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A city and its river: an urban political ecology of the Loop and Bridgeport in Chicago

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A CITY AND ITS RIVER:
AN URBAN POLITICAL ECOLOGY OF THE LOOP AND BRIDGEPORT IN CHICAGO

A Thesis
Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Master of Arts

In

The Department of Geography and Anthropology

by
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B.L.A., Louisiana State University, 2010
B.A., Louisiana State University, 2011
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Abstract

Today's urban environment is produced, both physically and perceptually, by a myriad of factors. Through a comparative study of two Chicago neighborhoods along the Chicago River, the Loop and Bridgeport, I construct the network of political, social, and economic factors that create the urban environment of the Chicago River in and along these places. I explore residents' perception of who controls the production of the urban environment as it relates to the Chicago River, and how the socio-environment is created. In this study, I utilize an urban political ecology approach that recognizes that environments produced simultaneously by social and physical processes are historically situated and that there is nothing inherently unnatural about urban, produced environments, but that these environments are a result of historically and spatially contextualized socio-environmental processes. Using this approach in conjunction with interviews, surveys, and participant observation, I analyze these factors to determine who the residents of these neighborhoods perceive as exerting control over the production of the environment of the Chicago River and how these various entities, along with the numerous processes that influence the environment of the river, are mobilized to serve particular purposes. This research allows me to view the interrelated entities that contribute to the production of the environment of the Chicago River as well as to understand that social factors and pressures that have both historically and recently played a larger role in this production than are often ascribed to them by residents.

1. Introduction: A City and Its River: The Urban Political Ecology of the Chicago River at the Loop and Bridgeport

It is a national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983 (Clean Water Act, 2002 [1972] Section 101 (a)(2)).

At this time, Illinois Environmental Protection agency has proposed used designations for all segments of the [Chicago River] that do not provide for recreation in the water; and has proposed use designations for certain of those segments that that do not provide for recreation on the water (Holst 2010, 2).

[the Environmental Protection Agency] recommends that Illinois revise its proposed recreational uses to include recreation in and on the water for all segments of the [Chicago River] ... EPA notes that, although the Illinois Pollution Control Board has chosen to separate its proceedings on Illinois EPA's proposed recreational use designations from its proceedings on criteria issues, Illinois will eventually need to adopt water quality criteria to protect all of its designated uses (Holst 2010, 3-4).

I became interested in the potential of a Chicago River project following a US EPA letter in April, 2010. This letter challenged the use designations and water quality requirements of the Chicago River (Holst 2010, 1-4). As I learned more about the impact of the letter on the agencies it effected and the people along the river whose environment would be altered, I became interested in trying to find a way to look at what elements helped to create this climate for socio-ecological reproduction, and produced the letter as well as how people who have lived with the river as an element of their urban environment view and perceive the river, its potential changes, and the actors who are involved in those changes. Part of my interest in how people view the river is to try and understand if their perceptions play a significant role in the initiation and influence of these changes. In many ways, this socio-environmental reproduction appears as a federal government, top down ultimatum to clean up the Chicago River, but in fact it has many more layers to it and has been a result of interactions of actors at a variety of scales over a long

period of time ultimately leading to the current historical-geographical context in which this current situation, network, and production of the river reside.

In order to carry out this research, I decided to undergo a comparative study between two community areas in Chicago. I was interested in selecting areas with significant similarities and differences both currently and historically in order to compare and contrast how the current historico-geographical context has been produced differently in each neighborhood and how that impacts the current situation. I selected the Loop and Bridgeport (Figure 1) as the community areas in which to conduct my research for numerous reasons. The neighborhoods are similar in size 1.6 and 2.1 square miles respectively and are bordered by a similar length of the river 2.7 and 2.8 miles each. In addition, these two neighborhoods lie at the eastern and western ends of the Chicago River. This is important in their relationship to the river as a whole and the particular alterations that focused impacts on the eastern and Great Lakes end of the river, or the western end connecting to canals and ultimately the Mississippi River. These locations allowed the neighborhoods to develop early on in the history of the city as well as allowing them to develop significant and unique economic identities related to the river. Though these identities changed over time, their locations on the river and their interactions with it were important to these developments. The demographic and socioeconomic characteristics of these neighborhoods also differ today as they have historically.

1.1 Research Study

This study examines how the Chicago River is a socio-environmental product using urban political ecology to understand how the river has been produced and reproduced

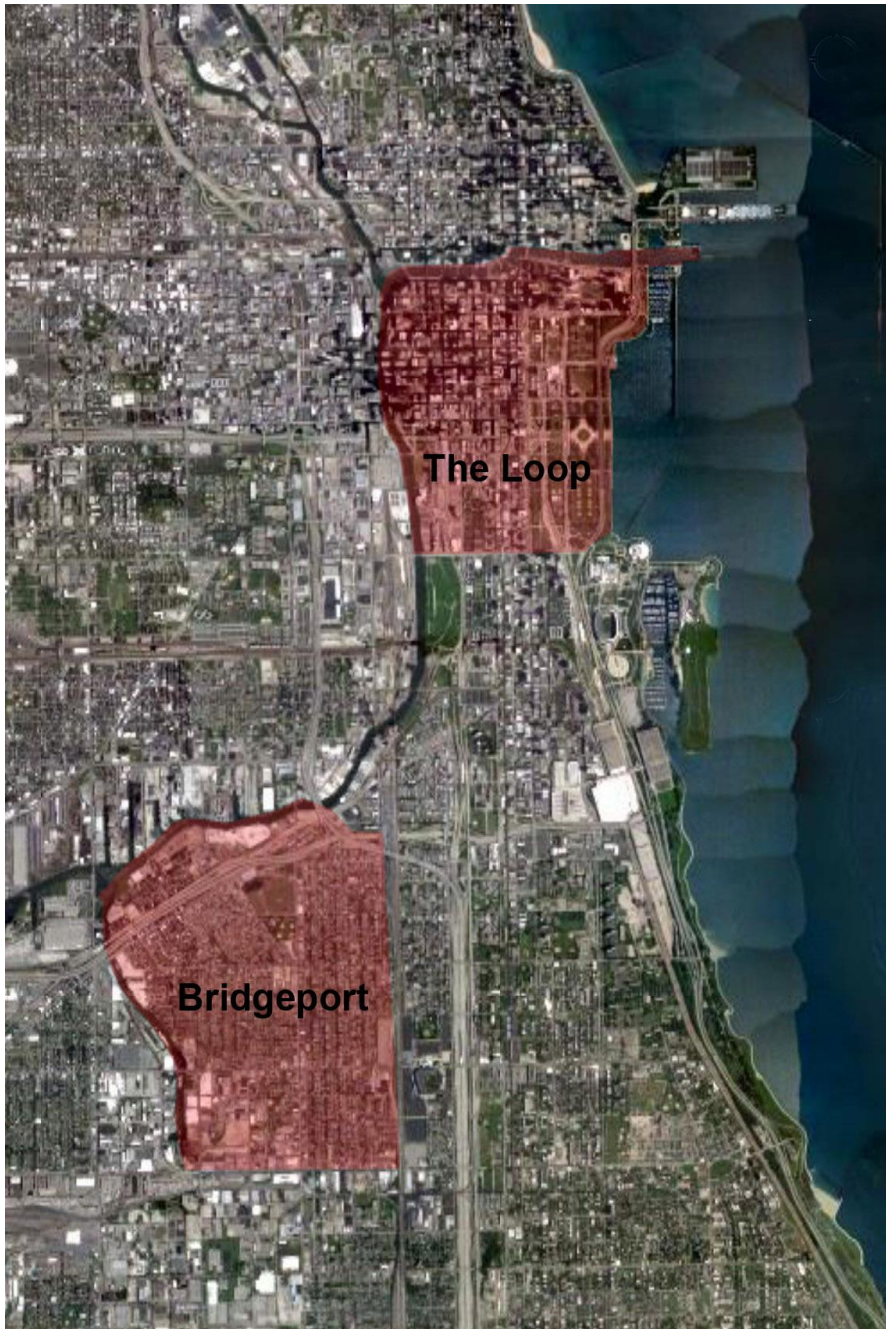


Fig. 1

Satellite image of the Loop and Bridgeport in Chicago, neighborhood highlighted. Courtesy of Google Earth, edited by Garrett Wolf.

throughout Chicago's history. This socio-environment can also be understood as the urban political ecology of the Chicago River, that is the combination of urban society, politics and urban ecology that works to produce the socio-environment that is the Chicago River. I analyze how various actors and their actions have created networks that produced the Chicago River in specific historic-spatial moments. In particular I look at how the urban political ecology of the Chicago River as it pertains to the communities of the Loop and Bridgeport has been produced and reproduced historically and currently through the situation and network initiated by a letter from the United States Environmental Protection Agency (US EPA) to the Illinois Environmental Protection Agency (IEPA) and Illinois Pollution Control Board (IPCB) in April of 2010. This letter recommended changes to the use designations and water quality of the Chicago River in order to meet the requirements of the Clean Water Act, which heretofore had yet to be met (Holst 2010, 3). I look at how political, economic, social, and environmental actors at a variety of scales participate in the network that produces the urban political ecology of the Chicago River. In addition, I look at how those actors influence the perception of the urban political ecology of the Chicago River for the residents of the Loop and Bridgeport.

Through their perceptions, I gather what residents perceive about the environment of the Chicago River as well as who they see as exerting control over the production and material conditions and uses of the river, and if they believe that such control serves the interests of "elites at the expense of marginalized populations" (Harvey 1993 [1973], 14-15; Harvey 1996, 5-6, 340; Swyngedouw 2004a, 3-4; Heynen et al. 2006, 6). It is important to recognize that these conditions do not occur in a vacuum and are a part of and connected to "social, political, and economic processes and cultural constructions of what constitutes 'urban' and 'natural' (Kaika, Swyngedouw 1999, 122; Kaika 2005, 3-4; Heynen et al. 2006, 6).

I analyze and construct how various actors are influenced within the network by other actors and how various processes or particular conditions (processes and situations at specific points on the river) are mobilized to serve particular purposes. These mobilizations reflect networks of social power relations between and among various actors (Foucault 1995, 24, 26; Foucault 2008, 52, 186; Latour 2005, 10-11, 66; Swyngedouw 2006, 22). This study looks at how these “mobilizations and transformation of nature and the allied processes” produce new “socio-environmental conditions” (Heynen et al. 2006, 6). (nature can be a controversial term, I will provide a more specific definition or context of the term when utilized in the text) These changes to urban environments are analyzed in the context of economic, political, and social relationships that lead to the change, recognizing that the nature of change may be contradictory. The contradictions exist when actions by actors produce conditions that are seen as positive in one location while negative in another (Heynen et al. 2006, 7).

1.2 Literature Review

I grouped the geographic and social theoretical literature that informed my study into six groups. The groups include urban geography, social and environmental justice, environmental geography and history, cultural, political, and urban political ecologies, actor-network theory, and Chicago and Chicago River history. These subsets provide a base on which I can study, understand, and analyze the urban environment of Chicago. In addition to these ways to understand the urban environment and its processes, I also use Actor Network Theory (ANT) to analyze how networks can be created and produced and to help understand the actors that participate in that production. I try in some ways to politicize ANT, partly in response to the

critique of ANT by Erik Swyngedouw, by acknowledging that particular actors have more influence or perhaps undue influence over the production of the network (Castree 2002, 114; Swyngedouw 2003, 95)

1.3 Urban Geography

Urban geography as a study of urban space began with the work of the Chicago School of sociology in the 1920s (Fyfe and Kenny 2005, 2). The Chicago School, using what it called human ecology, produced urban ethnographies through surveys and participant observation leading to the writing of such influential books as *The City* (Park et al. 1925, 3; Prudham 2009, 349), *The Urban Community* (Burgess 1926, 4), *The Gold Coast and the Slum* (Zorbaugh 1929, 5), and *One Hundred Years of Land Values in Chicago* (Hoyt 1933, 5-6). The term human ecology should not be confused to mean study focusing on the physical environment, the research in human ecology was focused on human relationships to the built environment and cities. The Chicago School viewed the city as a product of human nature and as “the natural habitat of civilized man” (Park et al. 1925, 1-2; Gregory 1009, 79). The Chicago School sociologists utilized ethnographic techniques to study urban cultures. From this work they developed descriptions of urban life, but often generalized from single Chicago case studies (Gregory 2009, 79). This first foray into the study of urban space is often criticized as incorporating a moral value in their understanding of urban distribution based on ecological principles (natural laws) that the best location would be obtained by the most powerful group (Pacione 2009, 59; Parker 2004, 43). The Chicago School of sociology was very influential in the development of urban geography, using human ecology to explain relationships between

society and nature (in this context often used to mean the built environment) that resulted in the organic formation of cities and how certain land uses and distributions could be observed and predicted (Gregory 2009, 79; Prudham 2009, 349). Post-World War II urban geography was car-jacked by the interstate highway system, transportation geography, and the quantitative revolution (Berry 2005, 69; Berry and Wheeler 2005, xvi). Following World War II, urban geography began to gravitate towards economic and locational theories influenced by the work of Chauncey Harris (1940, iv), Harold Mayer (1943 6-7), and Edward Ullman (1943, 853-854; 1954, 283-284), done before and during the war. The use of these theories allowed for a systemization of urban geography and set the stage for the quantitative revolution (Hall 2000, 21; Pacione 2009, 60; Lees 2002, 103). Urban geographers combined their economic and locational theories as well as a positivist approach with new methods of spatial science (Burton 1963; Harvey 1969; Chisholm 1975).

Criticisms of quantitative urban geography for not explaining social processes led to the development of critical geographies, particularly Marxist (Harvey 1973, 15) and Humanist (Ley 1974; Relph 1976, 1), and later postmodernist (Soja 1989, 1) and feminist (McDowell 1983, 60). This literature is important for my study as it looks at processes that result in understandings of control and marginalization and provides critical and theoretical avenues with which to approach contemporary urban issues. In addition to theoretical expansion, the scope began to widen to include networks (Latour 1993, 1), new urbanism (Lehrer and Milogram 1996, 50), gentrification (Smith and Williams 1986, 2; Smith 1996, 3-4), and globalization, as well as suburban, exurban and edge cities. This new combination of critical geographies and the changing concept of the city led to the development of the Los Angeles School and the cultural turn in urban geography (Lees 2002, 102). These “new” urban geographies represented a qualitative shift in methodology

away from the quantitative methods that had dominated the sub discipline (Jacobs 1993, 827; Lees 2002, 102). These methodological shifts led to a discussion of the politics of difference (Fincher and Jacobs 1998, 1; Shaw 2000, 292), networks and hybrid geographies (Swyngedouw 1996, 65; Whatmore 2002, 3). This cultural turn in urban geography is extremely relevant to my study as I look at larger scale (more detailed) issues and processes of people and neighborhoods and how they relate to broader social and political processes. However, only recently has urban geography engaged more fully with critical geographies (Lees 2002, 104).

In addition to the cultural turn, Edward Soja argues that the “spatial” turn, which began with Michel Foucault and Henri Lefebvre in Paris in the late 1960’s, is only now truly seeing an impact in urban geography, twenty years after Soja began introducing it to the English speaking world (Soja 2008, 18-19). Scholars who were involved in the spatial turn began to more clearly understand and express that there is a reality between and outside of perceived and conceived space that is an “essence” of a place (Relph 1976, 29). The “spatial” turn focuses on a trialectic understanding of space conceived, perceived, and lived. Soja argues that there is more than a material or immaterial way of thinking about the social production of space (Soja 2000, 10). What Soja terms the spatial turn is part of, and concurrent with, a shift to postmodern understandings of space and cities. Much of this is associated with the development of what is called the Los Angeles School, in contrast to the Chicago School, which proposes the center of the city is organized by the outer or peripheral parts of the city as opposed to the center organizing the periphery (Dear and Flusty 1998, 51). Though this has been criticized, it has also opened urban thought to postmodernism and beyond. This development is closely connected with ideas of justice with Tim Hall explaining the importance of the subfield of urban geography through what he calls the most pressing issue facing humanity: social, economic, and

environmental sustainability in the face of urban inequality and understanding how uneven geographic development has occurred (Hall 2006, 1-2; Harvey 2005, 55-56). These turns also allowed for the incorporation of more actors and processes into the networks that are understood to be a part of the dynamic city. These expansions in urban geography also connected with urban political ecology by bringing cultural and social theoretical elements into the study of urban systems as opposed to focusing exclusively on quantitative issues, which will be discussed later.

1.4 Urban Justice: The Justice of the Social and the Environmental

The issue of justice is a common theme in recent geographic literature, especially in urban settings. Much of this stems from Marxist geographies and followed by other critical groups, using ethical systems, evaluate how groups have been marginalized (Mitchell 2003, 5; Lefebvre 1996, 63). In geography, these themes are studied through social justice; a standard for assessing the fairness of society, specifically social distributions (Pulido 1996, 2-3). In conjunction with social justice, environmental justice is also a strong and growing current both in urban geographies as well as the ecologies - cultural, political, and urban political (Harvey 1996, 123; Neumann 1998, 37). Iris Young defines environmental justice as the right of everyone to enjoy and benefit from a safe and healthy environment, regardless of race, class, gender, or ethnicity (Young 1990, 5). Environmental justice also focuses on policy issues connected with how marginalized communities are affected by inequitable distribution of environmental quality and amenities. Since Young's analysis, significant work on environmental justice and marginalized communities has developed (Bullard 1994, 4; Bullard 2000, 2-3; Fortun 2001, 8). Much of urban geography, environmental and social justice are inter-connected (Harvey 1996,

117). This interconnection results because urban geography, environmental and social justice heavily involve the marginalization of groups and their associated surroundings (environments) based on race, class, gender, ethnicity, or any category used to other (Pulido 1996, 5; Young 1990, 7). The Marxist geographies, so prevalent in qualitative urban and “new” urban geographies, largely come out of Harvey’s work, which views social justice or the lack thereof, as a result of social processes in society (Harvey 1993, 15). Social justice for Harvey is the just distribution of advantages and disadvantages that develop out of the social production of anything and everything (Harvey 1993, 98). As other critical geographies developed in the discipline, many of them dealt with issues of social justice beyond class and economy, such as gender and race. Later work by Harvey extends into environmental justice and discusses how production and consumption in capitalist society produce the value of nature (in the western conception of the term, which can also be understood as the environment) both economically and socially (Harvey 1996, 157-158). Other contemporary work discusses more specifically how social and political processes are involved with social justice (Knox and Pinch 2000, 133; Merrifield and Swyngedouw 1997, 2), with more recent work exploring equality and moral geographies through a more philosophical aspect of justice while maintaining the activist character (Smith 2000a, 3; Smith 2000b, 2).

1.5 Urban Nature and Environment

Urban nature and environment involves understanding that the urban and urban processes are not unnatural, as conventionally understood, as well as the understanding that particular environments exist within urban settings that result from urban socio-political processes (Kaika

2005, 4, 12). There exists significant crossover in the understanding of urban nature and the ecologies, political and urban political, but this literature has the understanding of urban nature at the forefront as opposed to the socio-political processes. Much of this literature falls into the category of environmental history, as the literature looks at urban environmental history. William Cronon's book *Nature's Metropolis: Chicago and the Great West*, on Chicago and its influence on the development of the western United States is an excellent example of the relationship between cities and what is often termed hinterland (Cronon 1991). Despite the widespread view of the hinterland as rural or undeveloped, Cronon's discussion shows that all these spaces and places, hinterland and urban, result from intertwined social processes (Cronon 1991, 23, 81). In the exploration of urban nature the use of raw materials to construct the city through human processes can be equated to the use of raw materials to construct environments, often seen as "natural", through animal processes (Gandy 2002, 2). Cronon and Gandy in addition to many writer's whose work contributes to this category deal with how cultural, economic, and political actions coalesce to alter the environment of cities and result in particular socio-environmental reproductions of the city and portions of its environment. The recognition of the influence of social processes on "natural" disasters is also helping to break down the constructed divide between "urban" and "natural" (Davis 1998, 9).

1.6 Cultural, Political, and Urban Political Ecology

Cultural ecology's primary concern was initially relationships among transformations of nature, social reproduction, and cultural processes. Cultural ecology was coined by Julian Steward in the 1930s and largely developed out of his work. Cultural ecology has mostly dealt

with non-industrial societies often pastoralists, hunter gatherers, fishing cultures and small scale cultivators (Prudham 2009, 128; Steward 1990, 30-31). Many veins of study fit into cultural ecology. The wide-ranging expertise of Karl Butzer, particularly his use of environmental archaeology pushed breadth of the approach (Butzer 1966, 501; Butzer 1983, 333-334). Billie Lee Turner as well argued the importance of the nature-society subfields, largely in non-western settings (Turner 1989, 91-92). Since the outgrowth of cultural ecology, from the work of Julian Steward and the Chicago School, and subsequent developments of political ecology and urban political ecology, the “ecologies” have helped bring a particularly environmentalist perspective to geography (Gregory et al. 2009, 128; Watts and Peet 2004,8; Heynen et al. 2006, 3).

The division of political ecology from cultural ecology developed out of a view that cultural ecology did not take seriously the importance of the workings of society and reasons for human behavior as objects of inquiry, instead focusing on material culture and livelihood (Brookfield 1964, 283-284). This work by Brookfield (1964) exhibits the desire to search for answers to current issues and to incorporate perception and behavior into geographic analysis. This is the shift from which political ecology emerges. Major work in political ecology began in the mid 1980s with the publication of Blaikie (1985) and Blaikie and Brookfield (1987) (Zimmer 2010, 343). In *The Political Economy of Soil Erosion in Developing Countries* (Blaikie 1985) Piers Blaikie discusses how land use conflicts have turned soil erosion into a political-economic issue, but how because soil erosion occurs in many parts of the world it is “frequently disentangled from its political-economic context (Blaikie 1985, 2). As the state becomes involved in the mediation and decision making process in resolving land and environmental use conflicts it has an increasing role in its impact on the environment (Blaikie 1985 2-3). In *Land Degradation and Society* (Blaikie and Brookfield 1987), Blaikie and Brookfield go further,

saying that a major reason for the lack of progress in solving land degradation issues is the failure of scholars to discuss the issues that seemingly underlie all of their work. The main issues that the authors saw in the literature included; the environment seen only as a passive background element as opposed to an active participant and the frequent bemoaning of lack of political will, but no analysis or theorization to explain the inability of the state to effectively intervene (Blaikie and Brookfield 1987, xviii-xix). Political ecology also, later emerged as an approach to critically study the metabolism between nature and society, typically in rural settings (Robbins 2004, 14-15). This metabolism can be understood as the “process that is energized through the fusion of the physical properties and creative capacities of humans with those of non-humans” (Swyngedouw 2006, 24), this is influenced by Marx’s view of labour which Marx describes as “a process between man and nature, a process by which man, through his own actions, mediates, regulates, and controls the metabolism between himself and nature” (Marx 1867 [1971], 283). Political ecology began to deal with resource issues in terms of political involvement as well as exploitation, on a variety of scales (Watts and Peet 2004, 3-4; Zimmerer and Bassett 2003, 1-2). Urban political ecology links particular analysis of urban environmental problems to overarching socio-ecological solutions owing much of its foundational thought to radical and critical geographies and social theories (Keil 2003, 724). Urban geography often keeps nature and society (read urban society) conceptually separate while political ecology focuses primarily on rural agrarian issues of marginalization (Watts and Peet 2004, 7). Despite its rural focus, political ecology is important as a precursor to urban political ecology.

