate technical knowledge that the public may be able to offer, it may be overlooking valuable information and thus has established a less than efficient communication process. The EPA also undermines its own communication process by ignoring the fact that the "values, beliefs, and emotions of experts in science, engineering, industry, and government also play a significant part in...communication and environmental policy formation" (Waddell 142).

Finally, the EPA has published a plethora of information concerning both the human and ecological health risks associated with Hudson River PCBs. In August 1999, the EPA published four books providing human risk assessments for the Upper and Mid-Hudson and ecological risk assessments for the Upper and Lower Hudson. The Upper Hudson is defined as the area from Hudson Falls, NY to the Federal Dam at Troy, NY; Mid-Hudson is defined as the area from the Federal Dam at Troy, NY to just south of

Poughkeepsie, NY; and the Lower Hudson is defined as the area that extends from the Federal Dam at Troy, NY to the Battery in New York City (EPA, ERA Exec. Summ. 8/99 1).

The EPA's Ecological Risk Assessment, like the EPA's BMR, is an assessment of the future condition of the Hudson River PCBs and their effects on Hudson wildlife in the absence of any further remediation activities, i.e. dredging. The ERA follows an eight-point process delineated under Superfund legislation and overall concludes that "PCBs in the Hudson River generally exceed levels that have been shown to cause adverse ecological effects, and that those levels will continue to be exceeded in the Upper Hudson through 2018 (the entire forecast period)" (EPA, ERA, Exec. Summ. 8/99 1).

The ERA also indicates that although GE has ceased to release PCBs into the Hudson, there continues to be a steady supply of the chemicals into the Hudson and that this steady supply is a major source of PCBs entering into the food chain. "...PCBs adhere to river sediments. As PCBs in the river sediments are released slowly into the river water, these contaminated sediments serve as a continuing source of PCBs. During high flow events, the sediments may be deposited on the floodplain and PCBs may thereby enter the terrestrial food chain. High flow events may also increase the bioavailability of PCBs to organisms in the river water. Animals and plants living in or near the river, such as invertebrates, fish, amphibians, and water-dependent reptiles, birds, and mammals, may be directly exposed to the PCBs from contaminated sediments, river water, and air, and/or indirectly exposed through ingestion of food (*e.g.*, prey) containing PCBs (EPA, ERA, Exec. Summ. 8/99 2).

In the ERA, the EPA describes the risks assessed for four categories of fauna; the ERA examines the risks associated with PCBs for aquatic invertebrates/the benthic macroinvertebrate community, eight species of fish, five species of bird, including the bald eagle, and four species of mammals living in both the Upper and Mid-Hudson regions. Overall, the ERA concludes that all of the aforementioned species are at risk to PCB exposure.

Health risks associated with PCB exposure differ from species to species, however. There are only three categories of species that the EPA conclusively states are currently suffering adverse health effects from PCB exposure. The first category contains organisms in the benthic community. "Benthic community structure as a food source for local fish populations was assessed using three lines of evidence. All three suggest an adverse effect of PCBs on benthic invertebrate populations serving as a food source to local fish in the Upper Hudson River. Two lines of evidence suggest an adverse effect of PCBs on benthic invertebrate populations serving as a food source to local fish in the Lower Hudson River" (EPA, ERA Exec. Summ. 8/99 6).

Secondly, although not one of the original four categories mentioned, the ERA indicates that threatened and endangered species are at particular risk for adverse health effects related to PCB exposure. "Risks to threatened and endangered species were evaluated using four lines of evidence. Collectively, they indicate that current and future concentrations of PCBs are of a sufficient magnitude to adversely affect the reproductive capability of these fragile populations" (EPA, ERA Exec. Summ. 8/99 9). Similar findings were reached for what the ERA calls "significant habitats." "Risks to significant habitats were evaluated using two lines of evidence. Together, they indicate that current

and future concentrations of PCBs are of sufficient magnitude to adversely affect the ability of particular habitats in the Hudson River to support sustainable, healthy wildlife populations (EPA, ERA Exec. Summ. 8/99 9). The ERA defines significant habitats as "34 specific sites in the tidal portion of the Hudson River [that] have been designated as Significant Coastal Fish and Wildlife Habitats under the NYS Coastal Management Program. Five additional sites have been identified as containing important plant and animal communities to bring the total number of sites to 39...These areas are unique, unusual, or necessary for continued propagation of key species" (EPA, ERA 8/99 36).

PCB levels are expected to exceed threshold limits until 2018 (the entire forecast period of the ERA), for the Upper and Lower Hudson; therefore, PCB exposure levels for all of the species cited in the ERA will also fall within non-attainment levels. However, the EPA's assessment of adverse health related effects due to PCB exposure for the fish, bird, and mammal species in question becomes a bit more blurred. The EPA clearly states:

> PCBs may adversely affect the survival, growth, and reproduction of...fish in the Hudson,...birds and mammals that feed on insects with an aquatic stage spent in the Hudson River,...waterfowl feeding on animals and plants in the Hudson River,...birds and mammals that eat PCB-contaminated fish from the Hudson River, such as the bald eagle, belted kingfisher, great blue heron, mink, and river otter,...and omnivorous animals, such as the raccoon"((EPA, ERA Exec. Summ. 8/99 11).

The EPA is indicating, however, that the survival, growth, and reproduction of these species may be affected in the future, but currently do not exhibit such symptoms. The evaluation section for each fish, bird, and mammal species in question contains the following remarks: "current and future concentrations of PCBs are not of a sufficient magnitude to prevent reproduction of the [species name]. However, current and future

exposures to the PCBs may reduce or impair the survival, growth, and reproductive capability of waterfowl in the Upper Hudson River. To a lesser degree, current exposures may have similar adverse effects on [species name] in the Lower Hudson River" (EPA, ERA Exec. Summ. 8/99 6-8). It is unclear within the context of the ERA, however, how and why the EPA would predict that although present conditions do not seem to pose adverse health effects for Hudson fish, birds, and mammals future conditions without remediation activities would pose an increased threat.

Although the general public is unlikely to read the intricacies of the EPA ERA due to its sheer volume (the first of three books is 218 pages of single spaced text) and complex scientific and technical language, GE has certainly analyzed and responded to the ERA in their own literature, namely River Watch. Without producing reader-friendly synopses of their research, the EPA has once again failed to effectively communicate their messages to the public. EPA research is summarized and evaluated by GE in River Watch, which is then distributed to local communities and posted on the World Wide Web.

In addition to the ERA, the EPA released the Human Health Risk Assessment (HHRA) for the Upper and then the Mid-Hudson River in August 1999 and December 1999, respectively. Both HHRAs evaluate "both cancer risks and non-cancer health hazards from exposure to polychlorinated biphenyls (PCBs)" (EPA, HHRA Exec. Summ. 8/99 1). Both HHRAs also assess "both current and future risks to children, adolescents, and adults in the absence of any remedial action and institutional controls" (EPA, HHRA Exec. Summ. 8/99 1). The HHRAs follow a four-point process delineated under Superfund legislation, and the HHRA for the Upper Hudson concludes that "cancer

health risks and non-cancer health hazards to the reasonably maximally exposed (RME) individual associated with ingestion of PCBs in fish from the Upper Hudson River are above levels of concern...The HHRA indicates that fish ingestion represents the primary pathway for PCB exposure and for potential adverse health effects, and that risks from other exposure pathways are generally below levels of concern" (EPA, HHRA Exec. Summ. 8/99 1). EPA's HHRA for the Upper Hudson is written in language equally as technical as the ERA. The Executive Summary for the HHRA is, however, concise and much easier to comprehend. The major finding of the HHRA for the Upper Hudson are as follows:

> Under the RME scenario for eating fish, the calculated risk is one additional case of cancer for every 1,000 people exposed. This excess cancer risk is 1,000 times higher than the USEPA's goal of protection and ten times higher than the highest risk level available under Superfund law. For non-cancer health effects, the RME scenario for eating fish from the Upper Hudson results in a level of exposure to PCBs that is more than 100 times higher than the USEPA's reference (Hazard Index) of one. Under the baseline conditions, the point estimate RME cancer risks and non-cancer hazards would be above USEPA's generally acceptable levels for a 40-year exposure period beginning in 1999" (EPA, HHRA Exec. Summ. 8/99 7).

The EPA's HHRA for the Mid-Hudson River arrives at basically identical conclusions to those of the HHRA for the Upper Hudson. The only difference between the HHRA for the Upper and Mid-Hudson are the frequencies of adverse health risks, associated with PCB exposure, expected. The major findings of the HHRA for the Mid-Hudson state:

> Under RME scenario for eating fish, the calculated risk is approximately four additional cases of cancer for every 10,000 people exposed. This excess cancer risk is more than 100 times higher than USEPA's goal of protection and within the upper bound of the cancer risk range generally

> allowed under the federal Superfund law. For non-cancer health effects, the RME scenario for eating fish from the Mid-Hudson results in a level of exposure to PCBs that is 30 times higher than USEPA's reference level (Hazard Index) of one (EPA, HHRA Exec. Summ. 12/99 6).

The HHRAs continue to be written in overly technical language that is inaccessible to readers without advanced degrees; however, the fundamental problem with the EPA's Human Health Risk Assessments, as well as their Ecological Risk Assessments, is that the reports do **not** suggest scenarios, health risks, and exposure levels if further remediation activities in and on the Hudson were to commence. GE is quick to promote the negative ecological health consequences and disruption to human activities that further remediation activities, specifically dredging, may cause for the Hudson Valley. In actuality, to date, no in depth studies exist that explore the advantages and/or consequences for Hudson flora and fauna and/or humanity of dredging the river. Dredging in the Hudson could be very much a process where knowledge is generated from action, although GE has amassed an arsenal of reasons, in its publication River Watch, why dredging would be devastating for the Hudson River.

River Watch, debuted in the Winter of 1997 and is focused on a number of topics including informing the Hudson River community of GE's activities concerning PCBs in the river. Instead of individually examining each of the eight volumes of River Watch, the discourse analysis here will focus on the major topic trends of the newsletter.

Each issue of River Watch contains articles covering a range of topics; those topics can be classified into three general areas. Health issues are some of the most predominant articles in River Watch. GE has published numerous articles and cited empirical studies mostly concerned with PCB exposure and human health; however, River Watch also contains a significant number of articles addressing the ecological and

biological health of the Hudson River ecosystem. -Biological health, as it is referred to in River Watch and for the purpose of this thesis, refers to both the quality of the health for both the fauna and flora in and surrounding the Hudson River and also to the density and diversity of species. Ecological health, in this thesis, refers to the actual water quality of the Hudson River.