Political ecology is also important in recent scholarship throughout radical and “new” geographies, as it relates to access and control of resources (defined broadly) and politics of scale, particularly local-global relations (Watts and Peet 2004, 4). In addition, political ecology

contributes heavily to the use of Marxist and critical social theory in all areas of the ecologies including urban. Urban political ecology views the urban and nature as related and connected, recognizing the relationship of social, political, and environmental processes within the urban (Keil 2003, 725-726; Heynen et al. 2006, 4-5). This approach challenges the idea that the urban is outside of nature as Jane Jacobs' writing illustrates through her contention that "the cities of human beings are as natural . . . as are the colonies of prairie dogs" (Jacobs 1992 [1961], 443-444) or Harvey arguing that there is nothing intrinsically unnatural about New York City (Harvey 1996, 186). This is especially true as we try and differentiate pristine nature from "new" or socio-environmentally reproduced nature (Heynen et al. 2006, 6, 8, 10). Attempting to separate types of nature, which are seen clearly distinct, is where separating nature from anything including society fall apart. Nature can be seen as a historical-geographical process that leads to what is now known as hybrid, in an acknowledgement that the socio-natural cannot be separated. (Smith 1996, 35; Swyngedouw 2003b, 95-96). As political ecology looks at the metabolism between nature and society so does urban political ecology, linking urban environments to global processes such as capitalism. Erik Swyngedouw defines this metabolism as the:

Transformation of social and physical nature characterized by a fundamental social division between those owning the means of production (capitalists), and those only owning their labor which they need to sell as labor force to capitalists in order to secure their own short- and medium-term survival (Swyngedouw 2003a, 44).

For instance "water circulation is part and parcel to the political economy of power that gives structure and coherence to the urban fabric" (Swyngedouw 2004a, 2). Examples such as "the "making" of "Dolly," the sheep, the outbreak of mad cow disease, the buildup of CO₂ in the atmosphere and the depletion of ozone . . . all suggest how nature and society are constituted as networks of interwoven processes" (Swyngedouw 2004b, 129). This is especially important as it

links humans and nature both in local-global relations and local socio-economic relations. The concept of metabolism helps to understand the circulations and connections within the network and networks that make up the city and its elements (Swyngedouw 2004a, 1-2; Swyngedouw 2006, 22).

Urbanization can indeed be viewed as a process of contiguous de-territorialization and re-territorialization through metabolic circulatory flows, organized through social and physical conduits or networks of “metabolic vehicles” (Swyngedouw 2006, 22)

The understanding of these networks, their organization, and their formation can be aided by the use of actor-network theory, which provides an avenue through which the elements and actors involved in the production of the urban political ecology of a city or portion of a city’s environment can be organized and analyzed.

1.7 Actor Network Theory

Actor Network Theory (ANT) emerged out of work done in Science and Technology Studies in the 1980s. ANT looks at the world as a series of associations of elements, called actors. These actors come together to form networks, hybrid associations of human and non-human actors. An element of ANT that makes it applicable and useful to this study is the way in which ANT allows for the importance of non-human actors to be included in the network. Other theories or approaches to organizing the world or its elements do not necessarily, though they may, exclude non-human actors, but ANT is clearer in its acknowledgement of agency of non-human actors. In *Reassembling the Social*, Bruno Latour describes ANT as ‘a sociology of association’ as opposed to ‘a sociology of the social’ (Latour 2005, 9). This is an appropriate description and supported by John Law, another theorist of ANT, who notes that important

characteristics of ANT include the affording of agency to non-human actors, as it is clear that non-human actors impact networks. In concert with the agency of non-humans it is important to understand that agency is distributed to all actors of the network, and that the agency of the network is a result of the relationships within the network. In other words actor networks produce outcomes, not subjects and objects (Law 1994, 100-104). This relational understanding of networks and outcomes is derived from the post-structural philosophies of Michel Foucault and Gilles Deleuze (Deleuze 1994 [1968]; Foucault 1995 [1975]; Foucault 2008 [2004]).

Several important works brought ANT into contact with the studies of cities, and emerged just after the new millennium. These works dealt with the active role of non-humans in assembling the urban. Many of these works focused on the technical aspects and processes of the city, though the environment played a role. These works took pains to clarify or strengthen the definition of the network and what it can do. Amin and Thrift focus on describing the network not as a fixed set of nodes, but as a set of often tenuous fluid-like flows:

While these networks are clearly attempts to stabilize and pin down certain issues, ground the world by providing new worlds, they also contain within themselves – or through interaction with other networks, or both – the potentiality to become something else. Each network may diverge, or fold, on to others. (Amin and Thrift 2002, 29).

Graham and Mervin focused extensively on the various technical and infrastructural networks of the city helping to imbed the methods of ANT into urban networks (Graham and Marvin 2001). As I mentioned, since ANT comes out of Science and Technology Studies, much of its early literature focuses on the recruitment of technology into actor networks. Similarly, when actor network theorists began to import network understanding into the study of the urban it often focused on technological non-human actors. Non-human actors from the physical environment were introduced through the idea with cyborg urbanization, which imagines the city as an

organism (Graham and Marvin 2001, 184). The idea of cyborg was originally blended human-technological network, but the idea of the organism helped inspire the introduction of living, but non-human actors (Haraway 1991, 11; Farias 2010, 5). Work on cyborg cities and hybrid socationatures by Gandy, Swyngedouw, Heynen and others draws on elements of ANT, but is more generally associated with the previously mentioned urban political ecology (Gandy 2005; Swyngedouw 1997; Swyngedouw and Heynen 2003).

Actor Network Theory is important and useful to my study because it allows me to construct the relational networks that lead to certain outcomes or events. With ANT, I am able to analyze the human and non-human actors that form the network that caused various historical changes to the urban political ecology of the Chicago River as well as how various actors are currently constructing the network of the Chicago River and how that network is producing a particular social response which in turn acts upon the network resulting in continuous reproduction of the Chicago River and influencing of related actors. ANT's understanding of a continuous dynamic process of production and reproduction of networks as a result of the relationships between actors that are ever changing allow me as a researcher to view the current network production in context of various historical-political-social-economic issues while also seeing what actors were involved at particular points in history, how their relationships changes, and how actors were added and deleted from the network throughout history to contribute to the current context of the existing network.

1.8 Chicago and Chicago River History

Although literature on the Chicago River is limited, several texts do exist that discuss the history of the river and the environmental issues pertaining to it. These texts primarily argue that the natural environment of Chicago, and its region, is the reason for its existence. Without the river Chicago, would not be the city it is today (Hill 2000, 5). Yet, it is a river of contradictions, flowing past skyscrapers, manufacturing plants, markets, back yards, sending sewage south. The river is no longer as integral a part of Chicago's the industrial and commercial power it once was, and as its importance to these elements declined as various entities created plans to make the river an amenity. In ongoing attempts to create that amenity the river has been undergoing water quality improvements and has been the subject of many plans and proposals since the 1970s (Genzen 2007, 75; Hansen 1942, 7). The river has been the subject of change throughout its history from a link to the Mississippi through the Chicago Portage, and later canals, to its reversal in 1900, to various attempts to cleanse it, to the contemporary issues of Asian Carp (Platt 2005, 78, 136, 340; Stokstad 2003, 157). The river is discussed tangentially in this respect in literature dealing with Lake Michigan and the Port of Chicago (Hartshorne 1924; Hartshorne 1926; Mayer 1955). The river, just as the city, is dynamic "not static, but ever changing and ever fascinating: a living presence." (Solzman 2006, 259).

I also investigated the literature on Chicago's history, the history of the Chicago River, and other sources on Chicago and its relationship to the environment. This was necessary in order to understand the historico-spatial context within which Chicago is currently situated, as well as to analyze previous networks that produced and reproduced the Chicago River and its urban political ecology.

The major works at which I looked dealing specifically with the Chicago River were *The Chicago River: A Natural and Unnatural History* (2005) by Libby Hill and *The Chicago River: An Illustrated History and Guide to the River and Its Waterways, Second Edition* (2006), by David Solzman. The first book is the only thorough treatment of the history of the Chicago River, and helps to contextualize the overall history of the Chicago River. This was particularly useful for early to mid twentieth century history of the Chicago River, which often gets lost in the shuffle in writing on the Chicago River because the river began to decline in industrial importance that it held in the nineteenth century (Hill 2000, 199-200). The book by Solzman also provides an excellent overview, focusing on specific waterways and their development or changes to them. He takes an approach of describing each segment of the Chicago River as well as the waterways that have been added to the system, channels and canals (Solzman 2006, 25, 44-46). This work is not as in depth as Hill's work, but this book was written much more as a guide to the waterways as opposed to a history.

Works that dealt more with early Chicago History that contributed to the construction and analysis of the Chicago River in the 19th century were the three volumes written by A.T. Andreas, *Chicago History: From the Earliest Period to the Present Time*, volumes one through three (1884, 1885, 1886). These works published between 1884 and 1886 provide insight into the early industrial history of Chicago, although they focus mainly on significant citizens as well as lengthy tables, there are excellent accounts of early history and help to understand the feeling of the city at the time particularly the excitement of the citizens at certain actions (Andreas 1884 [1975]; Andreas 1885 [1975]; Andreas 1886 [1975]). In addition to Andreas' work the work of Bessie Louise Pierce (1937, 1940) is also important to this early understanding of the history of

Chicago from 1673, when Marquette and Jolliet passed through the area, to 1871 when the Great Chicago Fire occurred (Pierce 1937; Pierce 1940).

More recent works that cover broad swaths of Chicago History have been helpful in placing events in historical context that was unforeseen at the writing of earlier works. *Chicago: A Biography* (2009) by Dominic Pacyga works to tell a personal story of the city of which the river plays an important role. In particular Pacyga discusses the poor decisions made in regards to the environment of Chicago and the subsequent alterations made to the environment to compensate. Also Irving Cutler's (2006) fourth edition of *Chicago: Metropolis of the Mid-Continent*, which also goes in depth into the development of early industrial Chicago and the important role the river, played in both the industrial growth and public health concerns of the city. Other more recent works that look at a particular portion of Chicago history as well as dealing with the river include *Chicago Made: Factory Networks in the Industrial Metropolis* (Lewis 2008) and *Shock Cities: The Environmental Transformation and Reform of Manchester and Chicago* (Platt 2005). *Chicago Made* explores industrial and manufacturing districts in Chicago from 1860 to 1940, many of which impacted the river. *Shock Cities* looks at the industrialization of Chicago and the impact of industrialization on health and the environment, followed by the reform that these impacts lead to. Harold Mayer's work, best exemplified by *Chicago: Growth of a Metropolis* (1969), written with Richard Wade. This work discusses the change in the form of the city of Chicago, and how industrial and economic transitions in the Chicago area influenced population changes and movements. In addition, works on Chicago sanitation and waste disposal by Louis Cain (1972, 1974, 1978) and Craig Colten (1994) exhibit the relationships of industrial urban growth to health problems and solutions and how these issues impact the geography, economy, and ecology of Chicago. All of these works on the

geography, history, ecology, and economics of Chicago helped me to understand the historic-spatial picture and processes that continually reproduced the Chicago River and its urban political ecology.

1.9 Methodology

The methodology for this study included qualitative and quantitative methods. The study however largely relied on qualitative methods, particularly ethnographic techniques such as interviews and surveys. Recent cultural and postmodernist critical urban geography has been critiqued for its failure of a methodological foundation (Lees 2003, 109). Because of this, I used what Lees calls legitimate empirical ethnography as understood in a social science perspective (Lees 2003, 111). Ethnography is important to my study because of its usefulness in gaining insight into the social and political processes that are so prevalent in the understanding of the production of space (Herbert 2000, 550). The ethnographic approach is useful in shorter-term studies, and informs the utilization of ethnographic teachings and their importance to this study. This is achievable by interpreting, both what people say in the interview process and what they do during an interview and what they do daily in their ‘lived’ space (Eyles 1988, 125). Additionally, it is important to understand that the researcher’s own involvement is part of the ethnographic process (Tedlock 2000, 465). I primarily utilized structured interviews with minimal open ended questions to identify how people perceive action and control of the river and those who act upon it. I also inquired into how the river and associated processes act in part to define the neighborhoods I am studying. In addition to the view of these things through the social lens, I engaged with political aspects of river processes (the vision of the Mayor’s Office,

responsibilities of city departments, actions of other government agencies at a variety of scales), as well as economic aspects (tour guides, recreation guides, commercial entities). In order to accomplish the gathering of this information in an efficient way, I utilized condominium associations, building managers, business owners and operators, and consolidated user groups (kayakers, fisherman, marina ticker holder, business associations, community organizations) to gather a diverse range of interviewees for the interview process. Qualitatively, I also utilized phenomenological research in an attempt to identify the process and relationship of human experience with the river in differing locations (Creswell 2003, 15).

In the development of my study, especially as it pertains to historical geography of the river itself and the neighborhoods of study, I utilized the extensive archival resources of Chicago. Particularly, I sought information, through city council minutes, government reports, and newspaper articles as well as historical texts on Chicago to garner an understanding of the politico-socio-spatial developments and shifts along the river as influenced by various events relating to the river and the networks that produced the outcomes. The main archives I utilized included the Chicago History Museum, The Chicago Public Library: Special Collections, the Illinois Regional Archives Depository at Northern Illinois University, and the University of Chicago Library particularly the Regenstein Library and Map Collection.

This thesis seeks to contribute an approach to understanding connections between environmental perception and the ability of urban residents to exert control on the network that produces the urban political ecology of their environment. This approach utilizes the current reproduction of the historic-spatial process to analyze the role of residents in the network. Additionally, I hope to contribute to the understanding of how actors can participate in urban networks through my analysis of the various actors in the urban political ecology of the Chicago

River. This understanding can contribute to geographic scholarship on urban environments as well as social and environmental justice by recognizing disparities between communities within the same urban area, and observing the control they exert on producing their environment. In addition, there is potential to analyze the possibilities for shifting the relations of power that create the injustice. Furthermore, policy can benefit from understandings how particular actors influence a given network.

2. History of the Chicago River: Exploration to the Great Depression

A number of scholars call the Chicago River the most important geographic element to Chicago's existence, and even the reason for the city's existence (Cronon 1991, 32-33; Cutler 2006, 12, 24; Hill 2000, 13; Pacyga 2009, 16; Solzman 2006, 5, 25). While its presence on the southwestern shore of Lake Michigan provided the opportunity and potential for a port metropolis to arise, it is the myriad of changes enacted by a variety of entities that allowed Chicago to rapidly develop economically, and become the city it is today. These changes, however, also drastically impacted the environment and ecology of the Chicago River resulting in environmental and health issues as well as many reproduction of the urban political ecology of the Chicago River. This chapter illustrates the importance of the Chicago River to Chicago and how the river has been produced and reproduced over time by a number of entities creating a series of dynamic networks that at any particular moment in time produce the Chicago River and influence the perception of it.

Before we can understand the changes that have occurred to produce the Chicago River we must first understand a number of important elements of the history and geography of the Chicago River so we can contextualize the various dynamic situations in which the Chicago River is produced. This contextualization is aided by using approaches that have been used to analyze recent developments with the Chicago River and other environmental entities and applying them to historical reproduction of the city and the river. These approaches include urban political ecology and actor network theory that recognize the relationship of society, politics, and the environment, allowing the understanding of hybrid networks in which a number of actors participate in the production or reproduction of a space or entity (Heynen, Kaika, and

Swyngedouw 2006, 2; Latour 1993, 3; Farias 2010, 114). Each event discussed is related to its own unique network, there are actions and actors that intervene in and between each process to help produce the condition in which each event can constitute a network that results in a new reproduction of the Chicago River. While each event and the conditions they help to produce are related to subsequent events, each event or reproduction can be understood as a unique network formation for the purposes of understanding the processes and actors involved. The major phases, events or reproductions of the Chicago River between pre-European contact and the Great Depression include European exploration, the increasing involvement of the United States government, the promotion and boosterism of early Chicago, the construction of the Illinois and Michigan Canal, improvement to the Chicago Harbor, the increase in shipping and Chicago River traffic, the introduction of railroads and their alteration of the landscape, the construction and growth of the Union Stock Yards, the concerns of a growing city about public health and water quality, the construction of the Chicago Sanitary and Ship Canal, and the new attitude toward the river following the construction of the Chicago Sanitary and Ship Canal.

2.1 Physical Geography

The structure of the Chicago River has changed over time. Prior to the transformations of the Chicago River following settlement and industrialization the Chicago River consisted of what we today called the Main Branch, the North Branch and the South Branch. The Skokie River, the Middle Fork and the West Fork fed the North Branch of the Chicago River. The South Fork and West Fork, no to be confused with the West Fork the fed the North Branch, fed the south Branch of the Chicago River. In addition the South Fork had a South Arm an East Arm, and a West Arm

(Hill 2000, 32-37; Solzman 2006, 16, 22). Today the West Fork of the South Branch and all the arms of the South Fork of the South Branch no longer exist, filled in over the course of time. The East Arm was also known as the Stockyard Slip was filled in over the course of the early 1920s. The West Arm was declared non-navigable in 1923 and subsequently filled. Filling these arms ultimately shortened the length of the South Fork and today it does not extend past Pershing Road (Hill 2000, 213). The West Fork of the South Branch managed to survive the massive construction projects of the Illinois and Michigan Canal and the Chicago Sanitary and Ship Canal, but by 1921 the city and the sanitary district had no use for it. The western end was declared non-navigable in 1923, and the eastern end in 1935. The city filled it in 1938 (Hill 2000, 214-215). In addition to eliminating portions of the river, waterways have been connected to the river over time. In 1848 the Illinois and Michigan Canal was completed, connecting the South Branch of the Chicago River to the Illinois River, creating a link from the Great Lakes to the Mississippi. In 1900 the Chicago Sanitary and Ship Canal essentially replaced the Illinois and Michigan Canal, connecting the South Branch of the Chicago River to the Des Plaines River which flows into the Illinois River which connects to the Mississippi River. Other additions include the North Branch Canal, completed in 1857, and the North Shore Channel, built between 1907 and 1910 (Hill 2000, 86, 139; Solzman 2006, 23, 42, 43-44, 104)

Chicago's location has always been uniquely influenced by its geography, both physical and areal. Chicago lies near a sub-continental divide which separates the basins that drain to the Mississippi River and the Great Lakes. This divide put Chicago in an advantageous economic position as a potential site to connect those basins and create a route, following the completion of the Erie Canal, from New York City to New Orleans (Cronon 1991, 3; Masters 1933, 69). In addition, the southwestern shore of Lake Michigan where Chicago lies had been a marshy

prairie. Chicago remained marshy until it began to create problems with a rapidly growing population, which resulted in alterations to the landscape (Solzman 2006, 21-22; Hill 2000, 11). The average rainfall in Chicago in January is two and one tenth inches and four inches in July. The average high and low in January are thirty-two and nineteen degrees Fahrenheit respectively, in July the average high and low are eighty-five and sixty-seven degrees Fahrenheit. Years with heavier rainfall often caused problems early in Chicago's history before much of the marshy land had been drained or filled, occasionally resulting in flooding in the summer or dangerous ice flows in winter. In addition, years with low rain and hot summers resulted in a putrid smelling river as its minimal flow was unable to adequately dispose of wastes dumped into the river. Chicago's location and condition have been extremely influential in the development of the city. However, perhaps the most important feature of Chicago's geography is the Chicago River itself (Figure 2). The Chicago River is the major landscape reason for the particular siting of Chicago. It is why a connection between the two drainage basins was conceived and a major part of why it was possible. The Chicago River was the reason the first non-Native Americans entered the area, and development clustered along it from the first homestead to well into its growth as an industrial metropolis (Cronon1991, 23-25; Cutler 2006, 12).

As this area began to draw more settlers, these settlers began to alter the Chicago River in a number of ways in an effort to accomplish and facilitate various economic purposes (Cutler 2006, 12-13; Solzman 2006, 30). As these alterations combined with other processes of a growing industrial city began to cause environmental and health problems, additional alterations were made to the Chicago River in an attempt to solve these problems. These changes and others were strongly aided by political entities at the local, state, and federal levels (Pacyga 2009, 44; Hill 2000, 125; Solzman 2006, 48).



Fig. 2

Map of Chicago Area Waterway System.
 Courtesy of American Rivers.

2.2 European Exploration

In 1673, the French explorers, Father Jacques Marquette and Louis Jolliet, along with their crews were the first non-Native Americans to pass through the area that would become Chicago (The name Chicago actually comes from the Pottawattamie name for the wild onions that were gathered in the marshy prairie, *checagou* (Cutler 2006, 12, 21; Pacyga 2009, 8). They were returning from exploring the Mississippi River and natives, in what is today Arkansas, advised them that heading north up the Illinois River to the Des Plaines River and then portaging to the Chicago River would be a short cut back to Lake Michigan and the fort at Green Bay (Cutler 2006, 21; Hill 2000, 13; Solzman 2006, 46; Andreas 43 1975 [1884]; Pierce 1937, 6-7; Pacyga 2009, 10). Marquette and Joliet reached Arkansas on their expedition in search of the Northwest Passage. They turned around as it became late in the season and they were concerned about entering Spanish territory. When they neared the Chicago region they encountered Miami natives who lead them through the portage and to the Chicago River (Hill 200, 50, 52; Pierce 1937, 7). Not many details are known of the complete journey by Marquette and Joliet because their journals were lost when their canoes capsized on the return journey (Hill 2000, 54; Pacyga 2009, 10). However, in an interview with Father Claude Dablon, Joliet revealed shrewd analysis that a canal could replace the portage and provide an important strategic advantage for France, saying

a very great and considerable advantage and one which it will perhaps be difficult to believe; it is that we should be able to go easily by ship to Florida, by means of a very good waterway. There would be only one canal to make and that by cutting through only one-half a league of prairie to enter from the lower part of Lake Illinois [Lake Michigan] into the river St. Louis [Des Plaines River]¹ (Jolliet 2012, 1).

¹ there are differing interpretations of which river the river St. Louis refers to, either the Mississippi or the Illinois including the Des Plaines. Based on the description of distance in the

This canal would not come to fruition until more than a century and a half later, but its potential and eventual construction were integral in the early development and history of Chicago.

After Marquette and Joliet, use of the portage steadily increased. This was primarily due to the fur trade. In 1763, control over the Chicago area transferred from the French to the British following the defeat of French and Native American allies in the French and Indian War. The British however failed to gain control west of Detroit, or south of Mackinac, Michigan. Even after the land passed to the United States following the Revolutionary War the Potawatomi continued to control the Illinois Territory and the Chicago portage (Cutler 2006, 21-22; Hill 2000, 55; Pacyga 2009, 11). Despite increased use of the portage and the passing of control to new governments the first permanent settler in the area did not arrive until the late 1770s or early 1780s, when Jean Baptiste Pointe du Sable, a free man of color, believed to have been born in Haiti to a French sea captain and an ex-slave, built a cabin and traded with Native Americans and French fur traders in the area. Prior to du Sable, Native Americans hunted, fished, and gathered in the marshy area that became Chicago, but never settled directly on the banks of the Chicago River (Cutler 2006, 21; Pacyga 2009, 12).

2.3 United States Involvement

The signing of the Treaty of Greenville in 1795 ended the Battle of Fallen Timbers, and secured a six mile by six mile square at the mouth of the Chicago River and another area at the

text I am inclined to believe it refers to the Illinois including the Des Plaines since that is the actual body that one would arrive at and the French new that this was a tributary of the Mississippi, quote is taken from notes of an interview done by Father Claude Dablon with Joliet, translation of the French interview notes

mouth of the Illinois River where it meets the Mississippi River. This gave the United States control over the ends of a potential canal, and showed that the new country was serious in their western movement and the creation of a canal. In addition to granting parcels to the United States, the treaty also required Native Americans in the region to allow United States citizens passage and use of harbors and mouth of rivers without charge, including those adjacent to tribal lands (Hill 2000, 55; Pacyga 2009; 12).