Next, River Watch contains more articles that are concerned with PCB remediation in the Hudson than it does on any other subject. GE includes approximately a dozen articles, throughout the eight volumes of River Watch that focus on the concept of natural river recovery in conjunction with remediation efforts performed by GE. However, there are nearly twenty articles throughout River Watch that discuss the various possible ramifications of dredging the Hudson. GE takes the position that dredging should not commence in the Hudson for various anthropocentric and non-anthropocentric reasons. It is of particular interest to this thesis that GE not only bases its assessments of dredging on empirical studies, but that the company also claims that local communities are opposed to dredging for human, biological, and ecological health reasons.

Finally, River Watch explores and questions legislation, specifically regarding Superfund, and dredging, concerning PCB remediation in the Hudson River. River Watch highlights the remediation practices completed in and on the Hudson by GE under the direction of the EPA and the New York State Department of Environmental Conservation (NYSDEC). In addition to highlighting those completed and ongoing remediation efforts, River Watch contains numerous articles concerned with the impending FEIS scheduled for 2001. In addition to questioning various legislation, GE

questions the legitimacy of some of the EPA's scientific studies concerning the health effects and fate of PCBs in the Hudson and argues that future legal decisions should not be based upon these studies. GE also supports the idea of conducting more research prior to the EPA issuing a decision regarding dredging in the river.

River Watch also contains a handful of articles that do not lend themselves easily to the three subject categories used in this thesis. Such articles focus on GE's commitment to the Hudson River, PCB sources, and providing an overall history of the Hudson River.

In River Watch, GE focuses on an epidemiological study conducted by Dr. Renate D. Kimbrough at the Institute for Evaluating Health Risks (IEHR), referring to it as the largest human study concerned with PCB exposure, to support the idea that PCBs are not a threat to human health (RW Summer '98:8). GE has published at least five articles focusing on the Kimbrough study and has referred to it numerous times throughout River Watch. According to River Watch the Kimbrough study states that no correlation can be made between workers exposed to PCBs and incidents of cancer and/or deaths (RW Summer '98:8). GE presents the findings of the Kimbrough study as cold, hard, indisputable scientific evidence that conclusively state there is no reason to link PCBs with human cancer rates or any other disease. The Kimbrough study looked at 7,075 GE capacitor workers and found that "no association between actual human exposure to PCBs and deaths from cancer or any other diseases" (R W Summer '99:7). GE also claims that the capacitor workers in the study were found to be healthier than other individuals in society. " 'We found these workers to be healthier than the general

population, even though some had PCB levels hundreds of times higher than you would find in the general population,' Dr. Kimbrough said' (RW Summer '98:8).

GE authenticates the findings of the IEHR study by stating that the findings are in agreement with other presumably scientific studies, although GE fails to name those other studies. "The findings of this (Kimbrough) study are consistent with those of four other studies of workers in the same factories conducted by other researchers over nearly 25 years, but the new study is the largest and most statistically powerful study ever conducted of humans exposed to PCBs" (R W Summer '99:7). River Watch also cites professionals who testify to the legitimacy of the Kimbrough study. " ' This is a well-designed and carefully conducted study' said Dr. Jack Mandel, an epidemiologist and professor and director of Environmental Occupational Health at the University of Minnesota" (R W Summer '99:8).

GE's argument that PCBs are not cancer causing agents for humans is largely based on logos, using findings of the Kimbrough study, and secondarily on ethos, asserting the authority of the IEHR and its findings. The notion that PCBs do not cause cancer or any other disease in humans appears as solid fact, or as cold science, throughout several issues of River Watch. Using the theory of social constructionism and pragmatism, however, the objectivity of the Kimbrough study can be questioned because both of those theories take a critical stance towards knowledge that claims to be either objective or absolute. GE acknowledges that the company did financially support the Kimbrough study, but denies that it played a part in the findings. "The IEHR conducted the study at the request of and with funding from GE, which operates the two plants

where the workers were employed. GE had no role of any kind in the conduct of the study, the evaluation of the data or the conclusions drawn" (R W Summer '99:8).

Social constructionism and pragmatism allow the readers to question the objectivity of the IEHR, and thus the findings of the Kimbrough study, without having to comprehend the dense scientific jargon contained within the IEHR report itself. Although GE did not have a direct role in determining the study's findings, they could have provided an indirect influence. In any case, questioning the objectivity of the Kimbrough study is reasonable using social constructionism and pragmatism. The EPA did review the entire Kimbrough study, including its design and protocols, and found several inadequacies or limitations. For example, in the executive summary of its human health risk assessment for the upper Hudson River the EPA writes that in the Kimbrough study "more than 75% of the workers never worked with PCBs, the median exposure for those who worked with PCBs was only a few years, and the level of PCB exposure could not be confirmed" (4).

The discrepancy between the assertions of GE and the EPA regarding the Kimbrough study are but one example of the conflicting rhetoric within the melange of Hudson River discourse. Conflicting scientific discourse coupled with passionate narrative or community discourse, discussed later, paves a twisting and turning path for the creation of knowledge or what will, by necessity, eventually become to be known as the 'truth', by society as a whole, about PCBs and human health. Knowledge is, according to the theories employed in this thesis, constructed through daily interactions by individuals discussing, examining, refuting and reciting a variety of narratives including scientific, governmental, and community. When there are contradictions

within narratives themselves, the process of constructing knowledge only becomes more complicated.

River Watch also includes two other articles that focus on additional scientific studies concerned with the link between PCBs and cancer. An article in the winter 1998 edition of River Watch highlights a study discussed in the article "Plasma organochlorine levels and the risk of breast cancer" published in the New England Journal of Medicine (R W Winter '98:15). In the River Watch article, GE provides an overview of the study and its results:

> The new study, conducted by Dr. David J. Hunter, an epidemiologist at the Harvard School of Public Health, analyzed PCB and DDT levels in the blood of nurses who agreed in 1976 to participate in the study by giving samples of their blood. Ultimately, nearly 33,000 nurses sent in blood samples. Dr. Hunter and his colleagues examined the samples of 240 women who subsequently developed breast cancer and compared the levels of PCB and DDE (a marker for DDT) in their blood to that found in the other nurses who were similar in every way but did not contract the disease. The scientists found no relationship between the level of PCBs in women's blood and their likelihood of subsequently developing breast cancer" (R W Winter 98:12).

Scientists in the Hunter study found no link between PCBs and breast cancer in their study; GE then interprets that to meant that there is no link at all between breast cancer and PCBs and the company includes the commentary of other scientists to support the claim. " 'The results of (this study) along with those of recent studies should reassure the public that...compounds such as PCBs...are not a cause of breast cancer,' wrote Dr. Stephen H. Safe, a professor at Texas A&M University" (R W Winter 98:12). River Watch establishes Dr. Safe, whose name even suggests a sense of security, as a scientific expert simply by stating, "Dr. Safe has critically reviewed numerous studies claiming to prove the environmental link to cancer.

Relying on logos to convey the message and supporting that message using ethos adheres to the approach that GE uses when writing about the Kimbrough study. GE also uses pathos, however, when writing about the Hunter study and breast cancer. The article in River Watch, using the ethos of Dr. Safe, says that PCBs act as very weak estrogens, and conveys the idea that those estrogen-like chemicals, PCBs, are much less powerful than those found in a glass of wine. "Dr. Safe, who wrote an editorial on the study in the New England Journal, noted that PCBs and DDT are very weak estrogens present in tiny amounts in the body. Plants have so many naturally occurring estrogens and anti-estrogens that they might overwhelm any conceivable effects of environmental chemicals. Dr. Safe used the example of a single glass of red wine, which contains 1,000 times the amount of biologically active plant estrogens than all of the environmental chemicals to which a person would be exposed to in a day's worth of food" (R W Winter 98:13). Using the example of a glass of red wine likens PCBs, something that most average readers have not, at least knowingly, had first hand experience with, to a common and for the most part harmless substance that everyone has seen, smelled, and/or tasted.

GE leaves the reader with Dr. Safe's comparison of the amount of estrogens in red wine and those in a day's worth of food without qualifying the origins of the food. Nowhere in its discussion of the Hunter study does GE discuss the concerns of the EPA, community members, and activists groups that local residents may be at particular risk because certain areas of the Hudson River contain PCB levels that greatly exceed the levels of mostly every other body of water in the U.S. Also; nowhere throughout any of the issues of River Watch does GE inform its readers that PCBs bioaccumulate, are

stored and not metabolized, in humans and other organisms. Therefore, PCB concentrations in humans and other animals increase as they ingest PCBs over time.

GE also includes a short article in its latest volume of River Watch that focuses on the link between PCBs and cancer. GE writes that the latest study concentrating on PCBs and cancer, conducted by the Yale Cancer Center, also found no link between the occurrence of breast cancer and PCB levels. The aforementioned article is only seven sentences in length and simply states that in a study of 1,000 women in CT "no significant difference in (blood) serum levels was found between the women with breast cancer and the control group" (R W Spring 00:24).

Within the discourse of River Watch, GE displays the use of moral pluralism, a concept that is central to the theory of environmental pragmatism. In addition to arguing that PCBs in the Hudson are not a threat to human health, GE claims that the chemicals also pose no risk for the biological or ecological health of the river. In publishing materials that convey concern for human, biological and ecological health, GE is utilizing both anthropocentric and non-anthropocentric reasoning.

Throughout its eight issues, River Watch contains over a dozen articles promoting the idea of the Hudson River as a healthy habitat for wildlife. There are at least three articles that focus on sightings of the U.S. national bird, the bald eagle, in the Hudson River area. GE directly correlates an increased number of bald eagle sightings with what the company repeatedly claim throughout River Watch are decreasing levels of PCBs in the Hudson. "In January (1998), there were 125 sightings of the majestic bald eagle in the Hudson Valley area, the highest number recorded in the last 20 years...Wildlife are flourishing on the Hudson because of the diverse habitat, large

populations of fish and decreasing levels of PCBs in the water and sediment" (R W Summer 98:3). GE is careful here to support the claim of flourishing wildlife with a quote from a scientist. "Jennifer Sampson, a senior ecologist with Exponent, an environmental services firm in Bellevue, WA, and a consultant to GE, says, 'The combination of a good habitat and an abundance of food is attracting a steadily increasing number of animals to nest and feed on the Hudson River' " (R W Summer 98:3).

GE also includes an article highlighting the birth of a bald eagle in the Hudson Valley in one of its issues of River Watch and again qualifies what they portray as an increase in the eagle population with the statements of experts in the field. "In April (1998), the first eaglet documented to have hatched along the 315-mile Hudson River in at least 100 years was born...Peter Nye, chief biologist in New York State's endangered species program, has said in press reports that he expects more pairs to begin nesting along the Hudson soon" (R W Winter 98:31).