The Louisiana Purchase, made in 1803 by Thomas Jefferson, roughly doubled the size of the United States, and increased the strategic importance of a potential canal route. The US government constructed Fort Dearborn in 1803 at the mouth of the Chicago River, opposite du Sable's house, to bring a US presence to the area to show the British and local natives that the US was intent on enforcing its control (Hill 2000, 55; Pacyga 2009, 13; Cutler 2006; 21-22). The Chicago area, however, remained lightly settled. In 1805, as American interests began to encroach on his trading business, du Sable moved to Missouri and sold his house and property to John Kinzie, an early community leader and businessman (Pacyga 2009, 13; Cutler 2006, 22, 403). The American Fur Company who traded with native and French trappers as du Sable had was the primary economic presence in the area. In 1812, Winnebago natives attacked Fort Dearborn, burning the fort to the ground and killing soldiers and civilians as they fled. This caused the few settlers who were in the area to abandon it. The site would remain uninhabited until 1816 when the US government rebuilt Fort Dearborn and encouraged the area's settlement. Also in 1816, the US signed another treaty, the Treaty of St. Louis, transferring control of a ten mile wide strip of land extending the length of the supposed route of the canal from native tribes to the United States, the boundary became known as the Indian boundary lines (Hill 2000, 55; Cutler 2006, 404; Pacyga 2009, 16). However, even with these developments, the area that

would become Chicago remained sparsely populated until the government surveys created land plots, and treaties forced the remaining natives west of the Mississippi River (Andreas 1975 [1884], 174; Cronon 1991, 25; Cutler 2006, 22-23; Hill 2000, 57; Holland 2005, 50-52; Pacyga 2009, 16; Pierce 1937, 46).

Many natives found this and other treaties to be unacceptable and refused to honor them. Chief Black Hawk of the Sauk tribe in Wisconsin led a group of Sauk and Fox warriors in a series of skirmishes and battles with the US military from 1831-1832. This became known as the Black Hawk War (Andreas 1875 [1884], 266-268; Cronon 1991, 27; Cutler 2006, 23; Hill 2000, 56; Pacyga 2009, 16; Pierce 1937, 36-37). The US military defeated the natives at the Battle of Bad Axe River on August 2, 1832, ending the fighting, although officially the war ended with the signing of the Treaty of Prairie de Chien later in 1832 (Cronon 1991, 29; Hill 2000, 56). This treaty, in addition to ending the war also required all natives to leave Illinois. Some exceptions to this eviction were “friendlies”, mainly Potawatomie, and those of mixed European and Native American heritage, who were allowed to stay, with some even receiving land grants. A series of ceremonies in Chicago in September of 1833 marked the removal of the final tribes from the area. A council of natives was present to sign the treaty that would send them west of the Mississippi River, and drastically alter the future of the Chicago region (Cronon 1991, 28; Pierce 1937, 37). This set the stage for an increasing number of actors to become involved in the various networks that produce the numerous reproduction of the urban political ecology of the Chicago River, of which the most significant will be discussed below.

2.4 Canal Dreams and Early Chicago

The dream of the canal had been alive since Joliet spoke with Father Dablon in 1674. The canal and its potential was closely linked to the Chicago River and the reproduction of Chicago area waterways to include the canal would drastically alter the environment and network of the Chicago River. In 1830 prior to the Black Hawk War, plans for the canal were moving forward with the surveyor James Thompson platting the towns of Chicago and Ottawa at the eastern and western points of the potential canal route (Hill 2000, 57; Holland 2005, 52; Solzman 2006, 48). Various entities and boosters promoted the construction of the canal, and Chicago as a potential economic center (Cronon 1991, 33; Niles 1814, 1). A proposal was put before Congress in 1808 and again in 1814 following President Madison's request for construction of the canal to allow for the passage of warships. Differing views of the federal government's involvement in funding public works resulted in the rejection of both requests. The treaty with Native Americans in 1816, creating the Indian boundary lines, allowed engineers and surveyors, headed by Major Stephen H Long of the War Department, to analyze land for a potential canal route (Hill 2000, 63; Solzman 2006, 48). John Walls surveyed the future site of Chicago in 1821 and William Rector platted the site in 1822; this plat shows land parcels owned by the previously formed Illinois and Michigan Canal Commission (Holland 2005, 51). Despite all the activity related to a potential canal, its construction only came to be approved by Congress in 1827. It was at this time Congress granted the State of Illinois alternating sections of land along the five mile wide strip on either side of the proposed canal route. The proposed canal also influenced the shape of present day Illinois and Wisconsin. The boundary line between the states used to extend from the southern tip of Lake Michigan, but was moved 50 miles north when Illinois gained statehood in

1818 in order to keep the potential canal within one state. This movement of the boundary line also put Chicago in Illinois as opposed to Wisconsin (Hill 2000, 63). The Rector Survey laid out plots of land designating a number of plots as canal land. The potential of the canal and the land survey began to draw settlers and increased land sales until 1830 when James Thompson's survey officially fixed the location of Chicago and created land lots (Solzman 2006, 48). The Thompson plat coupled with the treaty in 1833, which forced the remaining Native Americans west of the Mississippi River, cleared the way for increased settlement, and allowed Chicago to be officially incorporated as a town (Cronon 1991, 28; Pierce 1937, 37).

In 1833, when the town was incorporated, Chicago measured only three-eighths of a square mile in area around the main branch of the Chicago River (Cutler 2006, 23). With land officially divided, the certainty of impending canal construction, and the removal of the Native Americans, Chicago was primed for growth and investment. This, combined with the canal commissioners' commencement of selling canal land to raise money for the canal, kicked off massive land speculation in the mid 1830s bringing huge investment to the area (Cronon 1991, 33; Hill 2000, 64; Pacyga 2009, 19). Once someone purchased the land they either opened a business or more likely they resold the land. There are many stories of people who earned their fortunes overnight through land speculation and inflating land prices. This is illustrated by, anecdotal accounts such as Harriet Martineau's, describing how much the canal commission itself was able to sell lots for; \$100 in 1832, \$3,500 in early 1834 and \$15,000 in mid 1836. Speculation ran so rampant that some reported making huge profits in a single day including buying lots for \$200 in the morning and selling the lots for over \$3,000 before nightfall (Martineau 1837, 260-261; Cronon 1991, 26, 29). Speculation was halted abruptly by the financial Panic of 1837.

The Panic of 1837 also caused an indefinite delay of canal construction, which had begun in 1836 (Solzman 2006, 48). The story of the Illinois and Michigan Canal is necessary in understanding the political and economic importance of the Chicago River, while remembering that the existence of the Chicago River gave life to Chicago, the canal, and the prosperity to come. The potential canal brought massive economic and political interest that was destined to change the area and the region, which still maintained a relatively low population. This is illustrated through a variety of activities including congress appropriating \$25,000 for harbor improvements in 1833 (Solzman 2006, 31-32; Hill 2000, 69). These harbor improvements would be necessary once the canal was completed to deal with the increase in shipping. These alterations all participated in the reproduction of the Chicago River and introduced more actors to the network that produced the Chicago River.

2.5 Illinois and Michigan Canal

The canal was seen as a necessary step and alteration to take advantage of what Chicago boosters called the natural advantages of the area. The city and boosters wanted to economically capitalize on the proximity of Chicago to the Great Lakes and the Mississippi River Valley and turn Chicago into the dominant mid-continent economic metropolis.

The original estimate for construction of the canal was \$640,000-\$700,000 in 1823-1824, to build a canal that could accommodate 13.5 foot wide boats. By the time that the Illinois legislature decided on a route for the canal a new estimate of \$4 million for construction shocked all involved. The reason for the dramatic rise in cost was an element of the canal design called the "deep cut" which would carve a 30 mile long canal through very tough glacial clay and

limestone bedrock. The unexpected difficulty of the proposed project is what made the cost of construction estimate so much higher (Hill 2000, 65). The plan to use explosives to blast through the limestone almost priced the canal into failure. The state put canal plans on hold while they investigated other routes and a possible railroad. Ultimately the state chose to stay with the original canal route and actually expanded the size. In January 1836 the Illinois legislature authorized the issuance of bonds, which became even more important as cost estimates rose to \$8.6 million (Hill 2000, 66; Solzman 2006, 48).

The major actors in the process and network of planning and gaining approval for the canal were primarily; the US government, the Illinois government, the Board of Canal Commissioners, and influential businessmen in Chicago. The US government gave the land on which the canal was ultimately dug or provided funds for the canal by allowing the canal commission to sell the plots they were granted. The Illinois government was heavily involved in the project because of the Federal government's unwillingness to directly fund local projects. The Board of Canal Commissioners was a body appointed by the state, but most were Chicago businessmen and boosters whose own economic interests would be served by the canal. It was largely by the efforts of the commissioners that the canal was constructed. Their desire to bring economic success to Chicago for themselves and the city as a whole was a driving factor in their dogged efforts to raise money to complete the canal despite numerous financial difficulties (Hill 2000, 63; Solzman 2006, 48).

Construction finally began on July 4, 1836 to great excitement, with many Chicago residents traveling south to what was then Canal-Port across the Chicago River from Bridgeport (Cronon 1991, 64; Hill 2000, 66; Pacyga 2009, 24; Solzman 2006, 48). The canal hit a stumbling block in 1837 with a nationwide financial panic drastically slowing construction for several years

(Cronon 1991, 64; Pierce 1937, 70; Solzman 2006, 48). In 1841 canal construction halted due to a shortage of money and leading to a period of fierce fund raising. Canal promoters in Chicago were able to raise money from investors in the eastern US as well as Europe to continue canal construction in 1845 (Cronon 1991, 64). These loans, however, required the canal design to be altered to make it less expensive, resulting in a shallower cut canal (Hill 2000, 66). Since the new shallow cut plan would not draw the previously anticipated amount of water from the Chicago River or the Des Plaines River, water would now have to be pumped into the canal from the South Branch of the Chicago River (Hill 2000, 66-67).

When the Illinois and Michigan Canal (I&M Canal) was finally completed in April, 1848 twelve years after construction had begun, it ran 97.24 miles from Bridgeport, then south of Chicago, to LaSalle-Peru, Illinois at a wide spot on the Illinois River. The reason for the length of the canal was to bypass not only the Chicago portage, but also low water levels and rapids in the waterways between Chicago and LaSalle-Peru (Andreas 1884 [1975], 171-172; Hill 2000, 67; Solzman 2006, 48). Locks were also an integral part in the canal since the land drops 141.3 feet from one end of the canal to the other. Fifteen locks controlled water levels allowing vessels to manage the height difference between Lockport and LaSalle-Peru (Hill 2000, 67; I&M Canal 2012, 1). This technology was instrumental in the ability to construct the canal. Overall, the technology used to construct the I&M Canal was not particularly cutting edge. The I&M Canal was built near the end of the canal building boom, and much of the canal was dug by hand (Solzman 2006, 48).

The canal commission dug a 16.8 mile long feeder canal from the Calumet River, south of Chicago, to the Bridgeport end of the I&M Canal, to supply water to the main canal. In addition, the commission built a pumping plant at Bridgeport containing two pumps utilizing 160

horsepower steam engines, pumping 7,000 cubic feet of water per minute (Hill 2000, 67-68; Solzman 2006, 48). This shallow cut design did not draw water from Lake Michigan, but when the pumps at Bridgeport were running it was reported that the Chicago River actually ran east to west. These pumps when running drew about 250 cubic feet of water per second from the Lake, though the shallow cut design did not permanently reverse the flow of the Chicago River (Hill 2000, 68). The need for the feeder canal and pumps were a result of technological limitations as well as the high cost of using explosives and constructing the original deep cut plan.

As mentioned above, the I&M Canal is a product of a number of actors. The most significant of these actors are the Chicago River, the Canal Commission, the State of Illinois, the Federal Government, and the City of Chicago. All of these entities came together to produce a new urban political ecology or a new element of the urban political ecology. This particular case is interesting because it is not just an alteration of an existing element of the urban environment, but it is the creation of an element that did not previously exist. (One could argue that any alteration “creates” or “reproduces” a new version of any particular element. This situation, however, is the creation of a 96 mile long body of water that had previously not existed).

The canal when constructed and completed, however, was not yet a part of the city. The areas containing parts of the canal were annexed in 1863 and 1889 (Keating 2004, 53). However, the canal as a production, and the various elements involved, had a significant impact on the urban political ecology of Chicago. The canal created a connection between the Great Lakes and the Mississippi River, which altered the dynamic of Chicago. With the completion of the canal, traffic on the Chicago River increased dramatically. This traffic meant increased industry, employment, and population. As a result, the center that was created by the canal also influences the geography of new railroads which also began to concentrate around Chicago. With so many

goods already arriving in Chicago from the east and being barged throughout the interior of the continent it made sense for the railroads to concentrate at Chicago. Many goods produced in Chicago as well as grain from Chicago markets were shipped east via the Great Lakes contributing to Chicago's importance as a transportation and economic center (Cronon 1991, 68-70; Cutler 2006, 27). This served to further increase industry, employment, and population which increasingly put stress on the Chicago River. Shipping traffic on the river increased dramatically, and as the city rapidly grew the river was used as the city's unofficial and later official sewer. Industrial traffic as well as human and industrial waste resulted in significant environmental and public health issues and contributed to the reproductions of the urban political ecology of the Chicago River.

In addition to the construction of the Illinois and Michigan Canal at the western end of the Chicago River, important changes were getting underway at the Chicago Harbor at the eastern mouth of the Chicago River. These changes occurred in the neighborhoods involved in my study and were integral in the beginnings of the rich commercial history of the Chicago River.

2.6 Chicago Harbor Improvements

It is true that there is still another difficulty which this ditch (Illinois and Michigan Canal) one would make could not remedy, it is this: The Lake of the Illinois (Lake Michigan) always forms a sand bank at the entrance of the channel which leads to it. I doubt very much in spite of what anyone says (Joliet) whether this could be cleaned out or cleared away by the force of the current of the Chicago River when it was made to flow therein, since much greater currents in the same lake cannot do it.

- Robert de La Salle, 1682

(Knight and Zeuch 1928, 22-23; Hill 2000, 69)

The entrance to Lake Michigan. . . which is 80 yards wide, is obstructed by a sandbar about 70 yards broad. Where the bar was highest the water rarely exceeds two feet in depth. It would be easy to remove the bar. Piers might be sunk on both sides of the entrance, and the sand removed between them. Since the river and each of its branches for two or three miles inland have sufficient depth of water to admit vessels of almost any burden removing the sandbar. . . would provide a safe and commodious harbor for shipping.

- Major Stephen H. Long, 1813
(Larson 1979, 3; Hill 2000, 72).

Soldiers at Fort Dearborn, often frustrated by having to maneuver around the sandbar to get out into the lake, tried a number of times between 1816 and 1828 to cut through the sandbar (Hill 2000, 72). In the spring of 1828, soldiers from Fort Dearborn dug a channel through the sandbar that guarded the mouth of the river (Andreas 1974 [1884], 113; Hill 2000, 72-73). This channel was dug to the level of the river which then cut a channel of fifteen feet in depth. The channel, however, was almost immediately filled in by processes of lake hydrology (Hubbard 1969, 40; Hill 2000, 73). This sandbar which guarded the mouth of the Chicago River provided protection for small boats, as well as preventing shoreline erosion, by breaking the energy of lake waves. In fact, Fort Dearborn was built on the protected shore where the river formally curved south (Hill 2000, 69; Solzman 2006, 30). The sandbar, however, created more problems than anything else. Parts of the sandbar that remained under the surface of the water were a hazard for larger crafts, and sand generally made the harbor too shallow for those larger vessels. Also the shape of the river with the sandbar created problems in guiding boats into and out of the harbor and river. These types of formations called baymouth bars are extremely dynamic landforms making them unpredictable and with the goal of simplifying and creating a safer harbor necessitate its removal (Hill 2000, 70; Solzman 2006, 30). These physical features necessitated the mapping of Chicago's harbor by a federal surveyor in 1830. The surveyor proposed damming the original outlet and cutting a channel through the bar 1,000 feet north of the current outlet near where the river turned south. This plan became bundled with the canal and began to appear on

maps. Congress became convinced by apparent success of the canal commissioners that Chicago would expand rapidly necessitating harbor improvements. In March of 1833, Congress appropriated \$25,000 for the project (Andreas 1884 [1975], 234; Hill 2000, 73; Solzman 2006, 30).

Work began in the summer of 1833 and continued into 1834 under the direction of the War Department's Board of Engineers, the precursor to the Army Corps of Engineers. The sandbar was rechanneled by soldiers from Fort Dearborn and the United States War Department's federal dredging equipment, but not without some difficulty. The difficulties came both from the dynamic physical feature as well as the engineers inexperience with projects of this sort. The engineers constructed piers to create a new mouth of the river making the mouth more accessible to the large vessels shipping goods to Chicago. The southern pier was built out to 500 feet by the end of 1833. Work began on the north pier in August of 1834. By fall of 1835 the north pier extended 1,260 feet and the south pier 700 feet. These piers flanked a 200 foot wide channel which remained very shallow, between three and seven feet deep, insufficient for the increasing harbor traffic (Hill 2000, 73-74; Cutler 2006, 23; Solzman 2006, 30). By 1837, little of the sandbar remained and the channel reached a minimum of ten feet in depth.

The piers altered the way in which deposition of sediment occurred, both from the lake and river, and resulted in a buildup of beach on the north side of the new mouth (Holland 2005, 63-65; Solzman 2006, 30). In terms of constitutional responsibility this project in a similar way as the canal, dealt with who is responsible for internal, local improvements. Since harbors were important for military defense and foreign trade, they were considered to be in the jurisdiction of the federal government, however not all harbors drew interest for improvement from the federal government (Hill 2000, 69). As work continued on the piers, sand continued to accumulate to the

north, land to the south began to erode because the piers were capturing sand and starving the southern beach. However, in 1852 the Illinois Central Railroad inadvertently solved the problem by building a breakwater parallel to the shore. This land filled in following an agreement between the Illinois Central Railroad and the city in the 1870s allowing waste disposal to occur in the lagoon created by the construction of a wall along the breakwater and trestle (Figure 3) (Colten 1994, 128; Gale 1902, 304; Hill 2000, 76).

In 1835, over 200 ships arrived in Chicago's harbor. By 1869 13,000 ships utilized the harbor annually, the north pier extended to double its original length and the War Department engineers dredged the channel to fourteen feet. The beach and sandbar continued to extend eastward with the extension of the pier and the US Army Corps of Engineers developed a plan to construct a 4000 foot breakwater to limit sand build up and shield vessels from the largest lake waves. Construction began in 1870, with both the inner and outer portions of the breakwater complete by the late 1880s (Solzman 2006; 30; Pacyga 2009, 104).

In August 1846, President Polk vetoed Congress' River and Harbor Bill that contained needed money for Chicago's Harbor. Polk vetoed the bill because he felt it contained too much money for local improvement irrelevant to foreign trade. Chicago, as well as other northern and western cities, were infuriated by the veto, which they saw as influenced by Southern Congressmen, and wished to show a united displeasure with the other cities over the veto. In July 1847, representatives from eighteen states gathered at Chicago for the River and Harbor Convention. The meeting lasted three days with 20,000 visitors. The convention showed the federal government in Washington that it had a duty "to improve navigable rivers and harbors for the benefit of all commerce, and that the Atlantic coast had been allotted an unfair portion of the



Fig. 3

A Panoramic Map of Chicago in 1868.
Courtesy of the Chicago Historical Society.

money thus far expended on such improvements" (Gilbert, Bryson, Rice 1929, 91-92; Hill 2000, 76). Though the convention did not immediately manifest in an increase in federal funds, it did establish Chicago as a leader on the issue of inland rivers and harbors (Gilbert and Bryson 1929, 91-92; Hill 2000, 76; Solzman 2006, 139; Pacyga 2009, 42).

For the various harbor improvement along the length of the western shore of Lake Michigan, the federal government only provided one dredge. In the spring of 1854 a build up of sand closed Chicago's harbor, resulting in the loss of a number of boats. At the time there was no one in charge of the Board of Engineers at Chicago causing slow reaction. Ultimately, the Chicago Board of Trade offered to borrow the dredge and pay all costs for opening the harbor and return the dredge. However, the federal government did not respond quickly, and the Board of trade in partnership with the Common Council of Chicago seized the federal dredge and began work on the harbor. When Lieutenant Colonel James D. Graham arrived to take charge, he retrieved the dredge and resumed work. By August, 18,000 cubic yards of sand had been dredged, towed out into the lake, and dumped. Dredging created a new channel 600 feet wide and approximately twelve feet in depth. The dredging was so successful that Graham recommended regular yearly dredging instead of relying on useless jetties. In order to accomplish this, however, Chicago would need its own dredge and despite including this recommendation in his annual reports for the twelve years he was in Chicago, it never came to fruition (Larson 1979, 83; Hill 2000, 77).

In 1863, Colonel Graham reported that the condition of Chicago's harbor was "dilapidated" largely due to no federal funds since 1852. Chicago historian T.A. Andreas (1975 [1885]) wrote that, "The Government still seemed loath to recognize Chicago's importance as a commercial emporium, even by so much as making a modest appropriation by which her

decaying harbor piers could be kept in repair. The city herself therefore took up the matter, trusting to the future for reimbursement. In the fall of 1859, a small sum was raised by the Board of Trade to preserve a portion of the North Pier, which was fast rotting and falling into the lake. In 1861 and 1862, the repairs undertaken by the city were just sufficient to prevent the harbor improvements from becoming utterly useless” (Andreas 1975 [1885], 70; Hill 2000, 77).

Despite the haphazard approach to harbor improvements, following the Civil War, Chicago emerged as the most important shipping center on the Great Lakes for both water and rail. The extent of the railroad’s influence and importance is further discussed below. During the war, Chicago became an important supply center for the Union, and in acknowledgement of its importance federal harbor funds became regular and sufficient (Hill 2000, 77). In 1866, Major Junius Wheeler became superintendent of the harbors on Lake Superior and Lake Michigan, holding the post until 1870. Major Wheeler supported a proposal by the Chicago Canal and Dock Company to create a major ship basin allowing entry from the north. To accomplish this proposal Major Wheeler also recommended the construction of a nearly 500 acre enclosed outer harbor to the south with a 4,000 foot long breakwater (Hill 2000, 78; Solzman 2006, 32). This would help to create a twelve foot deep protected harbor that would include piers and slips in addition to harbor space. He was able to receive funds for the project because Chicago had grown to the country's second largest port. Major Wheeler left before he had the opportunity to oversee the construction of his project and though his successor, Major David Crawford Houston, supervised the construction, he was unconvinced about the need for a pier to the south, thus that portion was never built. Houston was replaced in 1874, by Major George Gillespie who completed the superstructure for the breakwater, but did not enclose the basin, as he was sufficiently satisfied with the apparent caesure of sand accumulation in the harbor (Larson 1979, 106-107; Hill 2000,

78). The sand began to simply drop out of the water in a deeper portion of the lake, which it continues to do. Andreas, again, notes that the issue of protecting the harbor would be a continual battle between the government treasury and the forces of nature (Andreas 1975 [1884], 235; Hill 2000, 78; Solzman 2006, 31; Andreas 1884, 235).

The process of harbor alterations massively altered the mouth of the Chicago River. Wheeler had proposed a pier enclosing the outer harbor that was never built because Houston felt it unnecessary. The opening provided a convenient path of approach for the main harbor, which became a point of contention between federal and city government. Gillespie approved this approach for ships, but discovered that the City of Chicago was using the location as a site for dumping the dredgings from the Chicago River, creating a dangerous shoal. Gillespie suspected the city was dumping at night when his officers were off duty. Despite the mayor eventually promising to stop the dumping, it seems to have continued (Hill 2000, 80).

By 1871, more vessels arrived at Chicago than New York, Philadelphia, Baltimore, Charleston, San Francisco, and Mobile combined (Kamanski and Tank 2000, 17; Miller 1996, 33; Solzman 2006, 25). In 1871, totals were 12, 330 vessels carrying 3,096,101 tons (Randolph 1872, 109). Twelve years later, shipping peaked at, 22,000 ships and eleven million tons of cargo at Chicago's port. Shipping at Chicago Harbor began to decline after 1889 for a number of reasons. In 1869 modifications began at the mouth of the Calumet river and in 1880, the port at the mouth of the Calumet River began to be developed (Solzman 2006, 25). In addition to this, following the Great Fire of 1871, which burned most of the central city, land values rose along the Chicago River as the land began to go into commercial rather than industrial use. As a result many industrial interests, particularly steel, relocated to the Calumet River and its growing port (Colten 1986, 94-96; Colten 1990, 151; Hill 2000, 153; Lewis 2008, 53; Solzman 2006, 32).