In the midst of providing information concerning bald eagles in the Hudson Valley, GE also provides some seemingly conflicting or at least confusing information regarding the health status of bald eagles nationally. In the Summer 1998 volume of River Watch, GE emphasizes the eagle's resurgence and writes, "based on the eagle's strong rebound nationwide – due in part to the ban of DDT – the Department of the Interior recently recommended that the bald eagle no longer be considered a threatened species" (3). However, only a few months later in the Winter 1998 volume of River Watch, GE warns of the fragile state of the bald eagle. "Nationwide, bald eagles are classified as a threatened species, meaning they could become endangered in the near future if not properly managed" (3). In the same article that GE cautions the public to be

aware of the fragile state of the bald eagle population, the company combats assertion that the death of a young bald eagle found near the Hudson River was connected in any way to PCB concentrations. "Recently, it was widely reported that a young bald eagle found dead on the banks of the Hudson had a high level of PCBs in its blood, implying that the chemical caused the bird's death. In reality, the 16-week-old eagle, most likely searching for carrion along the tracks, was struck and killed by a moving train. There is no evidence to suggest that PCBs had anything to do with the bird's death" (R W Winter 98:3).

However, nowhere in River Watch does GE discuss or even refute the studies, that were publicized along with the death of the 16-week-old eagle in the Hudson Valley, that link the deformities in bald eagles and PCB levels in those animals in the Great Lakes region. The New York Times reported that the fat, the biological tissue in which PCBs bioaccumulate, of the dead eagle found near the Hudson contained 71 parts per million (ppm) of PCBs (9/17/97). The same article also reported that the 71ppm was "higher than the average level of PCB's found in the fat in three deformed fledgling eagles from the Great Lakes that were studied by Federal wildlife biologists in 1993" (NYT 9/17/97). The Times also quotes Ward Stone, a toxicologist for the NY State Department of Environmental Conservation, warning of PCB movement through the Hudson ecosystem. In referring to the 71ppm PCB concentration of the 16-week-old bald eagle, the Times quotes Ward saying, " 'This is a very strong warning that the PCB's are moving through the food chain. It's a warning for people, too, particularly if they do a lot of fishing' " (NYT 9/17/97). According to social constructionism, knowledge is constructed through daily interactions that are certainly influenced in turn

by stimuli such as the media. GE appears to have been adequately concerned about the construction of common knowledge, influenced by media reports of the 16-week-old eagle and the concentration of PCBs in its body, to respond in an article of their own in River Watch. However, by only partially addressing the issues raised in the media surrounding the death of the young eagle, GE runs the risk of appearing illusive, neglectful, or even deceiving in the eyes of the public.

In addition to the articles that focus on the bald eagle population in the Hudson Valley, River Watch contains articles that tout the overall health and diversity of the fauna found in and around the Hudson River. According to basic ecological premises, diversity in a natural system is essential for the health and stability of the ecosystem. GE emphasizes the link between diversity and stability, and the Hudson River in several articles where authors write about geese, duck, heron, and birds of prey sightings. GE accompanies the River Watch articles about wildlife with what can only be described as adorable pictures of foxes, bunnies, and a nesting great blue heron and her young.

The articles describing the diversity of wildlife found in and around the Hudson is also of a significantly different tone than any other articles in River Watch. The articles discussing wildlife are much more literary in style than any other, and they appear as though they are designed to appeal more to the readers' emotional rather than logical senses. For example, the article titled "At Home on the Hudson" begins with the following sentence: "In the northern reaches of New York State, the majestic Hudson River winds slowly down from the Adirondack Mountains, where tranquil waters provide sanctuary for a big variety of migrating waterfowl" (R W Fall 99:8). However, while mentioning the great blue herons, belted kingfishers, osprey, buffleheads, and other

visually impressive wildlife in "At Home on the Hudson", the article largely concentrates on the sheer numbers of Canada and Snow geese that populate the Hudson area. Once again in literary prose, GE depicts the flocks of geese near the Hudson as a success story testifying to the health of the river. "In the spring, large flocks of Canada geese and snow geese sound off as they arrive from points south and from nearby fields in the farmland of Saratoga and Washington counties. During the awakening season, sections of the Hudson are spotted with more than 100,000 Canada geese and 30,000 snow geese" (R W Fall 99:8).

Canada geese, which are widespread and numerous throughout the U.S., snow geese, herons, various duck, and other migratory species only reside in the Hudson Valley for a short period of the year and cannot, however, necessarily be seen as indicators of decreasing PCB levels in the Hudson. Without ever directly stating that migratory and residential wildlife in the Hudson Valley are indicators of PCB reductions in the water, GE does provide very strong inferences in the River Watch article "EPA studies divorced from reality" (R W Fall 99:12). In the aforementioned article, GE questions the legitimacy of EPA surveys and reports, a tactic that is discussed later in this thesis, saying that those studies do not accurately reflect the health or abundance of Hudson wildlife. "If you spend time on the Hudson River, the evidence is everywhere: Wildlife populations are thriving, healthy, and abundant...Nevertheless, the U.S. Environmental Protection Agency claimed in a report in August (1999) that Upper Hudson River wildlife are at risk" (R W Fall 99: 12). By undermining the EPA report that assesses the risks that PCBs may impose on the wildlife of the Hudson Valley, GE depicts the EPA as an agency that not only has an inaccurate picture of the reality of

Hudson wildlife, but as an agency that is at least partially incompetent. After the River Watch statements quoted above which imply that even the average citizen can see that wildlife in the Hudson Valley is thriving, GE then lists several observations and studies that they claim the EPA ignored. GE writes, "For example, EPA failed to consider: A New York State Department of Environmental Conservation (NYSDEC) study of the macroinvertebrate populations of the Hudson that could not identify any adverse effects from exposure to PCBs; (and)...NYSDEC's monitoring of the growing number of bald eagles in the Hudson Valley" (R W Fall 99: 12).

If GE had stopped at that assessment, they would have been more successful in portraying the image that the EPA has published erroneous reports concerning Hudson wildlife; however, GE then went on to admonish the EPA for using scientific reasoning in their assessments. "For some inextricable reason, EPA ignored or dismissed these data (NYSDEC observations, etc.) choosing instead to rely on theoretical extrapolations from scientific literature" (R W Fall 99: 12). GE, however, does not list or cite the reports which they claim the EPA has overlooked, and the only "theoretical extrapolation" with which the company takes issue, specifically, is an estimation of river fish consumption by humans in the Hudson Valley. By scorning the use of methods obtained from scientific literature, and without providing alternative suggestions, GE runs the risk of further confusing the public audience to which River Watch is directed because throughout River Watch, GE advocates that science should be the foundation for decision-making concerning PCBs in the Hudson River.

In addition to discussing the bald eagle population, wildlife abundance and diversity, and questioning the findings of EPA assessments, GE uses the opinions and

observations of local citizens and visitors to testify to the health of the Hudson River and its wildlife. " ' There have been a lot more people on and along the water in the past few years,' said Roy Collier, who lives in Fort Edward, Washington County, and who can be found fishing on the Hudson practically every day during warmer months. 'It's definitely due to the improving conditions of the water – the clarity is better and the fish have been larger. It's just beautiful out here now' " (R W Winter 97:4). River Watch also quotes Judy Schmidt-Dean, a marina owner in Schuylerville, N.Y. and chair of EPA's Citizen Liaison Committee, "The health of the river lies not only in its sediment, water column or fish, but in its people...If the EPA and other groups such as Scenic Hudson would only take a good, honest look, they would see how healthy and how alive the river really is" (R W Winter 98:17).

Quoting citizens, who sit on the committees that the EPA has designed to function as an important part of the agency's public outreach plan, testifying to the river's current health obviously flies in the face of any invasive activities, such as dredging, that the EPA may later propose as an action for the river. GE continues with this approach when River Watch quotes Merrilyn Pulver of Fort Edward, N.Y. who serves as the Co-Chair of EPA's Agricultural Liaison Group and member of the Fort Edward Town Council saying:

> At the end of the day, the issue is not really about science, models, data, studies. It's about people, many of whom live in my community. They are imploring their government not to undertake a project that would be harmful to them, to their way of life, to their home, family, farm and business, to all the things they cherish most. We all hope EPA will listen and hear – heed their words: Dredging and dumping are not acceptable anywhere (R W Winter 98:19).

GE's anti-dredging position is a second major topic addressed by the company in its literature. Although human, biological, and ecological health concerns compose a

substantial portion of the rhetoric generated by GE, discourse concerning dredging, remediation projects already in progress, and the concept of natural river recovery dominate GE publications concerning the Hudson River. GE also uses moral pluralism, including once again anthropocentric and non-anthropocentric reasoning, when articulating arguments against dredging in the Hudson. River Watch contains anti-dredging articles that focus on (1) reports that suggest that PCBs are being removed from the Hudson through the natural cleansing processes of the river itself, (2) GE's current and completed PCB remediation activities in and on the banks of the Hudson, (3) reports that suggest that dredging would be harmful to the biological, ecological, and recreational aspects of the Hudson, and (4) comments from community members that say they are opposed to dredging for a whole host of reasons including the need for a landfill that would be required if the Hudson were to be dredged.

First, one of the major reasons that GE cites to support their anti-dredging stance is the idea that the Hudson River is undergoing a natural recovery process in which the river is able to cleanse itself of PCB contamination. GE supports the idea that clean sediment is traveling downstream from the north and covering the PCBs in the Hudson, most of which have settled on the river's bottom. "PCB levels in water and fish in the Upper Hudson have declined 90 percent in the last 20 years. These improvements have taken place because of the river's natural recovery process, in which fresh sediment covers the river bottom, isolating old deposits of PCBs and preventing the fish from reaching them, and because of the major clean-up projects GE has undertaken on the shore" (R W Spring 00:6). However, GE fails to provide any information on the clean sediment that the company claims is traveling from the north, such as the total supply and

amount of sediment flowing downstream, and the sediment's expected accumulation patterns. GE also fails to address both the rate of sediment transfer down the Hudson and into the Atlantic Ocean, and the comparison between the rates of sediment flow coming into the Hudson to that exiting.

GE also alludes to the idea that the Hudson's natural river recovery process is safer, more effective, and more efficient than dredging. In the same articles where they write about the Hudson's natural recovery processes, GE states that by allowing those processes to continue, PCBs are taken out of the natural biological cycle and are no longer available to the fish in the Hudson and therefore unavailable to humans. On the other hand, dredging, according to GE, will damage the biological and ecological systems of the Hudson by increasing their exposure to PCBs. "Dredging will reverse the success of the natural burial process by carving away the protective layer of cleaner sediment on the river bottom, exposing and likely mobilizing deeper sediments with higher PCB levels...What makes no sense to us is investing in an ineffective, unproven and dangerous dredging project that will not improve, and could significantly harm, the fish and wildlife of the Hudson (R W Spring 00:6).