The Chicago Harbor improvements present a more traditional example of ANT and urban political ecology because it is an alteration, in this case a number of alterations of an existing environment. This also makes it slightly more complex than the I&M Canal and its network and reproduction of the urban political ecology of the Chicago River. The major actors in the network that came together to continuously reproduce the Chicago Harbor were the Chicago River, Lake Michigan, the Federal Government via War Department Engineers, City of Chicago government, Chicago economic boosters, and the economic interests that brought the vessels to Chicago's Harbor. The changes to the Chicago Harbor had a similar impact on Chicago and the Chicago River in that they worked to facilitate the economy and the metabolism of the city resulting in more industry, people, and waste. The changes also altered the ecology of the lake, resulting in sediment being deposited in different locations and building new land and beaches (Colten 1994, 126-129; Hill 2000, 78-80; Solzman 2006, 31). The political relationships related to harbor improvements, however, take on a different quality. The Federal involvement at first, was very much desired, due to the cost of the construction, ultimately though, it resulted in conflict from the involvement not being significant enough and then later too heavy handed. The created problems for other entities who were trying to act in particular interests. The various scales of government involved in this and many of the projects relating to the Chicago River call to mind the current issues facing the Chicago River.

2.7 Shipping and River Traffic

Ships began to utilize Chicago's harbor as soon as it incorporated as a town in 1833. This occurred despite no canal or harbor improvements as of yet. Lake Michigan shipping was

growing and vessels needed moorings, piers, wharves, and a deeper river. As the canal opened barges joined lake ships. With every river improvement made, it seemed more improvements were necessary. Retaining walls along the river banks as well as docks increased. Actors contributing to these changes and reproductions to the river included the War Department engineers and city government, but the primary actors were the various industries that used the Chicago River. These included lumber yards, grain elevators, shipyards, and warehouses among others. With their commercial success many of these businesses made alterations to the river in order to further facilitate their economic prosperity, often without the appropriate permission. As larger cargo ships began to utilize the river it necessitated a deeper straighter river with stronger docks and the replacement of center pivot bridges (Cronon 1991, 56, 106; Cutler 2006, 23; Hill 2000, 89; Pacyga 2009, 19; Pierce 1937, 80; Solzman 2006, 35-36). Early trade in Chicago centered on slaughterhouses and related industries, all of which used the river to dump their waste. By 1845, the waste from these industries had seriously polluted the river making it offensive to both sight and smell (Andreas 1975 [1884], 191; Hill 2000, 89).

As the economic importance of Chicago grew so did the ships that transported goods to and from Chicago. Heavy industry such as rolling mills, grain elevators, cement factories, lumber yards and sand and stone dealers needed larger, heavier ships to handle their goods. Increased traffic and needs of the vessels crowded the riverbanks, and it is said that there was so much traffic on the river that one could walk across the river on the decks of ships (Cronon 1991, 86-87; Hill 2000, 90; Solzman 2006, 37, 88).

As shipping increased in Chicago the city began to better define wharfing privileges in 1833. The city government created a system that allowed them to sell land along the riverbanks to entities that wished to construct wharves. However, the system was poorly managed and

quickly fell apart leading to disputes over privileges. The system to manage wharfing privileges remained in disarray until the construction of the I&M Canal was nearly complete. By 1847, the river was lined with lumber yards, elevators, shipyards, warehouses, and factories and the river was clogged with sail and steam powered boats (Hill 2000, 90; Federal 1939, 196). The impending completion of the I&M Canal, necessitated an agency to manage the navigable stretches of the Chicago River with the ability to authorize changes such as the straightening or widening of the river, the building of turning basins, and mediate wharfing conflicts. In October 1847, Chicago's Common Council took over responsibilities of examining land titles and vacating waterfront streets (Andreas 1975 [1884], 239; Hill 2000, 90).

River improvement picked up once the I&M Canal was completed, by multiple government entities. In 1848, the year the canal opened, the canal trustees began work on a turning basin at Wolf Point, the confluence of the North and South Branches of the Chicago River. The turning basin required the altering of river banks, necessitating the city to pass vacation ordinances and drawing new dock and lot lines. These ordinances continued to be issued until 1858 (Hill 2000, 90).

The rapid growth of Chicago as a port city and the connection to the Mississippi made it an economic center both for the transportation of goods as well as the production and distribution of goods. With the development of Chicago as an economic center it made sense for the new railroads to make Chicago their center as well as they exploded as the new transport technology.

2.8 Railroads

The Illinois and Michigan Canal was ninety-six miles long running from the South Side of Chicago to LaSalle-Peru, Illinois and connecting to the Illinois River from which it could reach the Mississippi River (Figure 4) (Hill 2000, 67-68; Pacyga 2009, 24-25; Pierce 1937, 118-119; Solzman 2006, 48). The canal altered American interior trade by reorienting trade from a north-south axis along the Mississippi River centered on St. Louis, to an east-west axis, focusing on Chicago (Cronon 1991, 64-65; Hill 2000, 61; Solzman 2006, 48). During the first season of operation corn shipments out of Chicago increased eight fold with ninety percent of new corn shipments coming via the canal (Cronon 1991, 64). Almost as soon as the canal was complete however, it was rendered technologically obsolete by a new developing technology, the railroad.

While railroads did not directly alter the Chicago River, they did play a major role in the production of the urban political ecology of Chicago and its river. The Illinois and Michigan Canal along with harbor improvements combined with growing western population and national desire for a port at the southern end of Lake Michigan. This, coupled with the connection to the Mississippi River, made Chicago into an economic giant and a center of trade. When railroad technology became the transport technology of choice, Chicago was a logical location for railroads to center upon. Trains shipped many goods that arrived in Chicago via ships from the Great Lakes throughout the interior of the continent. Likewise, trains carried commodities and goods, mostly crops to Chicago's Harbor. Ships then transported these goods as well as products manufactured in Chicago factories to the east on the Great Lakes. Railroads laid track right up to

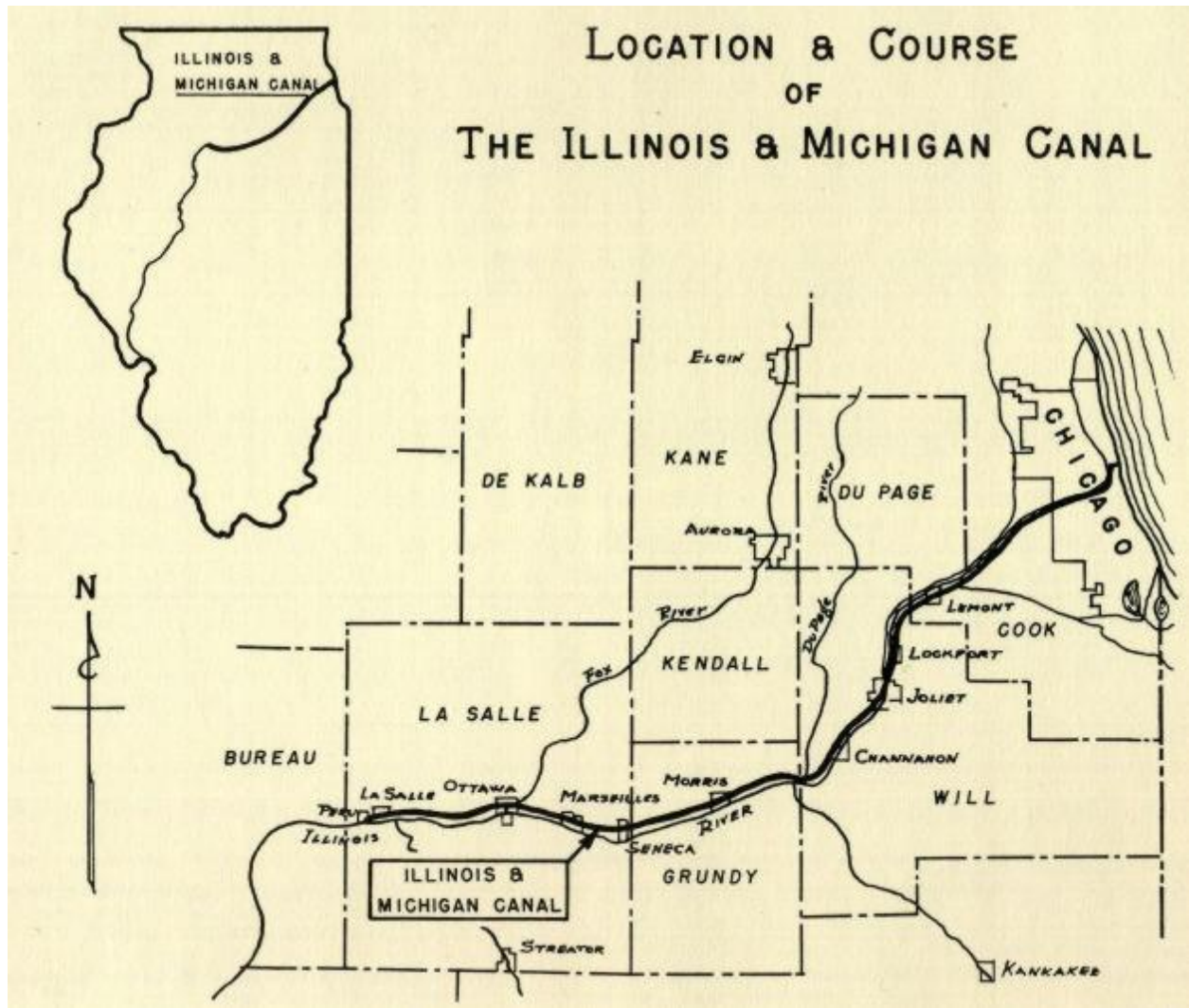


Fig. 4

Location and Course of the Illinois and Michigan Canal.
Courtesy of the Illinois State Archives.

the industries that lined the river, from breweries, to lumber yards, to steel mills, the rail and river were connected in the economic development of Chicago.

The Galena and Chicago Union Railroad's eastern terminus arrived at Chicago in November of 1848, and though amounting to only ten miles of track, almost immediately began to ship wheat from Chicago's near west. By 1852, over half of the city's wheat came to Chicago by the Galena and Chicago Union (Cronon 1991, 67; Cutler 2006, 309). By 1855, Chicago was the focus of ten trunk lines, with ninety-six trains a day arriving and departing the city (Cutler 2006, 310). By 1852, Chicago was connected to the east coast by rail and by 1869 to the Pacific Ocean. By the early 1870s, twenty-seven routes converged at Chicago (Cronon 1991, 68; Cutler 2006, 309-310). An example of Chicago's rising importance to rail transport and the national economy is the case of the Illinois Central Railroad. This railroad was originally going to run from Cairo, in southern Illinois at the confluence of the Ohio and Mississippi Rivers, to Galena in the northwestern part of the state. In 1850, however, the federal government granted a large portion of land to the Illinois Central as part of a plan to connect the Great Lakes and the Gulf of Mexico by rail. The land grant bill passed primarily because of a provision within the bill calling for an additional branch line connecting with Chicago. This planned connection generated significant eastern support for the bill as East Coast politicians and investors saw the economic potential of Chicago. The branch line ultimately became the main line, continuing to illustrate the growing dominance of Chicago and its economic power and potential (Cronon 1991, 68, 70). With Chicago as a centerpiece of the national economy and the dominant interior city in relation to the rural west, various industries, in addition to rail transport made, Chicago home. These included farm machine manufacturers such as John Deere and McCormick Reaper Works,

refrigerated rail cars, luxury rail cars, lumber, stockyards, and steel among others (Cutler 2006, 24).

This dominance came about due to a confluence of location, technology, and landscape change, all important elements of Chicago's rise to the interior metropolis of the United States. The location on Lake Michigan with the Chicago River and the potential of the canal, which was ultimately realized, helped to create Chicago as an economic destination. The canal turned Chicago into the dominant economic center of the mid-continent. This made Chicago the obvious choice as the center for a rail network, which again raised Chicago's economic profile. These economic opportunities and technological innovations put Chicago on the forefront of many national industries, and attracted innovative entrepreneurs and professionals. Industries gathered in Chicago for a number of reasons: opportunities to attract investors, ability to distribute nationally and internationally, ability to attract a skilled workforce, among others. Its location provided the opportunity for a landscape change, the Illinois and Michigan Canal, to increase its economic potential. This amplified the importance of Chicago's location, which led to more reproductions of the urban political ecology, the crisscrossing of rails across the country, centered at Chicago. The development of Chicago as an industrial metropolis resulted in even more industry locating there, especially along the river, which led to more reproductions of the urban political ecology, whether it was the industrial buildings and rail along the river, the harbor improvements, the growing urbanization and expanding reach of the city. While all of these can be counted as positive developments, many of these changes to the urban political ecology resulted in the continuing degradation of the Chicago River, particularly in terms of water quality (Pacyga 2009, 46; Platt 2005, 83-84). This in turn necessitated more changes to deal with living

in a marshy area, and the proximity of industry and a burgeoning population to the source of drinking water.

2.9 Stockyards

The canal and the railroads provided many opportunities for industries located in Chicago to access numerous markets. The meatpacking industry was one industry in Chicago that benefited greatly from these transport opportunities. As the meatpacking industry grew, especially, on the south side it began to send waste into the South Branch of the Chicago River. Most of these businesses were located near Bridgeport. In an attempt to regulate the waste entering the river, the City of Chicago extended its southern boundary to Thirty-Ninth Street in 1863. This brought most meatpacking related business within the city limits. It was intended to push the meatpacking industry further to the outskirts. In 1865 the stockyards were consolidated south of the city, they continued to dispose of their waste into the Chicago River, now in increasing quantities. The stockyards constructed over thirty miles of sewers draining the land to both the South Branch and the South Fork (Cronon 1991, 210-211; Cutler 2006, 312; Hill 2000, 102; Pacyga 2009, 60-61, 63; Wade 1987, 37).

Many Chicagoans, particularly those who lived in the Loop wished to push the meatpacking related businesses out of their neighborhood, as those industries were considered nuisance industries. By pushing meatpacking out of the Loop, meatpacking related businesses had to relocate. Following consolidation south of the city, the meatpacking industry began to draw a working class population and many immigrants (Ward 1987, 61, 66-67; Platt 2005, 154, 164). These immigrants were exposed to horrific working conditions as elucidated in Upton

Sinclair's *The Jungle* (2005 [1906]). In addition, the working class people who lived in the neighborhoods around the stockyards were exposed to increasingly polluted environments, especially neighborhoods along the Chicago River. This was due to the stockyards dumping their waste, human, industrial, and animal, into the South Fork of the South Branch of the Chicago River. There was little current on this length of river, which allowed the waste to sit and stagnate. This pollution led to health and quality of life issues and began the environmental inequities of the area which have continued in some form to the present day.

The move and consolidation of the stockyards, and related industries was caused by a number of factors related to the development of Chicago. Early in Chicago's history, slaughterhouses and packinghouses were centrally located on the Chicago River. This allowed for the shipping of preserved meat as well as salt and barrel-making supplies. However, the central business district increasingly became increasingly undesirable and inconvenient both for the businesses and their neighbors as the meatpacking industry required a sizeable amount of land to house animals. In addition, it was a dirty, noisy industry, continuously causing conflict with those who desired a respectable central business district. Cost of land in the central city continued to rise and the industry was simultaneously growing. Slaughterhouses and packinghouses moved to the South Branch in the late 1840s as the Illinois and Michigan Canal and the introduction of railroads helped to modernize the industry. This modernization included: commission men, market reports, hotels, scales, and rail connections, which were located near each railroad terminal (Holt and Pacyga 1979, 113-114; Lewis 2008, 74; Pacyga 2009, 21; Wade 1987, 25-26). As demand both locally and regionally continued to grow however, the separate stockyards became increasingly inconvenient and inefficient. This inconvenience was caused by increasing distances between yards and the inability to compare quality, volume, and price. In

addition, Chicago's population and economic growth resulted in increasing congestion between yards (Chicago 1953, 12; Lewis 2008, 75; Wade 1987, 47, 51). Due to extreme crowding there was little room for either rail or yard expansion and the answer to the problem was a consolidated stockyard. This stockyard would need to be outside the city yet accessible to railroads and meatpackers. A centralized location allowed for livestock concentration, open competition, better monitoring of market conditions, and decrease in railroad switching. The railroad negotiated heavily for consolidation and helped to raise capital for its construction. \$925,000 of the \$1 million of initial capital raised for the stockyards came from the nine main railroads which abandoned their separate yards on separate lines to consolidate. The new yard was extremely large, accommodating 100,000 head of stock, with planked pens covering 120 acres, 15 miles of rail, an extensive network of streets, and 50 miles of sewers carrying waste to the Chicago River (Lewis 2008, 75; Pacyga 2009, 61; Wade 1987, 50).

The city hoped that by consolidating the meatpacking industry it would be easier to regulate. Subsequently, the city attempted to require all slaughterhouses and related businesses to become licensed, but was unsuccessful. In 1867, the newly re-introduced Chicago Board of Health recommended an ordinance which the city council passed. This ordinance said that no one could deposit or cause to be deposited: dung, carrion, dead animal, offal, or the contents of a privy into the lake or waters connecting to the lake under the penalty of a \$25 fine, similar to an ordinance passed in 1833 (Hill 2000, 102; Wade 1987, 37).

In 1877, the city health commissioner indicted leading polluters, with the help of reform organizations. These polluters pleaded guilty, but with the absence of a precedent the court only fined the polluters and did not require changes in business practices. In 1878, the city council put the police department in charge on enforcing regulations on slaughterhouses. The ordinance was

challenged by business owners, but was ultimately upheld in the Illinois Supreme Court (Hill 2000, 104; O'Connell 1980, 78-79).

It was clear however that policy makers were tentative about interfering with economic interests and private ownership rights. The enforcement of ordinances was erratic and economic interests routinely blocked Board of Health attempts to enact more stringent regulations on the amount of waste that could be dumped into the Chicago River. The Union Stock Yards are an excellent example of the importance the large industries and the employment they provided despite the high levels of pollution they dispensed. The stockyards exemplify the interaction of industry, society, and the environment. The industry brought people to the area via jobs. Both industry and presence of residents altered the environment, and the industry through its pollution degraded the environment and threatened the quality of life of those living there (Lewis 2008, 76; Platt 2005, 164).

The stockyards chose their location based on its economic advantages. It was far enough away from the central business district to satisfy those who wanted to be rid of the nuisance industry, the location was close to existing trunk lines, and the yards had free access to the Chicago River to dump unlimited amounts of organic waste. The major disadvantage of the site was its location on low-lying wetlands. The land was so wet, it was only after the installation of thirty miles of sewers and drains that construction on the stockyards could begin. This, however, resulted in massive annual savings, because it provided access to dispose of all stockyard waste in the Chicago River (Lewis 2008, 75-76; Platt 2005, 166; Wade 1987, 31).

This marshy location presented risks to the health and well-being of residents, especially since there were not paved streets and sidewalks, storm drains and sanitary sewers, or access to pure water and indoor plumbing (Platt 2005, 166; Wade 1987, 48-50, 68-69). In addition,

industry, garbage dumps, railroad yards, and the putrid Chicago River hemmed in the neighborhoods near the stockyards, such as Bridgeport (Platt 2005, 166-167). The stockyards contributed to air pollution from their smoke stacks, degrading air quality in Bridgeport and surrounding areas. Additionally, waste and other material from the stockyard, such as livestock manure and drying hides, contributed to a horrid stench in the area (Hill 2000, 102; Wade 1987, 133). Decomposing carcasses as well as human and industrial waste interest the South Fork, eliminating any opportunity of using the water. In addition, the South Fork was unable to adequately flow because it was never a particularly powerful stream and its flow was further arrested by the I&M Canal and its deep cut in 1871, discussed below (Hill 2000, 106-107; Wade 1987, 130-131)

The growth of the stockyards as well as the increase in human and industrial waste as a result of a burgeoning population and growing industry greatly affected the health of the Chicago River. Water quality of the river was increasingly degraded and threatened the water supply. In addition the growth of river traffic resulted in alterations to the river to accommodate economic interests. However, with the increasing risk of disease from contaminated water and general public outcry the issues of public health and water quality would come to a head.

2.10 Public Health and Water

All of these previous developments, infrastructure improvements and additions, growth of shipping, rail, and population, the growth of highly polluting industries such as the stockyards all increased the amount of human and industrial waste that flowed into the Chicago River. Chicago's early leaders were concerned about future health and drainage problems due to the

slow moving current of the Chicago River and general poor drainage of the marshy area out of which they built Chicago. As previously mentioned, Chicago passed an anti-pollution ordinance in 1833 (Hill 2000, 97; O'Connell 1980, 74). In 1834, Chicago passed an even stricter ordinance during a cholera scare; however, once the scare passed people began to use the river to dispose of their waste (Hill 2000, 97; Pacyga 2009, 16; Pierce 1937, 37). By the mid 1840s, largely due to the waste from the slaughterhouses, the Chicago River was foul and offensive (Hill 97, Andreas 1975 [1884], 191).

The growth, both of industry and population, greatly altered the landscape of the southwestern shore of Lake Michigan with significant environmental impacts, particularly in regards to the human and industrial waste that entered the Chicago River (Cronon 1991, 70; Cutler 2006, 41; Pacyga 2009, 45; Solzman 2006, 34). The two major problems, with which Chicago had to deal, were how to supply the city with clean water and how to dispose of waste without adversely affecting health. As the population grew, it became clear that the government had to undertake wholesale changes in practices to address these responsibilities. This was underlined by the continued rapid growth in the years before the opening of the Illinois and Michigan Canal, which created the potential for an increase in disease. These changes began after 1848, when Chicago experienced both cholera and smallpox epidemics. Again in 1849, cholera arrived from New Orleans via canal boats and the epidemic spread throughout the city. In 1849, cholera killed 314 people, 450 died in 1850 and more than 1500 people were killed in 1854 (Cain 1978, 23, 40-41; Cronon 1991, 58; Cutler 2006, 33-34; Pacyga 2009, 44). In response, citizens urgently called for municipal ownership of the water supply resulting, in 1851, with the creation of the Chicago Board of Water Commissioners as a reaction to the cholera threat. However, outbreaks of dysentery and cholera continued to impact the city. In response,

the city created the Chicago City Hydraulic Company, replacing the privately held Chicago Hydraulic Company. This new entity was slow to act and in 1854, cholera killed nearly six percent of Chicago's residents. In response to the catastrophe, the Illinois legislature authorized the creation of the Chicago Board of Sewerage Commissioners (Andreas 1975 [1884] 186-187; Cain 1978, 40-41; Hill 2000, 98; Pacyga 2009, 44).

Because of the measures taken, by 1861, even with a burgeoning population, almost the entire city had running water funded by municipal bonds. There was still concern amongst Chicagoans, over the cleanliness of water. They saw safe drinking water as a matter of life and death. In response to these concerns, between 1864 and 1866, the Chicago Bureau of Public Works dug an underground tunnel, extending two miles into the lake for a new water intake in an attempt to supply the city with unpolluted lake water. This solution was negated however by the increasing amount of pollution entering Lake Michigan from the Chicago River. The polluted water continued to encroach on the intake, further exacerbated by the US Army Corps of Engineers lengthening of the piers at the mouth of the Chicago River (Cutler 2006, 23; Hill 2000, 73-74; Holland 2005, 116; Pacyga 2009, 44-45; Solzman 2006, 48). These two entities unwittingly continued to work against each other, and Chicagoans continually called for something to be done to protect the water supply:

Chicago had obviously neglected its natural setting, and it struck back with ferocity. The original plat maps of the city ignored the environment and placed a grid designed to make land sales easy. The city was simply built on a marsh without much thought. (Pacyga 2009, 44)

To combat this Chicago also undertook a new drainage plan. In February 1855, Chicago appointed members to the Board of Sewerage Commissioners. These members hired Ellis Sylvester Chesbrough, who was then the city engineer for Boston, as chief engineer to develop a sewage plan. Chesbrough's two main responsibilities as stated by the Board were to "remove

sewage and drain surface runoff” (Cain 1972, 356-357; Cain 1978, 23; Christensen 1973, 80; Hill 2000, 99; Pacyga 2009, 44). Though experienced with canal and railroad construction and some training in hydrology, Chesbrough had never worked on sewer systems. Up to this point no city in America had a comprehensive sewer system. To prepare himself for his work Chesbrough toured Europe in 1856 and created a manual that became a standard for the construction of sewers. From a number of options, Chesbrough determined that draining sewage into the Chicago River, which would then drain into Lake Michigan, was the best option. This plan concerned citizens who were already familiar with questionable water quality provided by the city via Lake Michigan. To limit risk, Chesbrough proposed two canals that would feed lake water into the North and South Branches to help dilute and flush water from the Chicago River. In addition Chesbrough believed that the large volume of water in the lake would help dilute pollutants coming from the river (Cain 1972, 357-359; Cain 1978, 24-26; Hill 2000, 99-100).

As a result, Chicago became the first American city with a comprehensive sewer system with waste from residences and streets draining into the river. In order to accomplish this, Chesbrough designed what is called a combined sewer, which handles both storm water and sewage, and utilized large diameter pipes, three to six feet in width. The issue with the design is the necessity of slope so gravity could carry waste into the river, while being deep enough underground to prevent freezing in winter. As Chicago lay, on average, only five feet above the level of the lake and river, the solution was to raise the level of the city. Beginning in 1856 and lasting twenty years, Chicago raised its ground level from between two and eight feet. Dredgings from the river were used to deepen the river and raise the land. While the city laid sewage pipes on the existing ground level and covered them with the dredgings. New streets rose to the height of second story windows until people either raised their homes or businesses or converted their

ground floors into cellars and extended walks out from their new front doors (Figure 5) (Cain 1972, 360-361; Cain 1978, 27; Colten 1994, 130; Hill 2000, 100; Cutler 2006, 34).

As increased pollution continued to flow into the river, and then into the lake, the water supply again became threatened (Pacyga 2009, 44). In the 1860s, the city was forced to push the water intake crib from two to four miles out into the lake (Cain 1972, 366; Cain 1978 46, 51). Much of this pollution was caused by production related to economic growth during the Civil War. The Chicago city government decided that the best way to solve the problem was simply to reverse the river. In fact, the original plans for the Illinois and Michigan Canal had called for a deeper canal that would have resulted in the reversal of the Chicago River. However, due to the financial panic of 1837, canal commissioners were forced to construct a less expensive, shallower canal (Hill 2000, 101; Solzman 2006, 48).

During wet seasons, when enough rain would fall to dilute the river water, the river caused little problem. However in dry seasons, it emanated an unpleasant odor and when the river water reached the cribs from which drinking water was pulled from the lake, disease outbreaks rose. In July of 1860, the smell from the river was so bad that the Chicago Board of Health met with representatives of the I&M Canal to arrange for the Bridgeport pumps to be used to create a current in the river that would take water away from the lake to avoid a potential epidemic. In 1862, the city via the Board of Health appropriated \$10,000 for this purpose (Cain 1972, 365; Hill 2000, 105). The inquiry in 1860, appears to have been the first thought of reversing the river since the original deep cut design was abandoned (Cain 1978, 11-12; Hill 2000, 105; Pacyga 2009, 46). In February 1865, ten years after the Chicago River officially became the city's sewer, the Illinois Legislature approved the construction of the I&M Canal on the original deep cut plan in order to dilute the water in the Chicago River and to send the diluted



Fig. 5

Clark Street, 1857.

Courtesy of the Chicago Historical Society.

water downstream (Hill 2000, 105; Pacyga 2009, 44). The city believed this deep cut would solve the sewage problems, yet by summer of 1865, the river's condition had deteriorated to a point where the city and I&M officials agreed to increase the flow rate from 250 cfs to 417 cfs using the canal pumps, until the canal could be enlarged (Cain 1978, 59; 61, 68; Hill 2000, 106).

Work on the deep cut began in fall 1865, after the canal closed to shipping for the season, and lasted six years. The Main and South Branches benefited from the pumping that occurred, which was necessary to actually reverse the flow, but the North Branch deteriorated further because the reversal of the Main and South Branch currents prevented the North Branch from flowing into the lake as in normally did, thus making it stagnant and putrid (Cain 1974, 595; Cain 1978, 61; Hill 2000, 106; Pacyga 2009, 104). By deepening the mouth of the I&M Canal to allow grade and gravity to reverse the flow of the river, the board hoped to solve the problems of the water supply. Eye witness accounts from the day of the reversal described seeing objects on the water slowly hesitate from flowing in their previous direction and begin to flow the other way. Within a few days the Chicago River had dramatically improved. However, the reversal was not permanent with strong prevailing winds from the west often forcing water to flow back into the lake affecting the water supply. The frequent collapse of canal walls also impeded the ability of the river to flow away from Lake Michigan (Cain 1978, 59; Hill 2000, 106-107; Pacyga 2009, 104). The deep cut led primarily to a stagnation of the river and almost no flow whatsoever. The lack of flow was further compounded when William Ogden, former Mayor of Chicago, built a ditch to drain privately held land near to the south of the canal. Spring flooding in 1872 resulted in the Ogden ditch overflowing, sending water into the Illinois and Michigan Canal, which backed up forcing the Chicago River to once again flow back towards Lake Michigan. Because the river water contained significant amount of industrial and human waste,

which flowed out into Lake Michigan past the water intake crib, misuse of the river again caused an outbreak of cholera throughout the city (Juhl 2004, 460; Solzman 2006, 49).

Ultimately it seems that the water tended to stagnate rather than flow west towards the Mississippi. Therefore, alterations were needed in order to permanently reverse the river's flow. This attempt to reverse the river resulted in the digging of a tunnel from the lake to the North Branch, following a previous idea of Chesbrough's. The tunnel, constructed between 1874 and 1880, would have reversible pumping works so that it could flush the North Branch when the current was too little and needed artificial current, and when a nor'easter arose which pushed the water of the Main and South branches toward the canal and forced polluted water up the North Branch, the pumps could pump the polluted water into the channel and the lake to alleviate pressure upriver. This idea, though creative, was ultimately unsuccessful because polluted water occasionally contaminated the water supply.

Chicago's health problems were not simply its production of waste, but the epidemics that followed the flow of that waste into the lake and water intake. This was particularly exacerbated by freshets from the west and the increase in farmland from what had been marsh land. This land that previously held runoff for days now drained into the river immediately. Winds from the west caused the Des Plaines to overflow its banks to the east, spilling into the Chicago River, and the Ogden Ditch began to contribute to the reversal of flow more regularly and the need for a solution was evident. In 1881, the city hired Rudolph Hering, a well-known sewage expert. After considering a number of solutions, he determined that the city should abandon the I&M Canal and construct a new canal through which sewage could be diluted by a larger volume of lake water and then flushed into the Des Plaines River (Hill 2000, 115; O'Connell 1980, 90-91). This proposal is very similar to that of Chesbrough's from thirty years previous.

The tunnel and pumps were never effective enough to alleviate the problems of water quality in the Chicago River. It was found the pollutants from North Branch industries such as distilleries, glue factories, and tanneries were being pumped into the lake via the tunnel on the North Branch. These pollutants would then flow into the crib when the winds blew from the northwest. The I&M Canal was simply not sufficient for the purposes of sewage relief for the city (Cain 1978, 63; Hill 2000, 108-109). Yet another alteration and reproduction of the Chicago River and waterways linked to it was necessary to reverse the flow of the river and improve the health and pollution issues.

2.11 Permanent Reversal

By 1880, the City of Chicago's water supply and sewer system provided services to over half a million residents. Heavy rains in the summer of 1879 had caused thirty straight days of flow from the polluted Chicago River into Lake Michigan. In 1880, citizens formed the Citizens Association of Chicago, appointing a Committee on Drainage and Water Supply, when the Committee proposed the construction of a new channel to carry diluted sewage downstream. This channel would run between the I&M Canal and the Des Plaines River from the West Fork of the South Branch to Joliet running 31.5 miles carrying both sewage and ocean-going ships. The estimated cost of construction for this new channel was \$7 million (Cain 1978, 64; Hill 2000, 115; Solzman 2006, 50).

In January 1886, Chicago created a new body, the Drainage and Water Supply Commission to respond to the Flood of 1885 and the fears of disease of the population. This Commission ultimately recommended the permanent reversal of the flow the Chicago River via

the digging of a new channel similar to the one proposed by the Citizen's Association. This plan, maintaining the strategy of dilution and sending downstream of polluted water, called for a channel connecting to the Des Plaines at Joliet. The plan of The Commission was also to continue to use the I&M Canal for shipping traffic (Cain 1978, 64-65; Hill 2000, 119).

The Illinois Legislature received legislation, crafted by Harvey Hurd, who was the head of the first drainage district in Illinois, to create a Sanitary District for Chicago. It was necessary to create yet another government agency in order to draw funds from a larger tax base because the construction of this canal required significant resources. This district needed to encompass an area larger than the city in order to be able to draw from a larger tax base than the city itself (Hill 2000, 119). In 1889, the Illinois Legislature formed the Sanitary District of Chicago to construct a new canal to reverse the river's flow in order to dispose of sewage and protect the city's water supply. This was the largest ever municipal project in the United States at the time: a twenty-eight mile long, 160 foot wide, and twenty-one foot deep canal in combination with a lock system at the mouth of the river. The importance and innovation of this project brought some of the best engineering minds to Chicago. They developed new technology specifically for this project (Cutler 2006, 41-42; Solzman 2006, 50).

In order to gain enough support for the construction of the canal, it was proposed that it be made large enough for steamboats and other large ship traffic. This gained the interest of downstate communities as well as states down river as they saw it as an opportunity to fulfill the Great-Lakes-to-the-Gulf Waterway. A major reason for this support was the potential competition it would create with railways along with an expected concomitant decrease in freight charges. This expanded canal would help the city dispose of its waste and increase the ability for money-making river traffic between Lake Michigan and the Mississippi (Cain 1978, 68; Hill

2000, 119-120; O'Connell 1980 94-95). These functions are reflected in the name of the canal: Sanitary and Ship Canal. The goal of the sanitary district was to protect public health by draining waste. However, a canal with the capacity and dual functions of the proposed Sanitary and Ship Canal would have to be declared legally navigable which created additional issues (Hill 2000, 120).

Boundaries for the new Sanitary District of Chicago included all of Chicago north of 87th Street, the towns of Cicero and Lyons, and a portion of Lyons Township, collectively containing 185 square miles. On November 15, 1889, citizens of the proposed sanitary district voted overwhelmingly in favor of the creation of the district in expectation of the future project. A landslide to be sure, illustrating the dramatic need of a way to deal with waste in the Chicago River (Cain 1978, 70-71; Hill 2000, 120).

The plans for a canal for sanitation and shipping meant that the Sanitary District of Chicago (SDC) would also have to widen, deepen, and improve the Chicago River at a considerable expense, to accommodate the larger ships which could utilize the proposed canal. In addition, conflict with the federal government, which by this point saw itself as in charge of navigable waterways, was inevitable (Cain 1978, 75-76; Hill 2000, 121).

When the channel was completed, it ran for twenty-eight miles from today's Damen Avenue to Lockport. The completed canal was the largest public works project ever undertaken in the United States up to that time. More earth was moved than in any previous project and the scale of this project necessitated new technologies such as new, more powerful steam shovels. Techniques used on this project became known as the "Chicago School of Earth Moving" (Figure 6) (Hill 2000, 127; Sayad 1989, 92-95). The project was so significant that the machines



Fig. 6

Excavation Site of the Chicago Sanitary and Ship Canal.
Courtesy of the Field Museum.

and techniques developed for the Sanitary and Ship Canal illustrated the feasibility of digging the Panama Canal (Cutler 2006, 41, 303; Hill 2000, 127; Condit 1973, 28).

When the canal was being planned, the Board of Trustees followed the legislative mandate which set forth their responsibilities to provide safe drinking water through dilution and drainage, and to provide for navigation (Cain 1978, 68; Cutler 2006, 41; Hill 2000, 128). The waste that entered the Chicago River from Chicago's sewers now flowed away from Lake Michigan and into the new canal. This helped to alleviate Chicago and the Chicago River of much of the waste and smell it had dealt with for over fifty years. The *New York Times* wrote of the opening of the canal that, "The Water in the Chicago River Now Resembles Liquid" (Changnon and Changnon 1996, 104; Hill 2000, 132). It also created legal issues with states and communities downstream who did not want to have Chicago's waste flowing by their communities. In addition, Canada and states bordering the Great Lakes were concerned that the diversion of Lake Michigan water into the Chicago River would lower lake levels and impact shipping and fishing. The Sanitary District was able to open the canal prior to Missouri filing an injunction, but did have to limit the amount of water they diverted from Lake Michigan (Cain 1974, 602; Cain 1978, 80-81; Hill 2000, 132-134; Solzman 2006, 50). The opening of the canal and the reversal of the river helped contribute to an altering of the attitude towards the river of many Chicago residents.

The legal situation that resulted from Chicago's decision to reverse the flow of the Chicago River and send its sewage downstate toward the Mississippi River and St. Louis is an interesting example of environmental equity and actor-network theory. The network around this issue included the City of Chicago, the Sanitary District of Chicago, the Illinois Legislature, downstate Illinois communities, as well as the State of Missouri. The environmental elements of

this network included the Chicago River, the sewage from the Chicago River, the Des Plaines River, the Illinois River, and the Mississippi River. The purpose of the canal was to send Chicago's waste to the south, down a series of rivers to the Mississippi River. Concerned downstate communities such as Joliet and Peoria as well as St. Louis, Missouri, did not want Chicago's sewage degrading water quality and presenting health threats to their citizens. The Illinois River and the Illinois Legislature's attitude towards it played a major role in the ability of Chicago's waste to be sent down it. Since the Illinois River lies entirely within Illinois as does most of its basin, it is subject to only Illinois laws. The Illinois River's use to transport Chicago's waste exhibits the larger environmental and geographic inequities within Illinois as Chicago's public health needs were seen as more important than the concerns of other parts of the state (Colten 1992, 193). St. Louis lying just south of the confluence of the Illinois and Mississippi Rivers was also concerned about the influx of waste and that it might enter the city's water intakes (Colten 1992, 196; Hill 2000, 128-129). In April of 1899 St. Louis petitioned the Supreme Court to prohibit the Sanitary District of Chicago and the State of Illinois from discharging sewage into the new canal, and in January of 1900 the State of Missouri joined St. Louis. However, the Supreme Court acted slowly. Illinois and the Sanitary District of Chicago were able to complete construction and on January 2, 1900 broke the temporary dam that kept water out of the main channel. The breaking of that small dam was made unannounced and with little fanfare, but prevented any relevant legal action against the canal's opening from taking place since it was already operating. The formal opening of the canal with the lowering of the Bear Trap Dam at the Lockport Controlling Works was done on January 17, 1900, the day that the Supreme Court was to rule on the potential injunction, eliminating even the most remote

chance that St. Louis could prevent Chicago's sewage from flowing down river (Hill 2000, 128-129, 132; Keating 2005, 1).

After the Sanitary and Ship Canal opened in 1900, water through the I&M Canal was reduced to only navigable levels until 1933 when the I&M was eventually closed as it was no longer needed, and all use was transferred to the Sanitary and Ship Canal (Hill 2000, 109).

In 1900, the Chicago Sanitary and Ship Canal opened and the flow of the river reversed away from Lake Michigan, much to the chagrin of downstate communities and the state of Missouri (Colten 1992, 196). Interestingly, in 1955 the American Society of Civil Engineers named the reversal of the Chicago River one of the seven engineering wonders of the United States (Hill 2000, 98).

2.12 Post Reversal Attitude

At the turn of the century with water improvements to the water quality of the Main and South Branch's, Chicago's attitude toward the river began to improve. A major part of this change in attitude, in addition to waste being sent down the Sanitary and Ship Canal, was also the shift in heavy commerce, and the bulky harbor elements associated with such commerce, to the south and Calumet Harbor. This attitude was also influenced by a nationwide change in the view of the environment and city beautification projects (Hill 2000, 153).

As the 20th century began, many more entities were becoming involved in the issues of the Chicago River. Throughout the early history of the river single entities often dominated the production of the river. At the turn of the century, however, many agencies, special interest groups, and citizen groups reviewed and approved changes to the River. This is illustrated in

John Larson's *Those Army Engineers: A History of the Chicago District, US Army Corps of Engineers*:

there began to be a proliferation of government and quasi-governmental agencies as well as private associations, corporations and firms that had to be consulted. In the course of carrying out the 1909 survey (regarding improvements of rivers and harbors in the Chicago area), Corps officers at Chicago consulted with the State of Illinois Rivers and Lakes Commission, the Sanitary District of Chicago, the Chicago Plan Commission, the City Council of Chicago, and officials of adjacent cities. Among the associations which became involved in the study were the Citizens' Association of Chicago, the Lumberman's Association, the Chicago Association of Commerce, and the Shipmasters' Association, plus businesses and hundreds of smaller organizations which were asked to provide information on their use of water transportation needs. (Hill 2000, 154; Larson 1979, 115-116).

We can see from the history of the Chicago River up to this point, that its urban political ecology has undergone many reproductions. In addition we can see how many actors have participated in those production some of which enter the picture for particular issues and some which remain involved in multiple reproductions.

Daniel Burnham published his *Plan of Chicago* in 1909, creating a complete vision for the city including the Chicago River. In his plan, Burnham discusses the river and opportunities for it:

...the Chicago River, which gave to the city its location and fostered its commerce, has become a dumping spot and a cesspool; bridges of every possible style and condition span it at irregular intervals and at all angles; and year by year riparian owners have been permitted to encroach upon its channel until there are to be found as many as four lines of docks, each newer one having been built further into the stream" (Burnham and Bennett 1970 [1909], 97; Hill 2000, 155).

Burnham saw the degraded environment of the river as an opportunity to change the system and the city through planning. With commerce shifting to Calumet Harbor, Burnham saw potential for improving the river banks functionally and aesthetically (Burnham and Bennett 1970 [1909], 97; Hill 2000, 155; Smith 2006, 130).

The first major improvement dealing with the river from the Burnham Plan was the Michigan Avenue Bridge, built between 1918 and 1920. It occurred simultaneously with significant construction along the river: the Wrigley Building 1919-1925 and the Chicago Tribune Tower 1922-1925. The expansion of construction onto railroad air rights contributed to the altering of the riverbank aesthetic. These buildings included The Chicago Daily News Building at Madison Street finished in 1929 and the Merchandise Mart in 1930, which symbolized the shift of the Chicago River to post-industrial commercial life.

However, the Depression and World War II halted the continued recovery of the Chicago River, and ushered in a new era of the Chicago River (Hill 2000, 156; Holt and Pacyga 1979, 20).

Each major alteration discussed here was a result of a network of a number of actors, discussed in each section, producing and reproducing the urban political ecology of the Chicago River. Each reproduction resulted from a new network some actors appear in multiple networks while other only in one. These networks are made of up the groups and individuals that participate in making the changes to the Chicago River that alter its environmental and ecological configuration, its economic importance, its social use, and its political relevance. Each one of the events discussed represents a delineation of a network based on the major environmental alteration. These events (or unity permanencies) are useful in determining which actors are involved in the production of a network and the urban political ecology of the Chicago River (Swyngedouw 2003, 95). Other networks and reproductions of the urban political ecology of the Chicago River will be discussed below particularly as it relates to the current production of the urban political ecology of the Chicago River. Prior to that, however, it is important to understand the various reproductions that resulted in the condition of the Chicago River to which the current production is a response.

3. Deindustrialization, Environmental Regulation, and Their Impact on the Chicago River

The preceding chapter deals with literature covering the Chicago River, concentrating mostly on the period until the permanent reversal of the Chicago River via the construction of the Chicago Sanitary and Ship Canal. Additional literature deals with a few projects done by the Sanitary District of Chicago in the early twentieth century as well as the Burnham Plan and some of its impact. However, there is a real break in the literature with regards to the Chicago River from the Great Depression until the environmental legislation of the late 1960s and early 1970s. This gap in the literature points to a distinct portion of Chicago River history when its industrial value and productiveness slipped so low as to no longer be seen as an economically valuable river. This lack of productivity resulted in the people of Chicago perceiving the river simply as polluted. This led to what appears to be the fall of the river from the consciousness of Chicagoans and during these decades, the river no longer served as a defining element of the city. This lack of literature illustrates the times and condition of the river in this period. No buildings of any kind were built in the Loop between 1934 and 1957, and no major residential structures until the State Street Mall was developed in 1978 (Holt and Pacyga 1979, 22; Pacyga 2009, 369; Wille 1997, 31). The Civic Opera House, opened a week after Black Tuesday, in October 1929, and one of last buildings constructed prior to the gap is illustrative of the city turning its back on the river (Figure 7) (Lyric 2012, 1; Solzman 2006, 238). In Bridgeport, the river slipped from consciousness largely because jobs in the neighborhood no longer relied on the river for employment. Instead, as Bridgeport grew in political importance residents desired jobs in city government and did not appear interested in saving river related jobs. This employment shift pulled more attention away from the river. The river and people's perception of it suffered in this period. It was seen as not necessary, not useful, and degraded. The city



Fig. 7

Civic Opera House, an example of buildings turning their back to the river.
Photograph by Garrett Wolf.

ignored the river and treated it as what it was, a sewer. It remained that way until environmental legislation created an atmosphere whereby when it could no longer be ignored (Hill 2000, 236-237).

3.1 Deindustrialization and Population Loss in Chicago

In terms of industrial traffic the Chicago Harbor had been decreasing in volume and importance for decades by the Second World War. This was due largely to the growth of Calumet Harbor, south of Chicago Harbor, for which Congress first appointed money in 1870. Not long after Calumet Harbor's completion, the bulkier industrial materials for steel were shipped to Calumet while the less heavy, industrial material continued to be shipped through Chicago Harbor and on the Chicago River (Hill 2000, 153; Larson 1979, 118-122; Office of the Chief of Engineers 1975, 11-1). This was significant for multiple reasons, first because the city lost no money, since Calumet Harbor was still within the city, and second, it allowed the Chicago River to shift to more leisurely use. In Daniel Burnham's 1909 Plan of Chicago, the Chicago River is intended as a place for pleasure boats, and as a beautiful city amenity as in many of the cities of Europe (Hill 2000, 155; Smith 2007, 130). However, as the Chicago River shifted to generally less industrial uses, the Calumet Harbor continued to grow in significance. It made a major jump in importance in 1921 when the Illinois State Legislature authorized the construction of a deep water port at the mouth of the Calumet River causing international shipping to increase through the 1930s and 1940s (Illinois General Assembly 1929, 217). In the 1950s the port underwent further development including the construction of turning basins, grain elevators, and public terminals. Construction of these improvements concluded in 1958 to take

advantage of the opening of the Saint Lawrence Seaway in 1959. All of these developments contributed to the falling industrial and ultimately general usage and importance of the Chicago River (Port 2012, 1).

In addition to most shipping moving to Calumet Harbor, the industrial structure along the Chicago River and in Chicago in general was changing. Industry was hard hit by the Great Depression and by 1933 only half of those who had been employed in manufacturing in 1927 remained employed while the overall unemployment rate in the city was thirty percent (Pacyga 2009, 256). Chicago's industry and overall economy would continue to struggle through the 1930s; however, with World War II looming in Europe, production began to increase and in mid-1941, Mayor Edward Kelly undertook an industrial survey of the city and gathered business in related industries to promote sharing of resources. The mayor was concerned that those who did not participate in war production would have to close due to lack of metal for non-defense products (Pacyga 2009, 279-280; Mayor's 1941, 29; Norman 1941, 29). Wartime production stimulated the Chicago economy with Chicago businesses filling \$2 billion in war orders by early 1942 as manufacturing in the city grew faster than at any other point in time. Chicago's position as a transportation center made it an obvious location for defense industry production and, from 1940 through the end of the War in the Pacific, both private companies and the federal war plant corporation spent \$1.3 billion to build factories (Duis and LaFrance 1992, 67-70; Lewis 2009, 386; Pacyga 2009, 276).