Overall, GE takes the position that natural river recovery coupled with GE's ongoing and completed remediation activities will allow the Hudson to recover quicker and with fewer harms to the biological and ecological systems than any dredging plan. GE has completed and is currently engaged in a number of Hudson River remediation activities, many of which have been or are under the direction of the NYSDEC and/or the EPA. In their rhetoric, however, GE seeks to portray an image of unity and cooperation between the company, government agencies, and Hudson communities.

> All of our (GE) work is driven by a single goal: to prevent PCBs from reaching the river. It's a goal we share with a lot of others, including regulatory agencies, the New York State Department of Environmental Conservation, the U.S. EPA, environmental organizations, elected officials, members of the business community and the public at large. We may seek to achieve this goal in different ways, but our common purpose is to find the most environmentally sound way to accelerate the river's recovery" (R W Summer 99:4).

Under the direction of New York State, GE has installed a series of wells around its Hudson Falls plant, one of GE's two plants located on the banks of the Hudson, to collect PCBs in the soil before the chemical reaches the waters of the Hudson. "A network of 262 wells has been installed around the Hudson Falls plant site to monitor and capture PCBs in nearby bedrock. To date, 4,500 gallons, or 22.5 tons, of PCBs have been collected" (R W Spring 00:11). The wells were installed as part of the remediation process when a wooden gate collapsed at a paper plant that sat just downstream of GE's Hudson Falls plant. PCBs from the GE plant are thought to have migrated down to the abandoned paper mill and when the wooden gate collapsed, large amounts of PCB contaminated sediment were released into the Hudson River. GE asserts that the PCBs released from the collapse of the wooden gate at the paper mill were responsible for the sudden increase in Hudson River PCB levels after years of measuring decreasing levels. "From the mid-1970's until the early 1990's, PCB levels in the water of the upper river declined steadily, as the river's own natural recovery took hold. Then, in 1991, the levels increased...It now appears that the Allen Mill and the surrounding area were a source of the PCBs that persisted in the fish in the Upper Hudson River years after GE's discharges of PCBs had ceased" (R W Winter/Spring 99:3-4).

In addition to the series of monitoring and collection wells that GE installed around the Hudson Falls sites, the company erected a water treatment facility in the same

area. "GE constructed a state-of-the-science water treatment facility at its Hudson Falls plant site. It has successfully treated more than 125 million gallons of water to date" (R W Spring 00:11). GE touts the fact that they are in fact treating both PCB contaminated water and sediment removed from around their Hudson Falls site. "Once collected, the PCB oils are sent off-site for destruction and the groundwater from the soils and rock under the plant site are pumped to a state-of-the-art treatment plant where PCBs are treated and destroyed. The clean water which then contains no detectable levels of PCBs is discharged back into the river" (R W Winter 97:2). It becomes evident further on in this section that GE has seemingly placed themselves in a bit of a paradox by celebrating the fact they are able to treat some PCB contamination and destroy others. One of GE's other major arguments against dredging is that a large-scale dredging project would require a massive landfill; however, if the company has the ability to treat and destroy PCBs, such a large landfill might be reduced or eliminated. GE fails to discuss any future possibilities for treating PCB contaminated sediments in the same manner as they are treating the sediment and water collected through their wells around Hudson Falls. Perhaps it is that dredging technologies are such that they are efficient in treating small quantities of sediment, but have been proven unsuccessful for large-scale dredging; GE, however, does not address such discrepancies. The company simply touts the use of remediation technologies for their completed and on-going remediation activities and ignores the idea as applied to large-scale dredging.

GE has also completed some remediation activities near their Fort Edward plant, also located on the banks of the Hudson. "In our first major clean-up project of the river itself, GE capped 60 acres along the shore of the Upper Hudson near Fort Edward to

ensure that no PCBs would leak into the river. These deposits were called 'remnants' because they remained after a dam at Fort Edward was demolished in 1973, causing parts of the river bottom to become exposed when the river level dropped" (R W Winter/Spring 99:3). River Watch, however, seldom mentions GE's remediation activities around their Fort Edward plant, but focuses instead on remediation activities around Hudson Falls.

GE published several articles in River Watch that boldly state their opposition to dredging because they believe the procedure would cripple the health of the river. "Dredging is the most risky and potentially damaging remedy – one that would inflict harm on the river's ecosystem and hinder recreational use of the river for years to come" (R W Fall 97:8). It is in this argument that GE again uses moral pluralism. GE argues that dredging would not only be harmful to Hudson wildlife, but that dredging would also interfere with human use of the river. "PCBs could be resuspended during dredging, increasing the amount of PCBs available to nearby fish and wildlife...Dredging could take 20 years, during which boating, sport fishing and other recreation will be disrupted" (R W Spring 00:14).

Contrary to most discussion concerning environmental pollutants that typically centered on anthropocentric concerns such as human health risks, GE mainly relies on non-anthropocentric arguments to oppose dredging in the Hudson. GE uses emotional language and largely constructs their nonanthropocentric arguments using pathos. The company creates an atmosphere of concern for Hudson wildlife and then portrays what would happen to that wildlife and its habitat if dredging were to commence.

> Dredging to remove PCBs from the Hudson River would involve massive digging in the shoreline area – the most sensitive and productive parts of the river ecosystem. Wetlands would be destroyed, fish habitats and spawning grounds ripped out. In the process, PCBs long buried would be resuspended to again contaminate fish...a dredging project would necessarily destroy large portions of the ecosystem, producing long-term adverse consequences for river life. PCB levels in deeper sediments are higher, measuring several hundred parts per million. Dredging would bring these deeper sediments to the surface, resuspending PCBs and exposing fish and other wildlife to additional contamination (R W Winter 97:8).

GE uses arguments throughout River Watch and their other publications that convey not only an interest, but also a deep concern for the health and well being of Hudson wildlife to convince their readers that dredging is not an appropriate action for the Hudson River. In order to support their claims that dredging PCBs in the Hudson will prove detrimental to the river's wildlife, GE likens the ramifications of dredging in the Hudson to PCB dredging in Michigan. "Sediment dredging by EPA in a river in Michigan has resulted in a 10-fold increase in PCB concentrations available to fish and other organisms in areas dredged" (R W Summer 98:16). The report that indicates an increase in PCB levels after dredging that GE refers to, however, was performed by a firm that was "commissioned by the Fox River Group, a group of seven companies that have been named Potentially Responsible Parties for the Fox River's cleanup in Wisconsin" (R W Summer 98:16). The EPA, as well as Clearwater and Scenic Hudson, then refute, in their own literature, the claims of the GE cited study commissioned by the Fox River Group. The public is therefore issued conflicting information by the giants who have pledged to protect the health of both the humans and wildlife living in the Hudson Valley. As long as the public is issued conflicting reports regarding the basics of Hudson River PCBs, including dredging, movement, health risks, etc., a metanarrative

will be unable to form and a 'truth' about PCBs will not be established in groups, i.e. communities, towns, etc.

Nowhere, however, does GE claim that dredging would directly cause any reason for an increase in concern regarding human health and PCB exposure. GE is consistent throughout River Watch and its other rhetoric in conveying the message that PCBs do not pose any threat to human health, expect if ingested in very large quantities. "PCBs do not present health concerns to those who swim, wade, and boat in the Upper Hudson, drink the water or breathe the air nearby. The only PCB-related risk ...is to people who eat exceptionally large amounts of fish from the Upper Hudson, where fish consumption has been banned for 20 years" (R W Spring 00:3).

GE mentions anthropocentric arguments against dredging only sparingly, and the only anthropocentric arguments that GE does employ are concerned with the disturbance of recreational activities. "Dredging could take 20 years, during which boating, sport fishing and other recreation will be disrupted" (R W Spring 00:14). GE does, however, rely wholly on anthropocentric reasoning in developing arguments against dredging because of associated activities, specifically disposal of PCB contaminated sediment. Yet another argument against dredging the Hudson, according to GE, is the need for a "Yankee Stadium-sized landfill" to dispose of the dredged sediment (R W Summer 98:14). GE mainly cites community opposition to a landfill as a major reason why dredging is not appropriate for the Hudson River. Community opposition included in River Watch and other GE discourse reflects the Not In My Back Yard or NIMBY syndrome common with any discussion of proposed landfill sightings. "A landfill in the

middle of this farmland would seriously impact our ability to market and sell our products and could affect the quality of our goods" (R W Summer 98:14). In several River Watch articles, GE also highlights various resolutions and petitions signed by local Hudson River individuals, businesses, and officials that oppose what they call a dredge and dump proposal. "The Intercounty Legislative Committee of the Adirondacks, comprised of elected officials in 11 counties from Saratoga north to the Canadian border, and the Business Council of New York State Inc., which represents more than 4,000 businesses, have joined more than 70 local governments, chambers of commerce, citizens' groups, business groups and farm bureaus in passing resolutions opposing dredging and dumping in the Upper Hudson" (R W Spring 00:21).

GE also argues that dredging should not be considered as a remediation activity for the Hudson River because the company states that dredging the Hudson River bottom would take decades to complete. In River Watch, GE writes that an EPA report issued in March 1999 estimated that:

> only 60,000-70,000 cubic yards of sediment could be removed each season during a dredging project in the area known as the Thompson Island Pool in the Upper Hudson...That would mean it would take 10 years to complete a dredging project in the Thompson Island Pool or 22 years to dredge the entire Upper Hudson River, over and above the number of years it would take for engineering, design, contracting, planning, land acquisition and mobilization of equipment" (R W Summer 99:6).

Lastly, GE composes arguments against dredging in the Hudson based on questioning the legitimacy of both current EPA legislation and scientific practices. GE criticizes the legislation that governs clean-up activities in the Hudson River, commonly known as Superfund, and advocates legal reform of several aspects of that legislation. "Superfund, the 17-year-old federal program created to speed cleanup of the nation's

toxic waste sites, is broken and badly needs fixing" (R W Winter 98:9). GE goes on to criticize the ways in which Superfund addresses site remediation including "remedy selection," "liability/funding," and "natural resource damages"(RW Winter 98:9-10). By criticizing Superfund legislation and its remediation activities, GE is also critiquing EPA's proposed remediation activities for the Hudson River. Additionally, GE critiques the EPA's execution of their duties. GE claims that the EPA has been remiss in their documentation responsibilities.

> The administrative record for the Hudson River has not been updated for more than six years. Important documents -- such as EPA's own reports, the responses and other research submitted by GE, correspondence from government officials and citizens and the more than 50 resolutions approved unanimously by area localities opposing dredging and landfilling in the Upper Hudson – have not been included. Consequently, a member of the public or an elected official who wanted to review all of the issues would find no help in EPA's record (RW Winter 98:28).