However, despite the rapid growth and success of Chicago industrial production, the federal government began to shift investment away from Chicago, the Midwest and the Northeast, a development that had significant economic ramifications for Chicago as World War II was the first of three wars in the Pacific. With this emphasis on the Pacific the industrial base

of the nation began to shift towards the West Coast. This also resulted in dramatic population shifts both within the nation and within the Chicago area. As West Coast cities drew military and industrial investment they also became popular destination for returning soldiers from the various wars and police actions, further growing West Coast economies at the expense of Chicago and other older industrial cities. Census data starting in 1950 underscores this decline, with the population dropping by over 4500 (Hauser and Kitagawa 1953; United States Census Bureau 1952). Furthermore, migration to suburbs compounded the decline of the city of Chicago and other industrial cities. Returning soldiers compounded this later trend as they largely moved out of old ethnic neighborhoods to the suburbs. Even with the wartime investment much of Chicago's industrial capability was outdated and worn-out, a product of neglect of the Great Depression. In addition, industrial jobs to many returning soldiers seemed dirty and they sought more respectable professions than working in the packing houses and sought employment in the rapidly growing suburbs (Pacyga 2009, 299). The combination of declining industry and declining population resulted in continued decline for Chicago and concomitantly in the use and general awareness of the Chicago River, resulting in continued degradation of the river. The quality of the river further declined at this time, despite the fact that the river quality had been of huge importance through much of the city's history (Hill 2000, 233-234; Larson 1979, 284; Tarbox 1969).

This shift in population created an ongoing dynamic between Chicago and its suburbs. In 1900, eighty percent of the population of the metropolitan area lived in the city. However, by the 2000 census only thirty-six percent lived in the city. Though some suburbs are as old as Chicago, the first major wave of suburban growth occurred following World War I, mostly fueled by a growing rail and streetcar network and the increasing use of automobiles. Suburban growth

slowed during the Great Depression; however, following World War II suburban growth rapidly increased (Cutler 2006, 341; Mayer and Wade 1969, 375). The movement to the suburbs following the 1950s were largely families of European origin, many of whom grew up in various ethnic neighborhoods, but following World War II identified primarily as simply white Americans rather than their particular ethnic background (Cutler 2006, 339; Pacyga 2009, 299). These types of population movements were common throughout the country with slow growth or declining city populations and growing suburban populations. This resulted partly from issues of space. The central city was nearly fully occupied (partly by the derelict industrial structures), with limited space for growth as well as the construction of expressways and demolishing of slums, which also lead to decreasing population density. Many residents also left the central city to escape what were seen as the negative elements of city life: racial conflict, slums, crime, high taxes, congestion, poor schools, and other problems (Cutler 2006, 342). The suburbs were particularly appealing to young and growing white families as a result of: improved transportation, higher standards of living, increased leisure, industrial decentralization, government financial aid, and mass construction of homes. This move was often predicated on race and class with whites moving to the suburbs as African American and Latino populations grew in the city, with more “Americanized” groups separating from ethnic groups, as well as, wealthier classes from the poorer classes (Cutler 2006, 343). This “Americanization” as Cutler describes it has also been explained as people who once identified with their ethnicity in their neighborhood began to identify as white, largely as a result from the shared experiences on the battlefield and the homefront in World War II (Pacyga 2009, 299).

The character of post World War II growth served to magnify Chicago’s problems. New development occurred outside the city limits, drawing taxpayers and businesses out of the city

and to the suburbs (Mayer and Wade 1969, 375). This period created a general pessimism about urban prospects and Chicago was not exempt from this view as its inhabitants became gloomy about the future of the city. Concomitantly, many scholars and critics predicted the decline and decay of Chicago (Mayer and Wade 1969, 375-376). The pull of the suburbs and an aging business district did much to impact the Loop and Bridgeport, which saw population declines as people moved out of ethnic neighborhoods to the suburbs seeking employment in the industries that were also moving to the suburbs. This migration of jobs caused Chicago's share of manufacturing employment fall from seventy-one percent in 1947 to fifty-four percent in 1961. By 1965 over half the industrial jobs were outside of Chicago (Mayer and Wade 1969, 426).

3.2 The Environmental Movement and a New Attitude toward the River

In the 1960s the environmental movement brought increased awareness to the plight of the environment, the human impact on the environment, and led to the idea that society had a responsibility for the environment (Clean Water Act 2002 [1972], 1; Environmental 2012a, 1; Hill 2000, 236-237). It is generally acknowledged that this "modern" environmental movement gained popular momentum with Rachel Carson's *Silent Spring*, published in 1962. This book helped to raise the public consciousness by linking pollution to effects on human health. This analysis brought people closer to their relationship to the environment altering people's perception of the environment and their relationship to it (Carson 2002 [1962], 8). This movement resulted in the passage of the environmental legislation of the early 1970s such as the Clean Air Act and National Environmental Policy Act in 1970 which established the US EPA; the Clean Water Act in 1972; the Endangered Species Act in 1973; the Safe Drinking Water Act

in 1974; the Resource Conservation and Recovery Act in 1976; and the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) known as the Superfund Act in 1980 (Environmental 2012a, 1; Hill 2000, 236). Prior laws included the Federal Water Pollution Control Act passed in 1948 and amended in 1956. The new legislation gave the federal government much more regulatory power and the ability to influence local issues more directly. This reformulation of environmental law also redirected organizational efforts of groups like the Sierra Club to shift from local projects to federal lobbying (Larson 2006, 1).

Throughout the 1960s federal authority over water quality grew due to the passing of legislation. In 1965, Congress passed the Water Quality Control Act requiring that states create water quality standards, and in 1969 passed the National Environmental Policy Act (NEPA) requiring environmental impact statements. This act changed the role of government from seeking to conserve wilderness, a concept about pristine nature, to protecting the earth, air, land, and water for its own sake (Hill 2000, 236; Environmental 2012b, 1). NEPA paved the way for additional policies of the 1970s including the formation of the EPA. The growing environmental consciousness did not only impact the federal government, however. In 1970 the State of Illinois created the Illinois EPA, the Illinois Pollution Control Board, and the Department of Natural Resources. This made Illinois the first state in the nation to adopt a comprehensive Environmental Protection Act (Illinois 2012a, 1; Illinois 2012b, 1). These entities worked to protect and improve the environment of Illinois and continued to augment environmental awareness within the state of Illinois and Chicago. In 1972, the Clean Water Act created new water quality standards, created guidelines to prevent pollution of waterways, set technology-based standards for water treatment, and standardized a permitting system. These changes in environmental attitude were seen as well in specific actions towards the Chicago River. The

early 1970s also saw an adopt-a-stream program gain traction as scout troops and other volunteers participated in riverbank cleanup projects and a number of articles were published in local newspapers that brought awareness to various plights of the river. These articles included topics concerning, the Chicago Transit Authority and local industries dumping pollutants into drains and ditches that flowed into the river. In 1975 Mayor Richard J. Daley expressed the optimism of these environmental changes by stating his desire that office workers downtown would be able to catch their lunch in the river and grill it in riverside parks (Hill 2000, 237; Daley 1/28/1975).

In response to environmental regulation and the growing environmental consciousness the Metropolitan Water Reclamation District of Greater Chicago (MWRDGC), formerly the Sanitation District of Chicago (the name was changed in 1989 on the centennial of the founding of the district), developed the Tunnel and Reservoir Plan (TARP), known as Deep Tunnel (Metropolitan Sanitary District of Greater Chicago 1966; Metropolitan Sanitary District of Greater Chicago 1972). This plan was adopted in 1972 to comply with the new Federal and State water quality standards. Construction of TARP began in 1975 and continues today (Hill 2000, 222-223; Schein 2004, 367).

This project began in 1975, and is designed to reduce water pollution in Chicago area waterways including the Chicago River by storing sanitary and storm sewer overflow in 109 miles of underground pipe during heavy storm events. The water will be stored in the pipes and surface reservoirs until the water can be treated by water reclamation plants and discharged into the waterways (Schein 2004, 367). Phase one of the project went online in 2006 and was officially completed in 2008, boosting the storage capacity of MWRDGC facilities to 2.3 billion gallons of water. The MWRDGC expects to complete the project by 2029 (Hawthorne 2011a, 1;

Metropolitan 2012, 1). This project has already done much to prevent sewage overflow into the river and has been a major reason for improving water quality in the Chicago River. The deep tunnel has improved water quality to a point that the attainability of recreation is seen as possible.

However, it was a *Chicago Magazine* article entitled “Our Friendless Chicago River” by Robert Cassidy (1979) that caused a shift in the attitude towards and a budding awareness of the Chicago River. This article discusses the state of the Chicago River and Cassidy’s observations from a canoe trip on it. The article also inspired the creation of the non-profit organization Friends of the Chicago River which works on restoration projects, wildlife and environment protection, community education, public policy and planning among others (Friends of the Chicago River 2012b, 1; Friends of the Chicago River 2011a, 1; Friends of the Chicago River 2011b, 1; Hill 2000, 238). This organization has been integral in bringing awareness and attention to the condition of the river as well as educating Chicagoans on the river and what it provides and it’s potential. The article points out the rivers existence as a habitat as well as its condition along various stretches of the river. Cassidy also talks about the development potential along the river for residential use a potential that has been increasingly realized over the past three plus decades and continues with future plans that, report that the Kennedy’s are planning a new development at Wolf Point (Cassidy 1979, 1; Roeder 2012, 1). The article discusses at length the MWRDGCs involvement with the river, writing about paddling past sewer pipes, and also discussing the TARP (Cassidy 1979, 1). The article foreshadows the river as a recreational and residential resource, an idea seemingly before its time with major steps over the past ten years and now being taken to realize them. The federal government has been involved in a number of ways in many of the steps towards improving the river through major legislation

(CWA), increasing regulations (US EPA), TARP (MWRDGC and the Army Corps). Since Cassidy's article a number of events have transpired and entities and actors have been involved with the river to create the current situation. To understand the current situation regarding the Chicago River we must understand the steps taken between 1979 and April, 2010.

3.3 Improving River Quality

During the 1980s water quality continued to improve due to environmental regulations and increasing public consciousness of what they could do to help improve the health of the river. As discussed earlier continually decreasing shipping traffic also allowed water quality to improve. These improvements lead to the return and increase in fish populations and wildlife such as eagle, beaver, mink, turtles (Hill 2000, 227). However, the 1980s also presented setbacks for the river. In the mid-1980s the MWRDGC ceased disinfection at its treatment facilities largely due to cost. The primary disinfectant at this time was chlorine which was quite costly to the reclamation district. The MWRDGC had begun disinfection in 1972 when Illinois adopted disinfection standards. However, the federal government repealed its disinfection requirement in 1976 because of mounting evidence that chlorine produced negative environmental effects as well as negatively impacting drinking water. It was not until 1984, however, that the MWRDGC halted disinfection via chlorination (Hill 2000, 226; Metropolitan Sanitary District of Greater Chicago 1985).

Increased commercial and residential development in the Loop in the 1980s and 1990s provided Mayor Richard M. Daley a reason and an opportunity to change the way the city viewed the river (Gobster and Westphal 1998, 79; Hill 2000, 255-256; Metropolitan Sanitary

District of Greater Chicago 1984). In 1990 the Chicago Department of Planning along with Friends of the Chicago River at the behest of the Mayor proposed new urban design guidelines for riverfront development that would embrace the river, not turn its back on it. So, instead of erecting solid walls up against the river, contractors built new structures facing the river with windows and through building orientation. In addition, these guidelines require buildings to include river access and connecting river walks along their portions of the riverfront (Figure 8). This had a tremendous impact on how Chicagoans viewed the river, now as a visual amenity, while developers took the opportunity to increase land value. These urban design guidelines have been updated over the years to further address the needs of the river and its users. The five expressly stated goals of the current Chicago River Corridor Development Plan (Chicago Department of Zoning and Planning 2009) are: to create a connected greenway along the river, with continuous multi-use paths along at least one side of the river; to increase public access to the river through the creation of overlooks and public parks; to restore and protect landscaping and natural habitats along the river, particularly fish habitat; to develop the river as a recreational amenity , attracting tourists and enhancing Chicago's image as a desirable place to live work, and visit; and to encourage economic development compatible with the river as an environmental and recreational amenity. The guidelines cover issues such as setbacks, riverfront development, riverbanks, and urban greenways (City of Chicago 2005, 1; Chicago Department of Zoning and Planning 2009, 3-5). This production of the river as a visual space, with the goal in furthering the river's development as a recreational amenity as well, was a step forward into the process of improving the overall health of the river and residents' attitude towards it. Further construction of TARP and other environmental regulations had slowly been improving the Chicago River, and people, downtown at least, no longer turned up their noses at the river.



Fig. 8

West Wacker 333, taken from architectural tour boat, good examples of embracing the river.
Photography by Garrett Wolf.

Water quality improvements and the growth of the river as a visual amenity began the process for the growth of the river as a recreational amenity. This initiated the ChicagoRivers Demonstration Project, in 1993. This was a collective effort of the Metropolitan Water Reclamation District of Greater Chicago; the US Army Corps of Engineers, Chicago District; the USDA Forest Service, North Central Research Station; the US Fish and Wildlife Service, Chicago Metro Wetlands Office; the National Park Service, Rivers, Trails, and Conservation Assistance Program; the Urban Resource Partnership of Chicago; and the Friends of the Chicago River (Friends). This project resulted from a series of forums organized by Friends in 1991 and 1992 (Gobster and Westphal 1998, ix, xiii). The forums resulted in a work plan produced by Friends and the National Park Service; this work gained the attention of Congress, resulting in the combination of a number of federal and local organizations into the ChicagoRivers Demonstration Project, designed to be a “model” for revitalizing urban river (Gobster and Westphal 1998, ix). The project had four major objectives: 1) identify and characterize major constituent groups, settings, and recreational opportunities in the corridor; 2) identify patterns of recreational use; perceptions of issues; and preferences for recreational activities, settings, and experiences; 3) examine commonalities and differences in uses and perceptions of different areas along the river corridor; 4) make recommendations for enhancing the river for recreation and related values and for improving river corridor planning and management based upon research findings (Gobster and Westphal 1998, 1).

Two major results of this project were the publications *Nature and the River* (Moore et al. 1998) and *People and the River* (Gobster and Westphal 1998). Together these two studies asked and researched important questions regarding the Chicago River. In the process of these studies Friends also initiated a public outreach process to connect citizens of Chicago to these studies

and raise awareness about the river and its potential. Both studies worked along the entire extent of the Chicago River as well as the Calumet River. In *Nature and the River* an exhaustive inventory of the wetlands, wildlife, and waterways was conducted to allow for future plans to be able to account for as much environmental information as could be available. *People and the River* presented results from a number of social science investigations into how user and interest groups perceived the river and how they would like to see the river improved for recreation and related uses (Gobster and Westphal 1998, 1-4). *People and the River* broke down the river into a number of segments to conduct the study analyzing the perceptions, needs, desires, as well as barriers for recreation in each segment of the river. The Chicago Rivers Demonstration Project officially concluded in 2004 following the publication of the results and the contribution to future river plans. Conclusions point to potential management strategies to increase recreation and overcome barriers. These two publications and the series of studies and partnerships that made them possible did much to bring awareness to citizens on their own feelings about the river as well as its potential as a resource for recreation and the qualities of its physical environment.

This awareness along with the Mayor's desire to make the river an amenity for the city helped to spur the Use Attainability Analysis for recreation on the river conducted by the Illinois EPA (2007) from 2002-2007, after which the IEPA submitted a proposal to the IPCB which contained no recommendation for primary contact waters. The IPCB began its review in 2008, and has since split its docket into four cases (discussed in the next chapter), of which one has been completed and the other three are still in the hearing stages (Girard 2010a,1). These cases deal with recreation, recreational use designations, aquatic life, and aquatic life use designations. The IEPA use attainability analysis, which assess the attainability of Clean Water Act standards, and its omission of primary contact waters in its report were the main factors that brought the US

EPA into involvement with the situation which can be linked to the demonstration project, river improvements over three plus decades, and peoples increasing awareness and involvement with the Chicago River and its health (Holst 2010, 1-2; Girard 2011a, 1).

Growth of river use and awareness has also brought other changes to the river. In 2006 Friends of the Chicago River started a museum in a Chicago River Bridgehouse at Wacker Drive and Michigan Avenue. This museum introduces the various stages and changes of the Chicago River over the course of history. It talks about settlement, industry, and the views of visitors to the city. It also talks about current projects underway to improve the river such as restoration projects, cleanup, and education (Bridgehouse 2012, 1). In 2011, new Mayor Rahm Emanuel unveiled plans to construct boat houses along the Chicago River in an effort to increase recreational accessibility. This project is a partnership between the City of Chicago and the US EPA and was announced by both Mayor Rahm Emanuel and US EPA Administrator Lisa P. Jackson. One of the boathouses will be located at a new park along the Bubbly Creek (the name derives from the bubbles that would rise to the surface from the animal carcasses dumped by the stockyards earlier in Chicago's history) and another at Ping Tom Park about half a mile south of the Loop (Hawthorne 2011b, 1; Mayor 2011, 1).

All of these changes continually reconfigured and reproduced the Chicago River in reality and in the minds of Chicago Residents. The decline of industry followed by environmental legislation and improving water quality moved the river from a polluted means of shipping and sanitation, to an ignored space, to a visual amenity through environmental improvement, and to the cusp of becoming a legitimate (speaking in terms of regulations) recreational amenity. It is at this juncture in which a new political intervention enters the network that my current researched is focused. That change is the involvement of the US EPA in pursuing

the meeting of Clean Water Act standards for the Chicago River. This intervention begins the reproduction of the urban political ecology of the Chicago River with its various actors some who have been a part of the network that produces the Chicago River for decades or even centuries and some who are newer to the network.

4. Historical Urban Political Ecology of the Loop and Bridgeport

4.1 Loop Historical Urban Political Ecology

Fort Dearborn was the first major American presence in the region on the southwestern shore of Lake Michigan. Fort Dearborn once stood within what are today the boundaries of the Loop, on the south shore of the Chicago River, several hundred feet from west of where the river flowed into Lake Michigan. Growth in the area was slow initially, but after the prospect of the I&M Canal became more likely as well as the completion of the Erie Canal in 1825 that dramatically increased Great Lakes shipping and access to Chicago the population began to grow more steadily. Upon completion of the canal the population rapidly expanded.

Early Chicago clustered close to the river. As a result, in the 1830s, South Water Street became a hub of activity as more and more ships began to utilize Chicago's harbor and river (Figure 9). Following the increased activity on South Water Street, Lake Street, one block to the south, became a major retail street in the Loop. When the city was still young, and still a walking city the Loop area contained all the functions of the city near the Main Branch of the Chicago River (Holt and Pacyga 1979, 14; Pacyga and Skerrett 1986, 4).

Harbor improvements and the I&M Canal drove the growth of Chicago industry. The reorientation of internal commerce during the Civil War resulted in rapid growth of the Loop, especially after the Union halted shipping on the Mississippi River, effectively ending St. Louis' reign as the major interior continental shipping destination. Chicago filled this void, and retained it following the war, continuing its rapid growth. Most of this growth centered on the Loop,

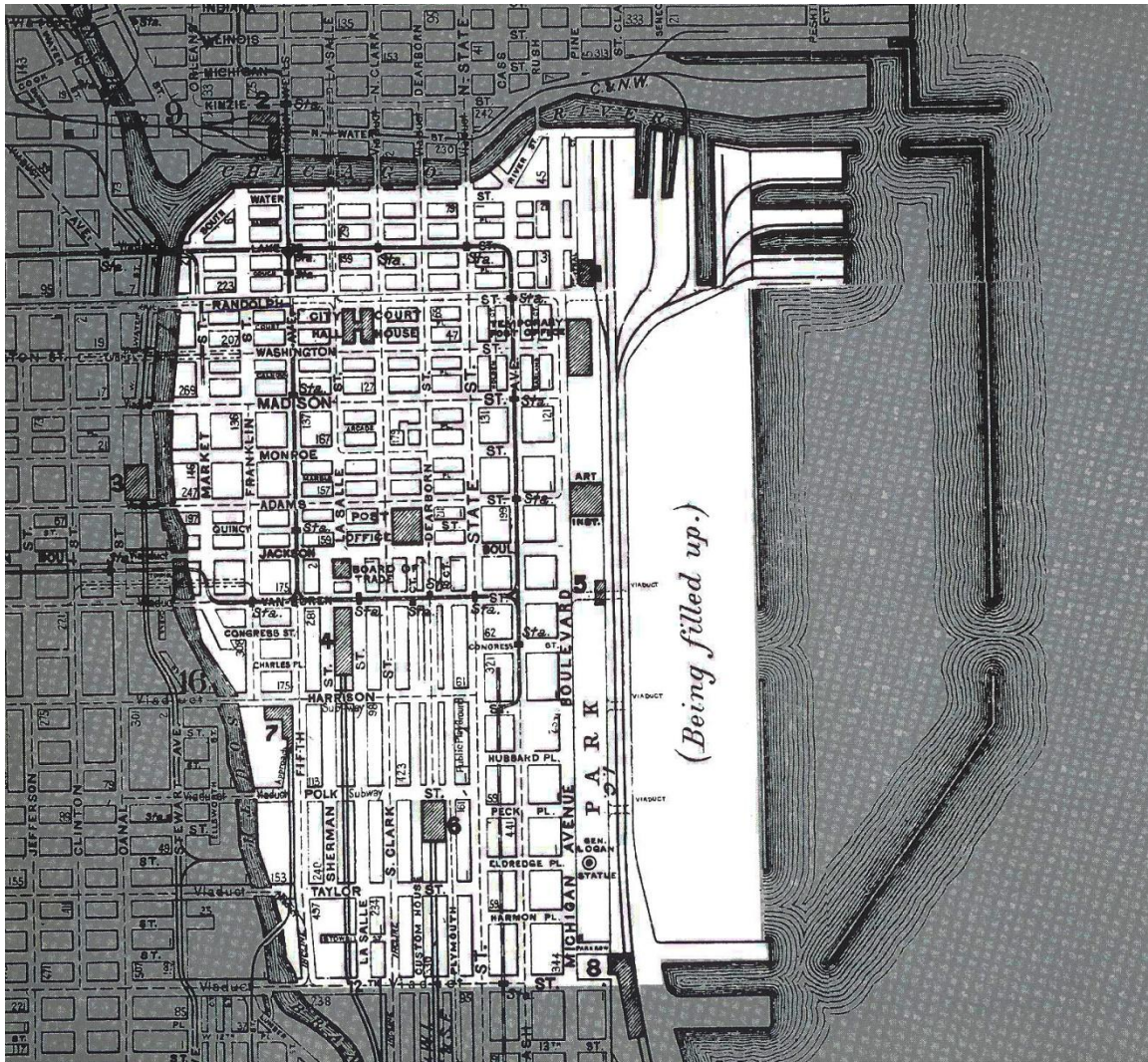


Fig. 9

1909 edition of *The Rand-McNally New Standard Map of Chicago*.
Courtesy of the Chicago Historical Society.

which essentially was the city in the 1860s, this expanded with the use of horse-drawn street cars, which were first introduced in 1859 (Andreas 1975 [1884], 176-177; Pacyga 2009, 75).

Little settlement occurred north of the Main Branch until the 1860s when the city built numerous bridges to span the waterway. Until then, the Main Branch of the Chicago River served as a barrier, preventing the movement of people and transaction of business between the Loop and what is today the Near North Side (Andreas 1975 [1885], 60; Holt and Pacyga 1979, 14; Pacyga 2009, 22). As a result of this barrier, Chicago's initial retail and wholesale businesses ran along South Water Street, located along the Chicago River. As the population continued to expand, reaching 12,000 by the mid-1840s, businesses began to cluster in particular sections of the Loop. Warehouses and businesses involved in manufacturing were located along South Water Street and the South Branch of the Chicago River. Retail concentrated along Lake Street, primarily from Wabash to Franklin. Population continued to expand rapidly: 29,963 by 1850 and 298,977 in 1860. By 1857 the Loop was filled (Andreas 1975 [1885], 694; Holt and Pacyga 1979, 14; Pacyga and Skerrett 1986, 3; Pierce 1940, 141). A major difference with the Loop then, as compared to now is that the Loop contained both slums and fashionable residences. Fashionable residences were concentrated along Michigan and Wabash avenues south of Van Buren, while working-class housing ran along Clark and State streets from Roosevelt Road and the rail yards to the southern edge of downtown (Holt and Pacyga 1979, 14; Pacyga 2009, 65; Pierce 1940,). However, by the 1860s manufacturers were leaving the Loop and moving to other water and rail transport centers outside of the central business district. City government and Loop residents pushed coal, lumber, and stone-cutting industries along with many warehouses west to the east bank of the South Branch in the Loop. Another major development in the mid 1860s was the shift of high end retail from Lake Street to State Street because Potter Palmer, a major real estate

developer and founder of Marshall Field and Company, as well as other real estate and retail developers saw that Lake Street could not accommodate the expanding luxury retail sector (Andreas 1975 [1885], 509; Holt and Pacyga 1979, 14; Pacyga 2009, 35; Pacyga and Skerrett 1986, 6; Pierce 1940, 139). These shops lined both sides of State Street between Polk and Lake. In addition to the commercial and residential functions of the Loop the City Council and County Commission both moved into the then new Cook County Courthouse on the block bounded by Clark, Randolph, LaSalle, and Washington streets, in 1853 and these government functions have remained in the Loop ever since. A financial district also developed in the Loop with the Chicago Board of Trade opening at LaSalle and South Water streets in 1848 and moving to LaSalle and Washington in 1865. In the 1860s the Court House and the Board of Trade areas drew banks, real estate and insurance agents, attorneys, architects and contractors, advertising agents, newspapers, and telegraph companies. Approximate boundaries for the government and financial district were Lake, Wells, Adams, and State (Andreas 1975 [1885], 66; Holt and Pacyga 1979, 16). Hotels tended to be located near the river and later around rail stations. By 1870 the vice district shifted south of Washington street and west of Wells Street from the south part of the Loop where it had been pushed by State Street development (Holt and Pacyga 1979, 16; Pacyga 2009, 108; Pierce 1940, 432). These continuous shifts in business, industry, and residential locations illustrate the importance of the Loop both in the diversity and growth that it provided the city.

Chicago's growth in both population and commerce had significant impacts on the urban political ecology of the Loop. Much of this resulted from improvements to and for shipping from various harbor improvements and the construction of the Illinois and Michigan Canal. These improvements and alterations brought a rapid increase in shipping as mentioned in chapter two.

These changes also brought more industry to the river edges in the Loop and other developing communities. Prior to 1870, the year when the first major move out of the Loop of various industries occurred, the Loop was home to reaper works, tanneries, distilleries, flour mills, boiler works, lumber yards, along with grain elevators and warehouses (Lewis 2008, 32). After leaving the Loop foundries, sash and door mills, and flour mills moved to the West Side and the north bank of the Chicago River. Lumber yards relocated to the southern portion of the Loop and across the river from this location. Grain elevators were constructed on the southern fringe of the city boundaries at the time near railroad terminals (Lewis 2008, 32; Hoyt 1933, 65-66; Andreas 1885 [1975], 673-698). In 1881, the Loop still continued as a huge site of manufacturing with forty-five percent of the city total. In addition, many firms were located across the Chicago River from the Loop. Eighty percent of the manufacturing firms in the city were within three miles of the corner of State and Lake. Simultaneously however, an industrial district began to develop on the outskirts of the city five to ten miles from the city center leaving the Loop at this time mainly specialized in clothing, printing, and leather working (Lewis 2008, 77).

As mentioned in the previous chapter, the Great Fire of 1871 had a tremendous impact on the reorganization of the Loop. As rebuilding commenced land use shifted from industrial to commercial and as a result land values rose. This moved much of the previous industrial land uses out of the central city to other reaches of the city and the Chicago River. The steel industry in particular relocated to the Calumet River at the mouth of which the city developed a new port (Colten 1986, 96; Holt and Pacyga 1979, 16; Solzman 2006, 32).

In the 1880s, cable car lines replaced slower horse drawn car lines. These lines served north, south and west districts of the city. In 1892 mass transit improved with the construction of an elevated steam railway connecting the South Side to the central business district. By 1897 the

elevated and most street car lines were powered by electricity (Holt and Pacyga 1979, 17). In 1879, the Chicago Post Office and Custom House moved to the block of Jackson, Clark, Adams and Dearborn while the Board of Trade in 1885 moved to LaSalle and Jackson. This created a triangle of the Court House, the Board of Trade, and the Federal Building which made up the core of the Loop's administrative, financial, and communications activities bounded by Randolph, State, Van Buren, and Wells. The major white collar industries in the city all battled for space in this area (Holt and Pacyga 1979, 17; Pacyga 2009, 156, 237). By 1900, the LaSalle Street financial canyon had become a regional and national financial center, while State remained the primary retail street though the higher end retail establishments began to move to Michigan Avenue south of Randolph. In the 1880s, a theatre and arts district developed in the Loop ultimately concentrating to the west of Clark Street between Randolph and Adams (Holt and Pacyga 1979, 17; Pacyga and Skerrett 1986, 7). The numerous industries and their locations show the concentration of importance in the Loop from the beginning of the city until today. However, wholesaling, very important to Chicago's economy at an early stage, began to lessen in importance. This industry had located in the Loop due to difficulties in transport, requiring horse drawn carts. As rail and intracity transport became easier, the location of wholesale businesses became more flexible, moving to the South Branch of the Chicago River in the Loop. By the mid 1890s the wholesaling industry all but left the Loop (Holt and Pacyga 1979, 18; Lewis 2008, 213).

As Chicago grew, it became an important city for events, the first of which was The River and Harbor Convention held in 1847, and discussed in the previous chapter. In 1860, Chicago hosted the Republican National Convention nominating Abraham Lincoln for president. By 1871, the year of the Chicago Fire, Chicago had already become a convention city and the

fire created additional opportunities for entrepreneurs to construct newer and larger hotels. By the turn of the century most hotels were located in the northern two-thirds of the Loop near the government and financial center or shopping (Holt and Pacyga 1979, 18). The southern portion of the Loop, from Van Buren to 12th Street on the other hand became better known for its boarding houses and inexpensive entertainment as well as vice. For the 1893 World's Columbian Exposition, however, much of the area in the South Loop and other areas south of the Loop were improved. Hotels were built, streets and sidewalks were improved, building exteriors were cleaned and local businessmen came together to create Lake Front Park, later Grant Park out of land left open for a park, but where much debris from construction over the years had been dumped. Though the park did not open until after the exposition, it acted as a catalyst for city planning and civic pride (Colten 1994, 127-128; Holt and Pacyga 1979, 18).

As discussed in chapter two, health and water quality concerns resulted in the permanent reversal of the Chicago River with the Chicago Sanitary and Ship Canal. This reproduction of the river altered the general perception of the river especially in the Loop, which in combination with the city plan designed by Daniel Burnham, saw the Chicago River as an important amenity to the city.

With shifts to the economy of the city, particularly the Loop, shifts in land use began to occur. These changes in economic structure as well as shifts in river attitude resulted in new plans for the river. In the 1920s these plans resulted in Chicago beginning to demolish the remaining wholesale warehouses along the Chicago River and East South Water Street in order to create a formal esplanade common in European river cities (Holt and Pacyga 1979, 20; Smith 2006, 12, 34). Another factor in the decrease in wholesale business from the Loop was the conversion of 1.5 million square feet of floor space converted from warehouse and wholesale to

office use during the 1940s and another million before 1955 and continuing in the 1960s and 1970s (Holt and Pacyga 1979, 22).

Wacker Drive, completed in along the Main Branch in 1926, and extended south to Congress Parkway and then Harrison Street completed in 1948 and 1954 respectively, illustrated the influence of the automobile on the Loop. This street followed the curve of the Chicago River, replacing South Water Street and River Street. This reorganized commerce, partly away from the river as the street now ran along the edge of the river in places (Cutler 2006, 1, 241; Hill 2000, 155; Holt and Pacyga 1979, 20).

The construction of the Michigan Avenue Bridge created a much needed and effective connection between the Loop and the North Side and also led to the development of North Michigan Avenue as a shopping destination (Cutler 2006, 257; Hill 2000, 155; Holt and Pacyga 1979, 20). Also throughout the 1920s, many new buildings were constructed in the Loop, the twenty-one story Chicago Temple, in 1923; the Bankers Building in 1928; the 45 story Civic Opera along the South Branch of the Chicago River in 1929; and the 29 story One North LaSalle Building in 1930. The last major buildings constructed in the Loop prior to construction succumbing to the Great Depression were the twenty-three story Field Building and the eight story Goldblatt's Store in 1934. It would not be until the mid-1950s that developers would erect another building in the Loop (Chicago Daily Tribune 1954a, A5; Chicago Daily Tribune 1954b, A5; Holt and Pacyga 1979, 20).

Before the Great Depression hit, Chicago's thriving economy allowed for over seventy office buildings to be built in the Loop, constituting the majority of structures in all parts of the Loop except the southwestern portion., with the finance and government district, which extended its borders to Jackson, Wells, Randolph, and Dearborn by the 1930s, continuing to be the

densest. Real estate brokers were located mainly in the two blocks south of the City Hall and Court House between LaSalle and Clark, from Monroe to Washington. Lawyers located in the same area as well as between Wells and LaSalle and Washington and Lake. Stockbrokers were located near the stock exchange on both sides of LaSalle between Jackson and Monroe, while grain dealers located between Van Buren and Monroe and between Clark and Wells. The professional offices of doctors and similar professions grouped along Michigan Avenue and Wabash between Washington and Van Buren. Finally, theatres concentrated in a district along Michigan, State, and Randolph (Figure 9) (Holt and Pacyga 1979, 22; Pacyga 2009, 255).

The Prudential Insurance Building at Randolph, east of Michigan Avenue broke the building hiatus in 1957, opening over air rights of the Illinois Central Railroad tracks. Over the next twenty years companies built 30 million square feet of office space in and near the Loop, almost doubling the previous square footage. However, with some of this construction happening outside of the Loop, it signaled an end to the Loops dominance as the center of office space and large hotels, though Chicago's central business district remained one of the most concentrated in America. In addition the office building boom transformed the Loop. It was no longer a prominent location for fashionable retail and entertainment with activity happening day and night. By 1970, the Loop tended to slow down and close down after five o'clock (Holt and Pacyga 1979, 22; Pacyga and Skerrett 1986, 13-14). This all became a part of the city with many of its citizens ignoring both the neighborhood and the river or failing to recall their important history or see their potential. The river especially became an afterthought, a dirty, sometimes smelly, afterthought. Much of this is due to the lack of activity. People were not living or spending their leisure and entertainment time in the Loop. They simply came in from other parts of the city and surrounding suburbs to work and then leave when the work day was done. This all

led to limited thought and care for the river, especially from the public. Though it set the stage for a river renaissance.

The 1980s also proved to be a renaissance of development in the Loop, particularly the increase in residential development. New construction had begun in the 1970s including a few residential buildings, but most of the new development was office and commercial. (Cutler 2006, xvi; Pacyga 2009, 255) The first major move toward this redevelopment was a plan in the southern loop for the Dearborn Park project, a multi-use development of townhomes and commercial space proposed in 1970. The project opened in 1979 as did the ill-fated State Street Mall. While neither of these projects were successful in their times, largely owing to the lack of permanent residents and amenities downtown they did offer a prelude of development to come. As Chicago's economy continued to recover developments like this became more viable. These projects were simply too ahead of their time to be successful, but they presented a changing picture of the Loop as it entered the 1980s (Pacyga 2009, 360). It was not until mid 1980s that the Loop really started to see the return of residents and economic growth following the election of Richard M. Daley. Much of this success stemmed from previous development projects finally taking hold and improving along with the regional and national economy (Pacyga 2009, 381). This shift in the Loop drew increasing numbers of residents to the downtown area. Between 1990 and 2003 the Loop added 30,000 housing units (Sulski 2003, 1; Hanson 2006, 17). Census data shows major increases in the population of the Loop from 11,954 in 1990 to 16,388 in 2000 and nearly doubling to 29,283 at the 2010 census (Danzer 2004, 764). In addition, the Loop economy was growing and the area becoming a tourist destination.

4.2 Bridgeport Historical Urban Political Ecology

Bridgeport is one of the oldest neighborhoods in Chicago. Bridgeport was the site chosen as a terminus of the Illinois and Michigan Canal, near the terminus of the portage route that preceded the canal, that would connect the Great Lakes to the Mississippi River. Bridgeport and the Chicago River are intertwined and owe much of their existence to each other. Similarly the Loop owes much of its existence to its location at the mouth of the Chicago River and connection to the Great Lakes. Before the State of Illinois and the Illinois and Michigan Canal Commission dug the I&M Canal, this area was known as the Lee Farm, or Lee's Place, and was one of the few settled areas until the 1820s. Several farms developed around Lee's Place, which is most significantly known as a site of a native attack in 1812 several months before the Fort Dearborn Massacre. Following the Fort Dearborn Massacre the farmers abandoned the Lee Farm, however when the fort was rebuilt in 1816 fur traders from Detroit opened a fur trading post at the former site of Lee's Place. Due to its proximity to the Chicago River, this area became one of the first places in Illinois to be surveyed, in 1821 by John Walls. The fur trading post known as Hardscrabble lasted until 1833, though the name stuck for longer. In 1833 the City of Chicago and War Department Engineers opened a quarry in Hardscrabble to cut stone for improvements of the Chicago Harbor. The opening of the quarry and the commencement of canal construction in 1836 marked the shift from sparsely populated rural frontier to Bridgeport and the path to becoming part of Chicago (Holland 2005, 51; University 1996a, 1).

The first major settlement in Bridgeport occurred in the mid 1830s when Irish laborers who came to work on the construction of the Illinois and Michigan Canal (Holt and Pacyga 1979, 113; Pacyga 2009, 31). Some sources say that the canal commission brought many of these

laborers in because they had worked on the Erie Canal (Solzman 2006, 49). The homes of these Irish laborers were wooden shanties on the banks of the South Branch of the Chicago River. Following the financial panic of 1837 and expenses of the canal, construction of the canal stalled and many of the laborers received payments in land scrips by the canal commission giving them ownership land in Bridgeport (Putnam 1909, 340). Population remained small in the area until work on the canal resumed in 1842. The area acquired the name Bridgeport during this period of the 1840s.

Bridgeport during the construction of the canal had many canal construction related industries. The completion of the canal, in 1848, established Bridgeport's position as an industrial center. Industry that developed along the banks of the river included lumberyards, manufacturing plants, breweries, brickyards and packinghouses opened, plumbing and steam fitting supplies, metalworking, railroads, furniture factories, planing mills, meatpacking, and slaughterhouses. In addition Livestock were driven to Bridgeport from farms to the south and southwest of the city by what is today Archer Road, helping to turn the path into a thriving commercial strip. Bridgeport, which was not a part of the city of Chicago until it was annexed in 1863, began as an industrial district outside of the city core. Following the opening of the stockyards in 1865, many of the packing related businesses moved to the yards, however the stockyards continued to be a huge source of employment for the residents of Bridgeport. Also in 1865 the Union Rolling Mill Company opened the Union Rolling Mill on the South Branch of the Chicago River in Bridgeport, providing more industrial jobs, and attracting other industry. By 1881, lumber and metalworking dominated industry in Bridgeport with smaller concentrations of food, leather, meat chemical, and carriage related industries (Lewis 2008, 71). In 1905, the Central Manufacturing District opened, the first planned industrial development, in Bridgeport in

the western portion of the community along the South Fork of the South Branch of the Chicago River (Pacyga 2009, 113). Railroads which served the many industries of Bridgeport and the surrounding area also employed many community residents beginning in the 1850s (Keating 2008, 113)

The Union Stockyards, which opened in 1865, also tremendously impacted the Chicago River, especially at Bridgeport. The Union Stock Yard opened the stockyards directly south of Bridgeport along the South Fork of the South Bank of the Chicago River, which at the time extended further south than it does today. The massive concentration of stockyard waste that was discharged into the river led to the nicknaming of South Fork, Bubbly Creek for the bubbles on the surface from decomposing parts of livestock and general putrifaction in the water (Hill 2000, 101). The stockyards cut a canal that flowed into the South Fork, which quickly filled with slaughterhouse waste: offal, carcasses, and manure. Occasionally the stream would crust over allowing chickens to walk across it. Stories tell of people unfamiliar with the area accidentally falling through into the polluted stream, and of the stream catching on fire (Hill 2000, 101; Solzman 2006, 226). The severely polluted water came to define Bridgeport. The stockyards, along with the increasing industrial and human waste all lead to tremendous sanitation and public health issues, especially with the water supply, ultimately resulting in the reasoning behind the reversal of the Chicago River. Also, at various times, as previously mentioned, the City of Chicago filled in portions of the South Fork due to the degraded and putrid nature of the river, this as well as over a century of stockyard waste has caused problems along the South Fork at Bridgeport because of the high volume of toxic sediment. Interestingly, the stream still bubbles today, as result of decaying organic matter as opposed to animal remains. However, this part of



Fig. 10

Racine Avenue Pumping Station, Bubbly Creek (South Fork of the South Branch).
Photograph by Garrett Wolf.

the river remains one of the most polluted despite the closing of the stockyards in 1971. This is largely due to the Racine Avenue Pumping Station at 38th Street and Racine Avenue (Figure 10). Most of the water from the south side of the city flows through this facility. During heavy storm events when the flow is more than the sewer system can handle, effluent is released into the channel. During such events untreated sewage enters the waterway and causes dramatic rises in water level (Solzman 2006, 227).

The reversal of the Chicago River by opening the Chicago Sanitary and Ship Canal did little to alter the attitude toward the river in Bridgeport. The stockyard still sent waste down Bubbly Creek and all of Chicago's waste flowing by on the South Branch Bridgeport remained connected with a highly degraded stream. In fact, following the reversal of the river the South Fork actually experienced a reduction in flow because the river no longer continuously flowed from the South Fork to Lake Michigan, now the South Branch flowed towards the South Fork causing the South Fork to become mostly stagnant (Reardon 1999, 1).

At the same time that the city recorded these events in regards to the river, most residents of Bridgeport were employed by local industry, but following the Civil War expanding city government provided an additional opportunity for employment. Opportunities expanded for work in government as the Chicago Democratic machine gained the Mayor's office in 1930 with Anton Cermak. Following Cermak's death mayor's hailing from Bridgeport dominated city politics, with a concomitant rise in patronage jobs that played a major role in the economic base of the neighborhood (Pacyga 2009, 115).

While the Loop was primarily organized around the shifting commercial, industrial, and service functions of the community, Bridgeport's commercial and industrial areas were established early on and remained consistent. Other organizing features of the neighborhood

were generally the places of social organization such as churches and taverns, and the ethnic boundaries within the neighborhood. For most of its history, Bridgeport had been a neighborhood of family communities surrounded by industry. There were divisions of between Poles and Lithuanians in the northwestern part of the neighborhood, Irish in the far south around Nativity of our Lord Church, German and Italian residents in the Dashiell area north of 31st Street, east of Halsted. These groups dominated their sections of the neighborhood often organized around their own churches (Figure 11) (Holt and Pacyga 1979, 117-118; Pacyga 2009, 31).

At the time that the Loop experienced a new building boom, the most significant changes in Bridgeport dealt with loss of industry and demographic changes. With the decreasing industrial use of the river, due to the growth of Calumet Harbor and the general deindustrialization of Chicago, Bridgeport lost businesses and jobs. Perhaps the biggest blow to the neighborhood in terms of employment was the closure of the Union Stockyard in 1971. The stockyards had been declining in size and ability to employ for decades, but its closure was another big blow to the economy of Bridgeport resulting from the general trend of deindustrialization (Pacyga 2009, 316-317). In addition to the job loss Bridgeport has experienced a significant decline in population since 1950 losing approximately 15,000 residents, about one third of its population. The decline, between 1960 and 1990 was particularly sharp at about 11,600 residents lost. The diversity of the neighborhood has also drastically changed. In 1950, residents classified as white made up nearly one hundred percent of residents in Bridgeport, largely of various European ethnic backgrounds: Polish, Lithuanian, Irish, Italian, etc. with little change in 1960 (Hauser and Kitagawa 1953; United States Bureau of Census 1972). By 1970, we see a growing Mexican population in Bridgeport, reaching nearly seven

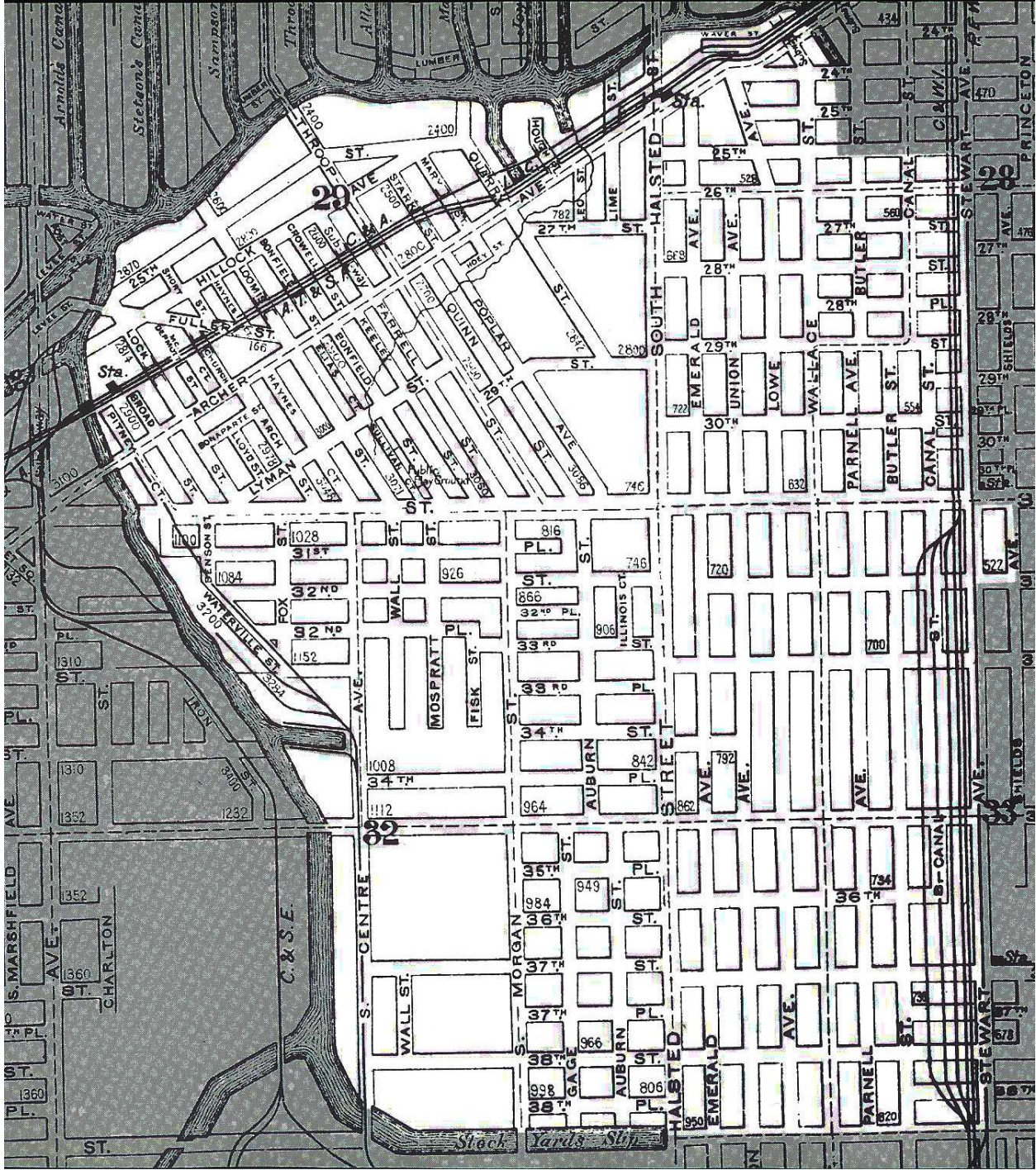


Fig. 11
1909 edition of *The Rand-McNally New Standard Map of Chicago*.
Courtesy of the Chicago Historical Society.

percent (Chicago Association of Commerce and Industry 1975; United States Bureau of Census 1972). In 1980, the Mexican population represents twenty percent of Bridgeport's population (Chicago Fact Book Consortium 1984). By 1990, residents identifying as Latino made up twenty-five percent of the population with a growing Chinese population rapidly reaching about sixteen percent (Chicago Fact Book Consortium 1995). Ethnicity data for 2010 is not yet available, but in 2000 census data showed Bridgeport comprised of thirty percent Latino and twenty-six percent Chinese (United States Bureau of Census 2003; University 1996b, 1). These demographic shifts have drastically altered the diversity and character of the neighborhood, though it has retained some of its heritage, especially Irish, Polish and Lithuanian. Many portions of commercial areas cater specifically to a particular population with a number of Latino and Asian groceries in the neighborhood.