In addition to calling attention to EPA legislation and performance, GE also questions EPA's scientific findings and processes while at the same time advocating for what GE calls "good science" (R W Winter/Spring 99:9). In an article titled "EPA studies divorced from reality," GE states that "the U.S. Environmental Protection Agency claimed in a report in August [1999] that Upper Hudson River wildlife are at risk" but that the report was "little more than a theoretical 'desktop' review" (R W Winter/Spring 99:9). The article then quotes "GE's vice president for corporate environmental programs" stating that EPA's report " ' does not reflect actual conditions on the Upper Hudson River and therefore should not be used in the Agency's decision-making process' " (R W Winter/Spring 99:9).

In several River Watch articles, GE calls EPA's studies "flawed science" (R W Fall 97:15). GE, therefore, also makes a plea in several articles for what they call "independent science" (R W Fall 99:15). Ironically enough, GE offers to pay for the independent scientific process. As a solution to solve their dispute over the legitimacy of the EPA's studies, GE offers to 'bring in a group of qualified, independent scientists to peer review both GE's analysis and EPA's analysis, side by side. Conduct the peer review in the open and invite interested citizens and the news media to watch. Invite the public to ask questions of the independent scientists so that all of the important issues are fully aired. If this process costs money, GE will pay for it" (R W Fall 97:15).

First, the neutrality of an independent evaluation of both EPA and GE science must be questioned if the evaluation is indeed funded by either of the organizations. Secondly, suggesting that the public question the scientific analyses is indeed a tactic that ensures the paralysis of public participation. Community members, more often than not, are at a disadvantage when reading and responding to scientific reports and analyses because of the complex and often jargon-filled language used. While calling for both good and independent science, GE assumes that their own evaluations and proposed actions for the Hudson will be reinforced. In an article that calls for "sound science...for the sake of the Hudson," GE states, "Dredging is not an effective way to speed up the recovery of the Upper Hudson and is likely to do serious, long-term damage to the river ecosystem, especially wetlands and fish spawning grounds" (R W Winter/Spring 99:9).

GE also produced a video in 1998 that includes Merrilyn Pulver, who is also quoted in River Watch, taking a strong stance on the position that dredging is not the appropriate answer for PCB remediation in the Hudson River. The video contains several

interviews with various community members living in the Hudson Valley who are also opposed to dredging. Pulver, who in the video is shown as a Fort Edward Dairy farmer and Town Councilwoman, states, "We've worked hard to make this our home. It's our little corner of the world, and we don't want to share it with a dump. And we'd like it to be here, to stay beautiful for the next generation to come" (Hudson River Recovery video). Pulver is making a statement of objection, based on pathos, to landfills that would be required if the Hudson were to be dredged.

The GE video echoes the sentiments of many of the River Watch articles and contains footage of blue Hudson waters as well as images of GE workers suctioning PCBs from the Hudson River near GE's Hudson Falls plant. GE's video captures the remarks of GE scientists stating that PCB contamination in the river is being buried by cleaner sediment from the north as well as testimony from local fishermen who say that they have never seen the Hudson look so clean and beautiful. In general, GE's video is a visual reiteration of its eight volumes of River Watch.

In order to assess the non-government and non-corporate efforts towards PCB clean-ups in this thesis, editorials, publications, videos, reports and other forms of information from the organizations Scenic Hudson, and Clearwater are examined. Clearwater is a volunteer organization that conducts "environmental education, advocacy programs and celebrations to protect the Hudson River, its tributaries and related bodies of water, and to create awareness of the estuary's complex relationship with the coastal zone" (http://clearwater.org/about.html). In its literature, Clearwater provides a general overview of the history of PCBs in the Hudson, including how, why, and when the chemicals entered the river, as well as synopses of EPA and GE studies and positions.

Clearwater takes the position that PCBs pose a health threat for both humans and Hudson wildlife. Clearwater not only reiterates EPA's claim that PCBs cause cancer in animals, but cites surveys and studies that indicate increased cancer rates for workers exposed to PCBs as well as non-cancerous health problems exhibited in workers and children born of mothers exposed to PCBs.

> Current evidence has shown PCB exposure to pose multigenerational impacts. For example, in Michigan, children whose mothers ate PCB-contaminated fish suffered from learning disorders, developmental disabilities and lower birth weights. In Taiwan, mothers who ate rice oil contaminated with PCBs bore children with a variety of birth defects: skin discoloration, abnormal fingernails, swollen gums with teeth that chipped easily, lower birth weights, and smaller general size. Finally, Eskimo infants which were fed PCB-contaminated breast milk for as little as four to five months exhibited observable developmental and behavioral defects. These and other studies suggest that at greatest risk are not the mothers who may have been exposed to PCBs but their unborn and/or nursing children (http://clearwater.org/news/hazard.html).

As evidenced through the use of references to mothers and children in their literature, Clearwater also uses a great deal of pathos to arouse a strong emotional response from their readers. Their literature is effective in evoking outrage, as well as a sense of distrust in GE's claims that PCBs do not pose any health risks for humans. "All of us have PCBs, and many, many other chemicals, in our bodies. We are the guinea pigs in a vast experiment using human subjects – an experiment we never asked to participate in. What are the results of this experiment? It depends on who [sic] you ask. If you ask the chemical industry you will hear that we are perfectly safe" (http://clearwater.org/news/fs2.html).

Unlike the EPA whose literature can become extremely verbose and technical, Clearwater produces "Fact Sheets" that are concise and easy to read. The writing style

and even the titles of these 'Fact Sheets' are infinitely more appealing to nonscientist community members than the multivolume works of the EPA's HHRAs and ERAs. For example, Clearwater's "Fact Sheet 3" is titled "PCBs, General Information Q & A for Nonscientists" (http://clearwater.org/news/fs3.html). "Fact Sheet 3" offers answers to questions such as "What are PCBs?" "Why are they dangerous?" "Where are they?" and "How did PCBs get into the water?" (http://clearwater.org/news/fs3.html).

The language used in some of Clearwater's literature, however, can appear somewhat inflamed when referring to PCBs as "serious poisons" and stating that "A National Academy of Sciences committee has stated that 'PCBs pose the largest potential carcinogenic risk of any environmental contaminant for which measurements exist" (http://clearwater.org/news/fs3.html). Clearwater's sometimes flamboyant language, regardless of its scientific accuracy, makes for more interesting reading than any of the EPA's literature.

Clearwater is also responsible, however, for propagating possible additional confusion regarding the health risks associated with PCB exposure. To date, the EPA has declared PCBs as probable human carcinogens and as known animal carcinogens. Clearwater, however, in more than one instance, blurs the distinction between PCB classifications for humans and animals. "It [PCBs] has recently been classified as a known carcinogen. Principle pathways for PCB uptake by humans are: Eating Hudson River fish. Eating waterfowl. Drinking Hudson River water (some 60,000 people are affected). Breathing Hudson air." (http://clearwater.org/news/fs2.html). The previous passage indicates, at least to this reader, that PCBs are classified as a known human carcinogen, which is absolutely false.

By presenting information, intended on generating discourse, in a manner that may purport knowledge in the community based on faulty assumptions, Clearwater may be responsible for further confusion and disagreement between individuals. While individuals are discussing potentially misleading Clearwater information and generating knowledge that according to social constructionism is formed through individual daily interactions, those individuals are less likely to facilitate change and influence the decisions in question regarding the Hudson River. Before a metanarrative or consensus regarding the 'truth' can be established, at least within communities if not scientifically, regarding the health effects associated with PCBs, individuals must sort through all of the various discourses present in society that pertain to PCBs and their potential health threats. Clearwater, therefore, in some instances may spur unintended consequences with their literature that delay social action.

Although their representation of the EPA's current classifications for human health risks associated with PCBs can be questioned at times, Clearwater also launches a concerted effort to debunk GE's claim that because an 'Eat None' health advisory is currently in place for Hudson River fish, humans are not at risk for PCB exposure. Clearwater conducted a survey whose results indicated that the majority of people who fish in the Hudson not only consume their catch from the river, but they are also unaware of the health advisories and potential risks associated with eating contaminated fish.

> Clearwater's 1993 Hudson River Angler Survey found that of 332 anglers, interviewed at 20 fishing spots, less than half (48%) reported being aware of health advisories. The Survey found that 72% either ate their catch or gave it away to others whom they believed were eating it. In addition, socio-economic factors were found to be significant in influencing fish consumption: more low-income anglers were found to eat their catch, with

> 36% indicating consumption to be among the primary reasons they fish (http://clearwater.org/news/harard.html).

Clearwater also refutes GE's claim that the Hudson is currently undergoing the process of natural river recovery and cleansing itself of PCBs. Clearwater writes, "GE's claims are based on laboratory tests under ideal circumstances that do not exist in the river. Yes, micro-organisms can partially convert the dangerous chlorine content of PCBs into non-hazardous chloride ions. However, under the natural river conditions of temperature and water flow, it is reliably estimated that this process would take anywhere from several hundred to several thousand years" (http://clearwater.org/news/fs3.html).

Information distributed by Clearwater also addresses the landfill concerns of citizens highlighted in both the GE video and River Watch. "There are a number of safe, effective and commercially available technologies to treat and destroy PCBs once removed from the riverbed. As a result, we are no longer limited to leaving PCBs in place (which is equivalent to the "no action" alternative), or landfilling contaminated sediments (which is subject to tremendous public opposition)" (http://clearwater.org/news/fs4.html).

By acknowledging the public's concerns for risk regarding PCB landfills and then responding to their opposition to landfills with a possible technical solution, Clearwater is fulfilling some of the requirements of the social constructionist model for public participation. "Under this model, risk communication is not a process whereby values, beliefs, and emotions are communicated only from technical experts" (Waddell 142). In this instance, Clearwater, a public non-profit organization, is responding to public citizens' concerns about dredging, some of which are represented in GE's video.

Technical information is being circulated among members of the public sector rather than from the technical experts to the public, which would be a top-down approach.

Clearwater literature not only challenges GE's individual anti-dredging arguments, but it also critiques GE's overall public outreach approach. Similar to the ways that GE criticizes the EPA for releasing inaccurate and incomplete scientific data, Clearwater castigates GE for its outreach publication River Watch.

> GE apparently feeling that a reality-based defense was getting it nowhere, prepared a rhetorical message composed of disinformation, misquotes, and pseudo-science, and flying below the radar of media fact-checkers took directly to the streets, unleashing an unprecedented corporate 'grassroots' campaign...The new GE version of reality is encapsulated in the most recent copy of River Watch, a newsletter that looks and feels like a river advocacy journal, but is actually the house organ of GE's anti-Hudson River agenda" (http://clearwater.org/news/rivertruth.html).

Clearwater then goes on to dispel what they call the "biggest bloopers from River Watch" (http://clearwater.org/news/rivertruth.html). Clearwater states that the science supporting GE's claim that PCB exposure results in no adverse health effects for human beings is simply false. In their Clearwater News&Bulletins newsletter, the organization claims that GE's funding of studies may influence the outcomes of those studies. "Corporate money funds a very high percentage of scientific work, exerting a conscious or unconscious influence on study design, which can have a profound impact on conclusions" (http://clearwater.org/news/rivertruth.html).

In 1997, Clearwater also produced a video concerned with Hudson River PCBs. Clearwater's video, A Toxic Heritage: The Hudson River PCB Story, was released prior to GE's video. Clearwater's video is a visual and narrative history of the Hudson River focused on the same PCB issues addressed in their written publications. The video also

walks the audience through the blood tests and results of Andy Mele, Environmental Director of Clearwater, as he is screened for PCB levels in his blood. Mele, who says that he has lived in the Hudson Valley for most of his life, explains that the most concentrated PCBs in his blood correspond with those PCBs found in the Hudson River. He then says, "I never asked to have PCBs in my body. I don't want PCBs in my body, and I am deeply concerned about my family's health and future" (Toxic Heritage).

The Clearwater video provides the history of the Hudson dating back to the school of Hudson River painters including Thomas Cole and then explains how PCBs came to reside in the Hudson. The video also displays contrasting images of GE workers dressed in plastic suits from head to toe suctioning PCBs out of the water juxtaposed to images of wading egrets and the graceful, and impressive, five ft. Mute Swan swimming in the same Hudson waters. The Clearwater video is a powerful blend of logos, ethos, and pathos.

Scenic Hudson is a second volunteer, activist organization concerned with PCBs in the Hudson whose goals include informing and involving citizens throughout the Hudson Valley (http://www.scenichudson.org/help.htm). Much like GE, Scenic Hudson publishes a newsletter called Action for Clean Air and Clean Water; however, the views of Scenic Hudson more closely correlate with those of Clearwater. Overall, Scenic Hudson's literature focuses on the adverse health effects associated with PCB exposure, recent EPA reports concerning Hudson PCB, and dredging.

Scenic Hudson takes the position that at least partial dredging is required in the Hudson to decrease PCB contamination levels and prevent the chemicals from additional dispersion throughout the river system. "For every day of 'no action' another 1.5 pounds

of PCBs enters the water from the sediment hot spots. It makes sense to clean up the river if the amount of PCB re-suspended by dredging is less than the total release from all the days of no action" (http://www.scenichudosn.org/pcb_report5.htm). However, it is unclear from where and/or how Scenic Hudson derives 1.5 pounds of daily PCB discharge from hot spots.

Scenic Hudson also spends a great deal of time and energy in opposition to many of GE's views and statements expressed in River Watch.

> GE claims that 'activists like dredging, but science does not.' However, Scenic Hudson's report, however [sic], reflects a strong consensus among scientists that dredging is the most proven and effective means of remediating contaminated sediments. Scenic Hudson spoke with top U.S. and Canadian contaminated sediment experts, four of who reviewed the report. These include experts from the U.S. EPA Great Lakes National Program Office, the U.S. Army Corps of Engineers Waterways Experiment Station, and others. The only source GE has cited to support its position are its own consultants and the EPA's 1984 'no action' decision. GE ignores advances in dredging since 1984 and downplays EPA's preference for dredging at other PCB-contaminated sediment sites. In addition, GE misleadingly cites portions of the 1984 decision that pertain to bank to bank dredging, not the more limited and less disruptive hot spot dredging option (http://www.scenichudson.org/pcb_report4htm).

Scenic Hudson believes, as does Clearwater, that the majority of GE's River Watch literature is a misrepresentation, or manipulation of the true facts. Again, these types of discrepancies foster additional confusion regarding the remediation activities that would best benefit the human and wildlife populations of the Hudson Valley. A recent article in The New Yorker reads:

> Dredging, if it ever does occur, will be an unpleasant business. It will be noisy and disruptive, and the contaminated sludge that it produces will have to be disposed of somewhere. It is this last prospect, in particular, that worries people along the upper Hudson. There has been a fair bit of speculation – and not without justification – that the sludge will end up

> buried, or 'encapsulated,' close to the river, on land that is now somebody's dairy farm. G.E. has done its best to feed these anxieties. Its current ad campaign includes a dozen different full-page spreads that have been run in rotation in newspapers like the Glens Falls *Post-Star*, and the Schenectady *Daily Gazette*, and television commercials that are being aired out of Albany, Poughkeepsie, and Kingston. 'Will this be the last dive for ten years?' reads one ad, which pictures a kid doing a cannonball into a river. Another shows a huge rig pulling sludge out of an unidentified waterway, and making a terrible mess. The captions reads, 'You can be guaranteed dredging will be devastating. You can't be guaranteed it will work' (The New Yorker 12/4/00).

The public is bombarded with reports, studies, newsletters, assertions, and advertisements regarding all aspects of Hudson River PCBs from what should be done to what is happening to the PCBs in the water, i.e. are they moving around or being buried, to the adverse health effects, if any, caused by the chemicals. Information is generated and disseminated by GE, the EPA, Clearwater and Scenic Hudson, none of whom seem to agree with one another. However, the pattern has continued for almost twenty years.

CHAPTER 4

CONCLUSIONS

Fundamental disputes between such monumental giants as the EPA and GE concerning the movement, burial, and accumulations of PCBs in the Hudson River leads the public into a definite quandary. Local communities are placed in a position where both the EPA and GE claim to be interested in protecting the health and welfare of the citizens as well as Hudson River fauna and flora. However, both of the key players, namely the EPA and GE, absolutely disagree on everything from how and where PCBs are moving or not moving throughout the river to what remediation activities should be implemented, if any, to decrease PCB levels in the Hudson.

Almost all of the literature produced by the EPA can be categorized as scientific discourse, which from the beginning places lay community members at a disadvantage because of the language used. Scientific discourse uses the technical language of experts. Community members are often unable to communicate their questions and/or concerns in the language of scientific discourse; their questions and/or concerns, therefore, are often not communicated, or are overlooked when they are composed in common, not technical, language. GE's literature, on the other hand, contains not only scientific discourse, but also articles written in the tone of narrative discourse. GE's literature, therefore, is overall more effective in carrying their message to the public, simply because it is easier to read and comprehend.

The public is in a position where it is jockeyed back and forth and treated almost as a pawn in the Hudson River PCB debate. It seems as though whoever can gather the support of local communities, including individuals, businesses, and other associations

may gain the upper hand in the ultimate decision of whether or not to dredge. Because of the contradiction and confusion among the literature and discourses of the EPA, GE, Clearwater and Scenic Hudson, a consensus or agreement regarding the 'truth' about PCBs has not been reached in communities or the media.

The theory of social constructionism which embraces the idea of an "interactive exchange of information during which *all participants* also communicate, appeal to, and engage values, beliefs, and emotions" could assist in alleviating some of the confusion surrounding the Hudson River PCBs (Waddell 142). If the theory of social constructionism was used as a model for Hudson River PCB discourse, GE would no longer have license to debunk the concerns of Clearwater and Scenic Hudson as emotional rhetoric. Similarly, the EPA would necessarily incorporate values and concerns for the Hudson not only in its outreach materials, which to date are quite limited, but also in their scientific reports such as the BMR, the HHRAs, and the ERAs. Granted that incorporating values into already cumbersome scientific reports may indeed increase their sheer volume; however acknowledging and embracing the value standards used in EPA decision making will legitimately bring those concerns into the decision-making process. Emotions and values routinely influence seemingly objective analyses, since scientists are humans and humans can only function from within the realm of their own inherently biased and unobjective prism; however no one dares speak of such an influence. Social constructionism could help remove the stigma from a process that routinely asserts its influences, yet continues wholly unrecognized by most. GE must then also become accountable for its own values and motives. Under the model of social

constructionism, GE's newsletter, River Watch, which has the appearance of a grassroots advocacy publication, would be scrutinized more closely.

The theory of environmental pragmatism would also go a long way to assist in dismantling some of the Hudson River PCB confusion. Moral pluralism realizes that individuals and organizations have different decision-making reasons and methods; however many or all of those methods are valid. If the theory of environmental pragmatism was employed within Hudson River PCB discourse, the EPA, Clearwater, and Scenic Hudson may have the opportunity to work more closely. Currently, although Clearwater and Scenic Hudson often cite and disseminate EPA information, the EPA does not incorporate, refer to, or in any other way advertise Clearwater and/or Scenic Hudson views or literature. The EPA's clear preference for Hudson PCB remediation is partial dredging which is identical to the views of Clearwater and Scenic Hudson. The two environmental activist organizations, however, employ a great deal of value based reasoning to support their views, as well as logos based argumentation. The EPA may avoid engaging Clearwater and Scenic Hudson partially for fear of portraying the image of an organization based on something other than pure, unadulterated scientific objectiveness.

In conclusion, this thesis has attempted to utilize the theories of social constructionism and environmental pragmatism to analyze the governmental, corporate, and non-profit discourse concerned with PCB remediation in the Hudson and demonstrate both effective and ineffective examples of environmental rhetoric. The theories of social constructionism and environmental pragmatism are very much relevant

in today's society and with their proper usage could assist in avoiding much confusion and contradiction, as well as fostering cooperation between organizations.

REFERENCES

"A Call for Independent Science." River Watch: A GE Report on the Hudson River. Fall 1999: 15.

"Aggressive GE Cleanup Continues." River Watch: A GE Report on the Hudson River. Winter 1997: 2.

"A Glance at the Hudson." River Watch: A GE Report on the Hudson River. Spring 2000: 5.

"A Pioneer in PCB Research." River Watch: A GE Report on the Hudson River. Summer 1999: 8.

"A River Gets Better with a Little Help from Its Friends." River Watch: A GE Report on the Hudson River. Winter/Spring 1999: 6.

A Toxic Heritage: The Hudson River PCB Story. Dir. Tobe Carey. With Andre Mele. 1997.

"Activists Like Dredging, But Science Does Not." River Watch: A GE Report on the Hudson River. Winter 1997: 7.

"Agencies Identify Other PCB Sources." River Watch: A GE Report on the Hudson River. Winter 1998: 29.

"At Home on the Hudson." River Watch: A GE Report on the Hudson River. Fall 1999: 8.

"All About Clearwater." Online. Internet. 22 November 1999. Available at: http://clearwater.org/about.html

Browner, Carol M. "Oral Statement Prepared for Delivery Before the Committee on Environmental Conservation, New York State Assembly." Albany, New York, 9 July 1998.

"Bruce Babbitt, PCBs, Casinos, and General Electric." Clearwater News&Bulletins. Online. Internet. 11 April 1998. Available at: http://clearwater.org/news/pcbscasinosge.html.

Burr, Vivien. An Introduction to Social Constructionism. New York, NY: Routledge, 1995.

Cantril, Albert, and Susan Davis Cantril. Reading Mixed Signals. Washington, D.C.: Woodrow Wilson Center Press, 1999.

Carley, William M. "Pollution from PCBs Keeps GE in Trouble with Pittsfield Mass." The Wall Street Journal 4 December 1997: A1.

"Checking Water Weekly, GE Keeps Tabs On River." River Watch: A GE Report On The Hudson River. Summer 1999: 4.

"Clearwater's State of the Hudson Report." Clearwater News&Bulletins. Online. Internet. 14 May 1999. Available at: http://clearwater.org/news/stateoth97.html.

Cronin, John. "The Hudson Still Waits for Help." Editorial. The New York Times 28 February 1998

Cushman Jr., John H. "Deep Within Superfund Bill Are Goodies for Montana." The New York Times 5 September 1997.

Dao, James. "G.E. Wins Delay of Study on Cleaning Up Hudson." The New York Times 25 February 1998: B1+.

"Data Evaluation and Interpretation Report: EPA's Report on GE PCBs in the Hudson River." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report1.htm.

"Deferring the Hudson River Cleanup." Editorial. The NewYork Times 28 February 98.

"Dredging vs. 'No Action'." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report5.htm.

"Dredging: Wrong Answer." Online. Internet. 30 March 1999. Available at: http://www.hudsonwatch.com/ldredgin.html.

"Dredging: Wrong Answer in 1984. Wrong Today." River Watch: A GE Report on the Hudson River. Fall 1997: 8.

"Environmental Dredging Would not be an Effective Remedy for Reducing PCB Levels in Fish in the Upper Hudson River and Should Be Ruled Out, a GE Study Has Concluded." Online. Internet. 15 March 2000. Available at: http://www.hudsonwatch.com/latest6.html.

"EPA Agrees to Peer Review on Some Studies." River Watch: A GE Report on the Hudson River. Summer 1998: 16.

"EPA Finds No Suitable Landfill Sites." River Watch: A GE Report on the Hudson River. Winter 1998: 4.

"Eagles Flock to Hudson Valley." River Watch: A GE Report on the Hudson River. Spring 2000: 8.

"EPA Dredging Project in Michigan River Turns Back the Clock of Natural Recovery." River Watch: A GE Report On The Hudson River. Summer 1998: 15.

"EPA, GE to Work Together on River Models." River Watch: A GE Report on the Hudson River. Fall 1997: 12.

"EPA Hudson River PCBs Actions Already Taken" Online. Internet. 14 March 2000. Available at: http://www.epa.gov/hudson/actions-taken.htm.

"EPA Hudson River PCBs in the Environment" Online. Internet. 14 March 2000. Available at: http://www.epa.gov/hudson/pcbs-in-env.htm.

EPA Hudson River PCBs and Human Health" Online. Internet. 14 March 2000. Available at: http://www.epa.gov/hudson/humanhealth.htm.

"EPA Hudson River PCBs Public Participation" Online. Internet. 14 March 2000. Available at: http://epa.gov/hudson/public-participation.htm.

"EPA Hudson River PCBs Public Participation Welcome" Online. Internet. 15 March 2000. Available at: http://www.epa/gov/hudson/welcome.htm.

"EPA Liaison Group Members Complain Agency Isn't Listening." River Watch: A GE Report on the Hudson River. Fall 1997: 17.

"EPA: No Dredging in Hudson – For Now." River Watch: A GE Report on the Hudson River. Winter/Spring 1999: 9.

"EPA Rejected Dredging in 1984 and the Hudson Has Only Gotten Better." River Watch: A GE Report on the Hudson River. Spring 2000: 12.

"EPA Releases Revised Baseline Modeling Report For Hudson River PCBs Reassessment Project-Refinements Provide Further Insight." Online. Internet. 14 March 2000. Available at: http://www.epa.gov/r02earth/superfnd/hudson/pressrel-rbmr.htm.

"EPA Report Fuels Dredging Concerns." River Watch: A GE Report on the Hudson River. Fall 1997: 5.

"EPA Reports Show PCBs From Upper Hudson River May Affect Human Health in Mid-Hudson; Threaten Fish & Wildlife In Lower Hudson For Decades." Online. Internet. 4 January 2000. Available at: http://www.epa.gov/region02/epd/00004.htm.

"EPA Risk Assessments Confirm Exposure to PCBs in River May Increase Cancer Risk, Other Non-Cancer Health Hazards and Threaten Fish & Wildlife." Online. Internet. 4 August 1999. Available at: http://www.epa.gov/region02/epd/99125.htm.

"EPA Studies Divorced from Reality." River Watch: A GE Report on the Hudson River. Fall 1999: 12.

"EPA To Continue Work on Hudson River PCBs Reassessment; No Immediate Action Planned." Online. Internet. 17 December 1998. Available at: www.epa.gov/region02/epd/98171.htm.

"Fact Sheet 2: Endocrine Disruption and PCBs." Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/fs2.html.

"Fact Sheet 3: PCBs, General Information Q & A for Nonscientists." Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/fs3.html.

"Fact Sheet 4: PCB Contamination of the Hudson: Is Dredging an Appropriate Cleanup Strategy? ." Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/fs4.html.

"Fact Sheet 5: Department of Health Fish Advisories for the Hudson River." Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/fs5.html.

"Fact Sheet 6: PCB Contamination of the Hudson: A Health Hazard?" Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/hazard.html.

"Fact Sheet 8: Hudson River PCB Pollution Timeline." Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/timeline.html.

"Fact Sheet 10: PCBs in The Air – What are the Risks?." Clearwater News&Bulletins. Online. Internet. 22 November 1999. Available at: http://clearwater.org/news/pcbs.html.

"Fish FYI." River Watch: A GE Report on the Hudson River. Winter/Spring 1999: 10.

"GE's Cleanup Accelerates River Recovery." River Watch: A GE Report on the Hudson River. Summer 1998: 3.

"G.E. Disputes Federal Finding that PCB's Are Flowing Down the Hudson." The New York Times 20 August 1998.

"GE Presses on with Extensive Cleanup Work." River Watch: A GE Report on the Hudson River. Fall 1997: 2.

"GE Sends EPA Its Review of Agency's Human Health and Ecological Reports on Hudson River." Online. Internet. 8 February 2000. Available at: http://www.hudsonwatch.com/latest_ge_responds_epa_assessmenthtml.

"GE Study Puts Spotlight on Real PCB Source." River Watch: A GE Report on the Hudson River. Winter 1998: 8.

"GE Takes to Air in Hudson Cleanup." River Watch: A GE Report on the Hudson River. Fall 1999: 6.

"GE Urges EPA: Don't Quit Until All Questions Are Answered." River Watch: A GE Report on the Hudson River. Fall 1997: 15.

"G.E. Wins Delay of Study on Cleaning the Hudson." Clearwater News&Bulletins. Online. Internet. 11 April 1998. Available at: http://clearwater.org/news/gewinsdelay.html.

"Good Science Must Prevail." River Watch: A GE Report on the Hudson River. Winter/Spring 1999: 8.

Golden, James L., Goodwin F. Berquist, and William E. Coleman. The Rhetoric of Western Thought. Dubuque, Iowa: Kendall/Hunt Publishing Company, 1992.

"Hail Hudson: River Has More Essential Plant Nutrients Today Than in 1609." River Watch: A GE Report on the Hudson River. Summer 1998: 6.

Harre, Ron, et al., eds. Greenspeak: A Study of Environmental Discourse. Sage Publishing, 1998.

Hauser, Gerard A. Introduction to Rhetorical Theory. New York: Harper & Row, 1986.

"Healthy Hudson River Ecosystem: The Facts." Online. Internet. 4 August 1999. Available at: http://www.hudsonwatch.com/latest_ecohtml.

Herndl, Carl G., and Stuart C. Brown, eds. Green Culture Environmental Rhetoric in Contemporary America. Madison, Wisconsin: The University of Wisconsin Press, 1996.

Hickman, Larry A., and Thomas M. Alexander eds. The Essential Dewey; Volume 1: Pragmatism, Education, Democracy. Bloomington and Indianapolis, Indiana, Indiana University Press, 1998.

"How GE Keeps PCBs Out of the Hudson." River Watch: A GE Report on the Hudson River. Spring 2000: 6.

"How Long Would It Take to Dredge the Upper Hudson." River Watch: A GE Report on the Hudson River. Summer 1999: 5.

"Hudson Hype: Environmental Groups 'Stretch the Truth a Little' in Push for Dredging'." River Watch: A GE Report on the Hudson River. Fall 1997: 19.

"Hudson Named Nation's Second Most Endangered River." Clearwater News&Bulletins. Online. Internet. 16 April 1997. Available at: http://clearwater.org/news/fs2.html.

Hudson River Recovery: Choosing the Most Effective PCB Remedy. (video) General Electric. 1998.

"Hudson Wildlife Are Thriving." River Watch: A GE Report on the Hudson River. Summer 1998: 5.

"It's a Whopper: The $40-Million Fish Story." River Watch: A GE Report on the Hudson River. Winter 1998: 20.

Kolbert, Elizabeth. "Letter From Hudson Falls: The River: Will E.P.A. Finally Make G.E. Cleanup its PCBs?." The New Yorker 4 December 2000.

Katz, Eric. Nature as Subject Human Obligation and Natural Community. Lanham, Maryland, Rowman & Littlefield Publishers, 1997.

Killingsworth, M. Jimmie and Jacqueline S. Plamer. Ecospeak: Rhetoric and Environmental Politics. Carbondale and Edwardsville: Southern Illinois University Press, 1992.

"Largest Human Study Finds No Link Between PCB Exposure and Cancer Mortality." River Watch: A GE Report on the Hudson River. Summer 1999: 6.

Light, Andrew, and Eric Katz, eds. Environmental Pragmatism. New York, New York, Routledge, 1996.

Light, Andrew, and Eric Katz, "Introduction: Environmental Pragmatism and Environmental Ethics as Contested Terrain" in Environmental Pragmatism. New York, New York, Routledge, 1996.

"Low Resolution Coring Report: USEPA Hudson River PCBs Site Reassessment Report." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report2.htm.

Lueck, Thomas J. "Rulings May Delay Decisions on Hudson Riverfront Plans." The New York Times 14 January 1995.

Luhmann, Niklas. Ecological Communication. Trans. John Bednarz, Jr. Chicago, IL: The University of Chicago Press, 1989.

"Major Findings of Kimbrough Health Study." River Watch: A GE Report on the Hudson River. Summer 1999: 7.

"Major Study Shows No Link Between PCBs, Breast Cancer." River Watch: A GE Report on the Hudson River. Winter 1998: 12.

"Marcy Benstock: The News Fit to Print." Interview. The Wall Street Journal 10 July 1996.

"Marina Owner to EPA: You're Missing the Boat." River Watch: A GE Report on the Hudson River. Winter 1998: 16.

"More Than 50 Communities Oppose Dredging and Dumping." River Watch: A GE Report on the Hudson River. Spring 2000: 2.

"Natural Resource Claim: Science or Politics?." River Watch: A GE Report on the Hudson River. Winter 1998: 22.

"Need EPA Info on Hudson? Don't Consult Official Record." River Watch: A GE Report on the Hudson River. Winter 1998: 27.

"New EPA PCB Report Puts General Electric on the Defensive." Clearwater News&Bulletins. Online. Internet. 11 April 1997. Available at: http://clearwater.org/news/epapcb.html.

"New EPA Report on PCBs in the Hudson." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/news/archives/n_no3_pg10.htm.

"New Yale Study Finds No PCB – Cancer Link." River Watch: A GE Report on the Hudson River. Spring 2000: 17.

"Newest EPA Hudson River Study Finds PCB-Contaminated Sediments Not Being Buried by Clean Sediments: 40-Percent PCB Loss Seen from Thompson Island Pool Hot Spots." Online. Internet. 98 July 1998. Available at: http://epa.gov/r02earth/epd/98088-b.htm.

"No Action Now on the PCB's In the Hudson." The New York Times 18 December 1998.

"Our Commitment to the Hudson River." River Watch: A GE Report on the Hudson River. Winter/Spring 1999: 2.

Parker, Ian, eds. Social Constructionism, Discourse and Realism. Thousand Oaks, CA: Sage Publications, 1998.

Parker, Kelly A. "Pragmatism and Environmental Thought." in Environmental Pragmatism. New York, New York, Routledge, 1996.

"PCBs and Human Health: Research Update." Online. Internet. 4 August 1999. Available at: http://www.hudsonwatch.com/latest_effectshtml.

"PCB Dump in Ulster County Gets 'No Support Whatsoever'." River Watch: A GE Report on the Hudson River. Fall 1997: 2.

"PCBs in the Hudson River & Human Health." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report3.htm.

"PCBs in Hudson Sediment Very Low Before Dredging Could Even Begin." River Watch: A GE Report on the Hudson River. Spring 2000: 14.

"PCBs in People: No Evidence of Cancer or Adverse Health Effects, American Council on Science and Health Reports." River Watch: A GE Report on the Hudson River. Summer 1998: 10.

"PCB Levels in Sediment Spike After Dredging Projects." River Watch: A GE Report on the Hudson River. Spring 2000: 13.

"PCB Levels in Water and Fish Cut in Half." River Watch: A GE Report on the Hudson River. Winter 1998: 2.

"PCBs Link Page." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/work_prog2a.htm.

"Peer Review and the EPA Hudson River PCB Reassessment." Clearwater News&Bulletins. Online. Internet. 11 April 1998. Available at: http://clearwater.org/news/peerreview.html.

Perez-Pena, Richard. "Pataki Orders PCB Cleanup Near Hudson." The New York Times 14 November 1999: Metro44

Perez-Pena, Richard. "State Sues G.E. Over Pollution in the Hudson." The New York Times 16 November 1999: B1+.

"Push for PCB Cleanup Intensifies." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/news/13.htm.

"Questions and Answers About Contaminated Sediment Dredging." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report4.htm.

"Rediscovering the Upper Hudson." River Watch: A GE Report on the Hudson River. Fall 1999: 2.

"Review of Public Comments Confirms EPA PCB Findings: GE Report Found Flawed." Online. Interent. Available at: www.epa.gov/hudson/99001.htm.

Revkin, Andrew C. "Babbitt Assails G.E. Over Delay in Ridding Hudson of Chemicals." The New York Times 26 September 1997: B1+.

Revkin, Andrew C. "G.E.'s Comments on Disposal of PCB's Draw Objections." The New York Times 28 January 1999.

Revkin, Andrew C. "High Levels of Pollutants Found in Mud in the Hudson." The New York Times 5 August 1998

Revkin, Andrew C. "High PCB Level Is Found in a Hudson Bald Eagle." The New York Times 17 September 1997: B4.

Revkin, Andrew C. "Lower Hudson Has Safe Levels of Chemicals in Striped Bass." The New York Times 23 February, 1999: B1+.

Revkin, Andrew C. "New Studies Show PCB's Persist in Hudson, and Are Entering Air." The New York Times 22 February 1997: A1+.

Revkin, Andrew C. "New York Inquiry into River Damage." The New York Times 30 July 1997: B4.

Revkin, Andrew C. "A Newly Clean Hudson Awaits Swimmers." The New York Times 24 May 1996: B1+.

Revkin, Andre C. "Toxic Chemicals from 70's Still Pollute Hudson, Study Says." The New York Times 24 July 1998: B1+.

"River Truth." Clearwater News&Bulletins. Online. Internet. 11 April 1998. Available at: http://clearwater.org/news/rivertruth.html.

Robichaux, Mark. "New York Harbors Revitalized Fishing." The Wall Street Journal 31 January 1997.

Rolston III, Holmes. Environmental Ethics Duties to and Values in The Natural World. Philadelphia, Pennsylvania: Temple University Press, 1988.

Sagoff, Mark. The Economy of the Earth Philosophy, Law and the Environment. New York, New York: Cambridge University Press, 1988.

"Sediments Being Buried, EPA says." River Watch: A GE Report on the Hudson River. Spring 2000: 16.

"7,075 Capacitor Workers Studied; No Link Found Between PCBs and Cancer." River Watch: A GE Report on the Hudson River. Summer 1998: 8.

Shotter, John. Cultural Politics of Everyday Life: Social Constructionism, Rhetoric, and Knowing of a Third Kind. Buffalo, NY: University of Toronto Press, 1993.

"Site Unseen: EPA Uses 20-year-old Data to Justify Yankee Stadium-Sized Landfill for Fort Edward." River Watch: A GE Report on the Hudson River. Summer 1998: 13.

"Statement of John P. DeVillars Concerning EPA/GE Negotiations." Online. Internet. 24 September 1998. Available at: www.epa.gov.

"Striper Hyper: PCBs and Hudson River Fish." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/news/news14.htm.

Sullivan, Thomas F.P. ed. Environmental Law Handbook Fourteenth Edition. Rockville, MD: Government Institutes, Inc., 1997.

"Superfund is Broken." River Watch: A GE Report on the Hudson River. Winter 1998: 24.

"Symbol of Recovery: 1st eaglet born on Hudson in 100 years." River Watch: A GE Report on the Hudson River. Winter 1998: 30.

"10 Things You Can Do About PCB's." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report6.htm.

"The following Are Excerpts from the U.S. Environmental Protection Agency's 1984 Record of Decision (ROD) for the Hudson River." Online. Internet. 15 March 2000. Available at: http://www.hudsonwatch.com/regul2.html.

"The Hudson River is in the Midst of a Spectacular Comeback, But Some Special-

Interest Groups Haven't Noticed." River Watch: A GE Report on the Hudson River. Winter 1998: 10.

"The Hudson: Safe To Drink, Safe to Enjoy." River Watch: A GE Report on the Hudson River. Spring 2000: 2.

"The Right Answer for the Hudson River." River Watch: A GE Report on the Hudson River. Spring 2000: 4.

Thompson, Paul B. "Pragmatism and Policy: The Case of Water." in Environmental Pragmatism. New York, New York, Routledge, 1996.

"Thriving Upper Hudson Beckons Fisherman, Boaters." River Watch: A GE Report on the Hudson River. Winter 1997: 3.

"U.S. Army Corps Considers Ulster County for Dredged Material Disposal Facility." River Watch: A GE Report on the Hudson River. Winter 1997: 9.

United States Environmental Protection Agency. Ecological Risk Assessment: Executive Summary. New York, New York: 26 Federal Plaza, August 1999.

United States Environmental Protection Agency. Ecological Risk Assessment Addendum: Executive Summary. New York, New York: 26 Federal Plaza, December 1999.

United States Environmental Protection Agency. Phase 2 Report Further Site Characterization and Analysis Volume 2F – Human Health Risk Assessment Hudson River PCBs Reassessment RI/FS. New York, New York: 26 Federal Plaza, August 1999.

United States Environmental Protection Agency. Environmental Impact Statement on the Hudson River PCB Reclamation Demonstration Project. New York, New York: 26 Federal Plaza, October 1982.

United States Environmental Protection Agency. Human Health Risk Assessment: Mid-Hudson River Executive Summary. New York, New York: 26 Federal Plaza, December 1999.

United States Environmental Protection Agency. Human Health Risk Assessment: Upper Hudson River Executive Summary. New York, New York: 26 Federal Plaza, August 1999.

United States Environmental Protection Agency. Phase 2 Report – Further Site Characterization and Analysis Volume 2E – Baseline Ecological Risk Assessment Hudson River PCBS Reassessment RI/FS. New York, New York: 26 Federal Plaza, August 1999.

VanDeVeer, Donald, and Christine Pierce, eds. The Environmental Ethics & Policy Book. 2nd ed. Belmont, California: Wadsworth Publishing Company, 1988.

"Victory for PCB Cleanup Advocates at GE Stockholder Meeting." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/pcb_report3.htm.

Waddell, Craig. "Saving the Great Lakes: Public Participation in Environmental Policy." in Green Culture Environmental Rhetoric in Contemporary America. Madison, Wisconsin: The University of Wisconsin Press, 1996.

"What Experts Are Saying About PCB Exposure and Cancer Mortality." River Watch: A GE Report on the Hudson River. Summer 1999: 5.

"What Others Are Saying About Scenic Hudson." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/quotes1.htm.

"What Other Scientists Have Said of the Study." River Watch: A GE Report on the Hudson River. Summer 1999: 9.

"What's Up in the Thompson Island Pool." River Watch: A GE Report on the Hudson River. Winter 1997: 5.

"What's Wrong with GE's PCB Picture?." Action for Clean Air and Clean Water. Online. Internet. 22 March 2000. Available at: http://www.scenichudson.org/news/archives/n_no3_pg9.htm.

"Why GE Backs PCB Cutoff Strategies." River Watch: A GE Report on the Hudson River. Spring 2000: 11.

"Why GE Is Opposed to Dredging." River Watch: A GE Report on the Hudson River. Spring 2000: 10.

Wiesner, Diane. E.I.A. The Environmental Impact Assessment Process: What It Is and How To Do One. California: Prism Press, 1995.

"Wild Things Thriving on the Hudson." River Watch: A GE Report on the Hudson River. Summer 1998: 2.

"Working Hard to Improve the River." River Watch: A GE Report on the Hudson River. Summer 1999: 2.