Bridgeport has been experiencing a declining industry, since the rise of Port Calumet. This decline became more rapid in the post World War II years. With declining industry Bridgeport has therefore had to rely heavily on its political connections for economic survival, with five of the last eight mayors coming from the neighborhood. More recently, beginning around the year 2000 Bridgeport began to undergo the beginnings of what some have called gentrification (Talen 2010, 497-498). This resulted in the construction of new townhomes and condominiums especially near the Chicago River. These are often laughed at by long time Chicagoans, including Dr. Dominic Pacyga of Columbia College, who mockingly ask "why would I spend a million dollars to live next to the smelly South Fork, my grandmother would roll over in her grave."² The construction and gentrification has however slowed following the housing market crash in 2007 though Bridgeport seems to have been less impacted than many

² From an interview with Dr. Dominic Pacyga of Columbia College, July 14, 2011 on matters of the history of the Chicago River and Bridgeport. Dr. Pacyga agreed to let his name be used on this matter for this research. Transcript on file with author.

other neighborhoods, experiencing a minimal increase in foreclosures. A number of neighborhood residents that I spoke with said they expect the new construction to continue as the economy improves.

As we have seen, many actors have been involved with the river's reproduction via historic-spatial processes in both the Loop and Bridgeport. The growth of the Loop as a residential neighborhood and Bridgeport's changing residential make-up have helped to produce the opportunity for another reconstruction of the urban political ecology of the Chicago River. This reproduction of the urban political ecology of the Chicago River is produced by a number of actors, some of whom have been a part of the production of the urban political ecology of the Chicago River before and some new. It is the present situation and network reproduction that we will look at in the next chapter.

5. The Urban Political Ecology of the Chicago River at the Loop and Bridgeport

The Chicago River has undergone a renaissance; parts of it are now quite beautiful and provide opportunities for Chicago to present itself in a very unique way. The riverwalk plan has brought the city and its downtown residents closer to the river. Architecture tours attract visitors from local, national, and international destinations. Awareness of the river, its condition, and its potential have increased since the environmental movement of the 1960s and 1970s, with particular events and movements along the way that build upon previous awareness. The Chicago River therefore stands as a reminder of the historic-spatial processes that have produced, reproduced and influenced it.

This chapter explores the network that produces the urban political ecology of the Chicago River itself. There are many networks that act and produce the elements of the City of Chicago and these networks are made up of numerous actors. These actors are involved in multiple networks and significant overlapping of networks occurs when looking at the city as a whole. Each network, however, can be pulled out, constructed, and analyzed to understand the particular effects of its actors on each other, the network as a whole, and what is produced by it. So, while many actors and networks potentially impact the urban political ecology of the Chicago River, I have used the Chicago River as an entity around which to construct a network, which I refer to throughout this chapter. The production of this network occurs primarily through analyzing the series of legal and regulatory actions and observing the entities that the various environmental regulatory changes impacted. In addition to constructing this network this chapter analyzes power relations within the network. I analyze how those power relations are manifested in changes to the urban political ecology of the Chicago River produced by the network. I also

examine how those power relations influence public perception of the Chicago River as well as how they influence actors and actants within the network. I analyzed public perception and the influence of residents of the Loop and Bridgeport through interviews and surveys with members of the communities as well as representatives of various entities within the network.

In actor-network theory a network is made up of actors and actants. It can sometimes be difficult to distinguish why one term is used over another. Actors are often easier to understand because they enact identifiable action and decision-making. Actors are typically individual entities or a group seen to act as a single entity. Actants are more difficult to classify often because their “acts” or agency is not as obvious or conventionally understood. While an actant may be human or non-human, actants are entities that are “enrolled” or “allied” to support a position or the production of a network (Callon 1986, 197; Johnson and Latour 1988, 298-299). Actants are often elements of the network that traditionally are not given agency. However, these entities do exhibit agency through their ability to influence the acts of other entities (Risan 1997, 1). An example might be sewage, which is not typically understood to have agency. However, sewage by its presence, others perception of it, and who is responsible for it exerts agency by influencing actions of other members of the network.

This chapter focuses on the activities that produce the river beginning on April 15, 2010 when the United States Environmental Protection Agency (US EPA) issued a letter to the Illinois Environmental Protection Agency (IEPA) and the Illinois Pollution Control Board (IPCB) challenging the existing use designation of the Chicago River (Appendix A). The letter is in regards to the US EPA’s review of revisions of water quality standards pending before the IPCB and the reasons those revisions were proposed. The letter states the purposes of the Clean Water Act (CWA) to attain water quality that protects wildlife habitats and allows for recreation (Holst

2010, 1; Clean Water Act, 2002 [1972] Section 101 (a)(2)). In order to designate water bodies for uses that do not meet CWA goals a state must conduct a use attainability analysis (UAA), this UAA must provide adequate reasons for a state's inability to meet CWA standards and goals for that water body. In addition, water body segments that do not meet those standards and goals must be re-examined every three years. The proposed designations for all segments the Chicago River "do not provide for recreation in the water; and has proposed use designation for certain segments that also do not provide for recreation on the water" (Holst 2010, 2). The support by the IEPA's proposal comes from two of six UAA factors.

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use. (Clean Water Act 2002 [1972], 40 CFR Part 131.10(g))

These factors are supported by the IEPA's assertions that: untreated and undisinfected sewage discharge from municipal water treatment facilities prevents recreation in the water; barge and other commercial boat traffic, vertical concrete walls, channelization, steep embankments, flood management for navigation, and limited shoreline access prevent recreation in and on the water; previous mentioned alterations result in hydrological modifications and prevent recreational uses; local governmental authorities have placed legal restrictions on recreational use of the Chicago River (Holst 2, 2010; Illinois Environmental Protection Agency 2007, 13-14). In this letter, the EPA questions the rationale that these reasons demonstrate that recreation in and on the water is not attainable, saying: human sources of pollution "can be remedied through construction and operation of storage, conveyance and treatment facilities" and there "has been no demonstration that construction and operation of such facilities would . . . cause more

environmental damage” (Holst 2-3, 2010). In addition, human caused conditions are not the same in all segments of the Chicago River, there is documented widespread recreation in all segments of the Chicago River, and the EPA does not consider recreational prohibitions by local governments to be relevant in assessing the attainability of use designations that meet CWA standards and goals (Holst 2010, 3). The letter concludes by recommending that Illinois revise the proposed use designations to include recreation in all segments of the Chicago River, and that “Illinois will eventually need to adopt water quality criteria to protect all of its designated uses (Clean Water Act 2002 [1972], 40 CFR 131.11(a); Holst 2010).

This letter served as the catalyst for a number of changes by entities related to the river that in turn impacts the river in various ways. In addition to impacting how various government agencies interact with the river this letter also brought significant public attention to issues of the river including those involved in the letter (use designations) as well as other issues such as water quality and how Chicago compares to other river cities.

The two neighborhoods, in which I focused my study of the impacts of this letter and the subsequent changes involving the variety of entities mentioned, are the Loop and Bridgeport. The impacts on neighborhoods differ significantly as do their perceptions of the river. This is due to a number of factors related to different historical, environmental, economic, and demographic relationships to both the city as a whole and to the Chicago River as illustrated in chapter four.

The Loop today has remained the central business district of Chicago as well as being home to the major parks and cultural institutions of the city, but it has also become the fastest growing residential neighborhood in Chicago. The Loop is also the primary tourist destination in Chicago. All of these factors have resulted in a Chicago River that the city has acquired an interest in improving and further wishes to make an amenity of it. This is especially true

following the decrease in shipping on the Chicago River and general deindustrialization of the city, and remained true into the 1990s as the city began its riverwalk project (Figure 12), and development along the river focused on high end residential and commercial space.

Bridgeport, since the rise of Port Calumet, experienced industrial decline that accelerated after 1945. Demographic shifts in Bridgeport since 1950 show a declining population overall, but a growing non-European immigrant population since 1970 that has altered its character (Chicago Association of Commerce and Industry 1975; Chicago Fact Book Consortium 1984, Chicago Fact Book Consortium 1995; Chicago Loop Alliance 2011; Kitagawa and Taeuber 1963; United States Bureau of Census 1962; United States Bureau of Census 1972; University 1996b, 1). A more recent demographic shift appears, however, to herald the beginnings of gentrification, creating a situation where young professionals and their families move into the area, lured by lower real estate values, than other neighborhoods near downtown (Talen 2010, 487-488; United State Bureau of Census 2003). Thus these two neighborhoods have helped to create the situation in which this most recent reproduction is occurring.

5.1 Chicago River Production

So what is the Chicago River today? The Chicago River is the result of historically and spatially contextualized processes existing in nothing more than a unity permanency or thing-like moment. The Chicago River is an integral element in the production and reproduction of the urban political ecology of the waterway along with the myriad of other environmental, cultural, economic, and social elements. These hybrid productions of the network result in the urban political ecology of the Chicago River in these unity permanencies (Swyngedouw 2003, 95).



Fig. 12

Portion of riverwalk along Main Branch of the Chicago River.
Photograph by Garrett Wolf.

That is the Chicago River exists in its current condition because of how it has been continually produced through historical-geographical processes. Society and nature are inseparable and only exist in the unity of socionature (Lefebvre 1991, 401-402; Swyngedouw 2003, 96). In this we can understand how outcomes are co-determined, or how a network produces an outcome, but that network is made up of numerous elements of what we understand to be elements of the physical and social environments.

All of the reproductions of the river's urban political ecology combine in the ever dynamic multiplicity of hybrid socioenvironment that is the Chicago River today. Historically the production of the river has been a means of industrial transport and sewage disposal, and thus has never been equated with the face of Chicago. This resulted in Chicagoans' willingness to put up with industrial traffic and bad smells partly because very few people lived in the Loop, and buildings along the river turned their back on the river, while residents in Bridgeport had little access to the river and its industrial nature and later political connection, provided stable employment (Pacyga 2009, 62). This historic relationship with the river as well as more current events has shaped this current urban political ecological situation with the river. New residents in both neighborhoods, as well as the city and other government agencies, are interested in turning the river into more of both an aesthetic and recreational amenity (Figure 13) and creating a place to live. Current conditions in each neighborhood, however, are drastically different (Figure 14 and Figure 15).



Fig. 13

View of riverwalk and Main Branch toward Trump Tower.
Photograph by Garrett Wolf.



Fig. 14

Comparison of River Setting the Loop (above) and Bridgeport (below) (1).
Photographs by Garrett Wolf.



Fig. 15

Comparison of River Setting the Loop (above) and Bridgeport (below) (2).
Photographs by Garrett Wolf.

5.2 The Situation and Network

The US EPA's letter to the IEPA and IPCB, cited the Clean Water Act as well as data from an Illinois EPA report which suggested recreational use designations were unattainable (Holst 2010, 1-2). The US EPA letter says that according to the Clean Water Act "it is a national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife, and provides for recreation in and on the water be achieved by July 1, 1983", and that state water quality standards should "protect the public health and welfare, enhance the quality of water and serve the purposes of the Clean Water Act" (Clean Water Act 2002 [1972], Section 101 (a)(2); Holst 2010, 1). In light of these elements of the Clean Water Act the state of Illinois has failed to demonstrate that these goals are not attainable. The US EPA states' that in fact the IEPA shows that despite use designations inappropriate for the protection and propagation of wildlife or recreation, the number of species of fish, birds, and other wildlife continue to grow and people in all segments of the Chicago River demonstrate recreational activity (Holst 2010, 2-3).

This letter set in motion a very public debate about the quality of water in the Chicago River, further enflamed by comments by the former Mayor of Chicago, Mayor Daley who when asked about the letter in a press conference at the end of May 2010, said that the Feds should and I quote "Go swim in the Potomac" (Byrne and Hawthorne 2010, 1). This statement simply made the issue of the Chicago River more newsworthy along with the story itself and its myriad issues. I want to point out, however, that this comment is a reflection on Daley's view on Federal involvement in, what he considers, a local issue, and not his view on the Chicago River. Over the course of summer 2010, information about the river and various entities' positions on it became

very public information, finding its way into the daily newspaper, the nightly news, and water cooler conversations. Since 1984, when Chicago terminated the use of disinfectant in the Chicago River, Chicago is now the only major city that does not employ this water quality procedure on sewage that enters a municipal waterway, a fact that has sparked controversy. (Byrne 2010, 1; Hawthorne 2011c, 1; Hill 2000, 226). Many Chicagoans were aware that the Chicago River was not the cleanest body of water, though long time residents of the city acknowledged that the river had improved significantly since the late 1960s and early 1970s. As the Chicago River and its quality became an increasingly newsworthy story, information about its quality became better known. Among the disturbing facts are the fecal coliform content of the river averaged 12,000 colony-forming units (cfu) per 100ml and tested as high as 170,000 cfu per 100 ml. To put that in perspective, the standards for swimmable water in Illinois is 500 cfu per 100 ml (Hawthorne 2010, 1). Additionally, seventy percent of the water in the Chicago River is undisinfected effluent. This is an astounding statistic, but it is important to note that the seventy percent refers to the fact that seventy percent of the water in the Chicago River flows through a MWRDGC treatment plant, which receives and discharges the combined storm water and sewage of the Chicago sewer system. The seventy percent does not mean that seventy percent of water in the Chicago River is polluted sludge (Lepeska 2012, 1).

Throughout 2010, the issue continued to grace Chicago area newspapers as effected parties took various courses of action and the Illinois Pollution Control Board continued to receive public comments on issues of the Chicago River. Prior to the US EPA letter the IPCB had created a review of the use designation issues with the Chicago River. At this time the IPCB also created separate case dockets to deal with effluent limits for fecal coliform colony-forming units and disinfection requirements, issues of aquatic life usage, and issues of water quality to

achieve determined aquatic life usage (Holst 2010, 2). In August 2010, the IPCB issued a first notice on its opinion and order for changing use designations of the Chicago River that would result in necessary water quality improvements. During the remainder of 2010 state agencies held public hearings and engaged in various legal activities to figure out how to achieve use designation changes and water quality improvements as well as attempting to block the US EPA from forcing them to make those changes.

Since the US EPA letter in April 2010, various entities have taken up the cause of non human actors and actants and many other actors have made their presence known in regards to the socionatural production of the Chicago River. Here is a look at a number of them that I shall profile by looking at who they are, the actions in which they are involved, and who those actions serve.

I have already addressed the US EPA, IEPA, and IPCB, but I wanted to mention also that the US EPA sent a second letter in May of 2011 telling the Illinois EPA that if the water use designations were not promptly changed then the US EPA would be happy to change them for the state of Illinois, not long after that the IEPA and IPCB released a report recommending use designation changes, that are to be voted on before the end of the year. Water bodies including the North Branch of the Chicago River, the Chicago River, and the South Branch of the Chicago River were proposed to become primary contact waters. Primary contact water means “any recreational activity in which human contact consists of full body contact with the waters such as swimming, diving, or jumping; and, including all Incidental Contact Recreation” (Girard 2011b, 16). Also, the South Fork of the South Branch of the Chicago River (Bubbly Creek) was proposed to become incidental contact recreation water which means “any recreational activity in which human contact with the water is incidental and in which the probability of ingesting

appreciable quantities of water is minimal, such as fishing; commercial boating; small craft recreational boating; and any limited contact associated with shoreline activity such as wading” (Girard 2011b, 15).

The MWRDGC (Figure 16) is the actor most directly responsible for the quality of water in the Chicago River by most other government agencies, not for profits, and many residents. The reason it is viewed as most directly responsible, by the aforementioned actors, is because it is the actor which discharges waste water into the Chicago River and could incorporate disinfection into its treatment process. Following the first letter from the US EPA, the MWRDGC became visible and vocal in its fight against improved water quality and changing the use designation because its administrators understood this would mean the need to commence costly disinfectant process. In terms of direct impact on water quality, the MWRDGC is the primary actor because it is the entity responsible for reclaiming and treating wastewater in Chicago to protect public health and local waterways.

Since 2005, the MWRDGC has spent \$13 million fighting tougher water quality standards and originally, following the first letter, they opposed the US EPA positions due to the cost, which at the time they said was estimated at \$623 million, saying essentially that it was a waste of taxpayer dollars. The MWRDGC has simultaneously been working on other projects to improve water quality such as the Deep Tunnel Project with a total cost of over \$4 billion (Schein 2004, 367). However, in June, 2011, the board of the MWRDGC, on a vote of eight to one, altered its position to begin disinfection procedures in 2015 following the construction and retrofitting of wastewater facilities (Hawthorne 2011d, 1; Young 2011, 1).

Through the MWRDGCs struggle against changing the use designation, its board felt they were serving the taxpayers. Though its actions were portrayed as anti-environment, anti-



Fig. 16

Metropolitan Water Reclamation District of Great Chicago boat.
Photography by Garrett Wolf.

health, and anti-investment its primary motive for originally fighting the order was a belief that it was not financially feasible to suggest disinfection with the board president, of the MWRDGC, saying “In these difficult economic times when public agencies are facing budgetary shortfalls, people are losing their jobs and homes ... it is important ... that public funds are spent wisely”. The board also was not convinced that disinfection would have a significant impact on water quality, and that other variables needed to be considered in a solution (Hawthorne 2011d, 1; Hawthorne 2011e, 1). However, once the board believed that public sentiment supported disinfection it responded, though this was also likely influenced by the second US EPA letter that made it clear that they were going to push the improvement of water quality standards and use designation to a conclusion.

On June 2nd, the Illinois Pollution Control Board issued an opinion and order to alter the designation of all portions of the Chicago River. This order changes all portions of the Chicago River, excluding the South Fork of the South Branch from Incidental Contact Recreation Waters to Primary Contact recreation waters, and the South Fork from Non Contact Recreation Waters to Incidental Contact Recreation Waters (Hawthorne 2011f, 1; Girard 2011a, 2). This order effectively made clear that the IPCB would ultimately enact this order and remove any possibility that the MWRDGC would avoid being forced to begin disinfection. The use designation changes were officially adopted on August 18th, along with new use designation categories (Girard 2011b, 1, 19, 20).

In an interview the President of the Board of Commissioners of the MWRDGC, stated that he felt the board should vote based on scientific data, which he did in the dissenting vote. The Board President also said that he felt that public opinion, awareness, and activism had been the main factor in achieving the vote to begin disinfection. According to President of the Board

of Commissioners, of the MWRDGC, Terrence O'Brien, data shows that disinfection would do little to improve the quality of the Chicago River, because much of the pollution entering the river comes from other communities along the river not impacted by MWRDGC jurisdiction as well as storm water runoff that does not pass through water treatment plants.³

The larger government actors tend to be the most visible actors within the network, but to be sure there are others that influence the network and attract significant attention to the actions of other actors. Other actors and actants in this network include the not for profit group Friends of the Chicago River, recreational users, commercial and industrial shippers and boat operators, numerous non-human actors, and the residents of the Loop and Bridgeport themselves (Cook County Circuit Court 2008, 60; Gobster and Westphal 1998, 181; Illinois Environmental Protection Agency 2007, 39). Recreational users include a number of sub groups such as canoers and kayakers, small power boat operators, swimmers, people who fish in the river, as well as high school rowing teams (Chicago Area Sea Kayakers Association 2008, 1; Gobster and Westphal 1998, 181; Girard 2010b, 20; Illinois Environmental Protection Agency 2007, 39).

These users have had a significant influence on this network as their interests and use of the river have had major implications, that have led to the change in use designations of the river to promote recreational usage and to improved water quality. It was data from the Use Attainability Analysis conducted by the Illinois EPA that helped to convince the US EPA to send its original letter and later say they would be willing to change the use designations themselves (Stoner 2011, 1). The increase in recreation is largely a result of the improving water quality stemming from environmental legislation of the early 1970s and actions since then. As the Chicago River recovered as a visual amenity, it gradually grew as a potential recreational

³ From an interview with Terrence J. O'Brien, President of the MWRDGC, January 19, 2012 on matters of the MWRDGC's involvement with the Chicago River and responses to the US EPA involvement. Transcript on file with author.

amenity. This is the juncture at which the river currently sits. If these legislative changes make the anticipated impact in water quality, then it is believed that recreational use of the river will grow rapidly. In 2005 and 2010 it was reported that over 10,000 canoers and kayakers utilized the river for recreation⁴ (Figure 17) (Dennis 2007, 1). The increase in recreation also played a major role in instigating the first letter from the US EPA. A growing number of residents who live along the river own and use their power boats on the river and many residential towers along the river offer spaces for residents to keep their boats (Gobster and Westphal 1998, 49, 53-54; Illinois Environmental Protection Agency 2007, 2-11; Solzman 2004, 1). Also high school and college rowing teams have begun to use the river over the last decade. However, due to the close proximity and likelihood that at some point a member of a rowing team could fall into the river, rowing teams have taken health and safety precautions. The rivers current state of health means that rowers who fall in are immediately injected with antibiotics to prevent them from becoming ill (Lydersen 2011, 1; Spielman 2011, 1).

Commercial and industrial shippers and other boat operators including the barges that still utilize the river to bulk transport materials, mainly sand and gravel, as well as tour boat operators that conduct architectural tours on the Chicago River (Figure 18 and Figure 19), had particular concerns about changing use designations of the river. These concerns were unrelated to pollution and water quality in general as these users do not believe, and are not considered by many to be significant polluters of the waterway, though it has been brought up that water behind barges is often slick with petroleum residue.⁵ The primary concern of these large vessel operators

⁴ From an interview with Ozana Balan King, Director of the Bridgehouse and Chicago River Museum for Friends of the Chicago River, July 26, 2011 on matters regarding people's use of the river and Friends involvement. Transcript on file with author.

⁵ From an interview with Terrence J. O'Brien, President of the MWRDGC, January 19, 2012 on matters of the MWRDGC's involvement with the Chicago River and responses to the US EPA involvement. Transcript on file with author.



Fig. 17

Kayak tour on Main Branch of the Chicago River.
Photograph by Garrett Wolf.



Fig. 18

Sand and Gravel Barges on the Chicago River.
Photograph by Garrett Wolf.



Fig. 19

Architectural Tour Boats on the Chicago River, near Wolf Point.
Photograph by Garrett Wolf.

is the awareness of would be recreators to safely share the river with larger vessels. The American Waterway Operators (AWO), which is the national trade association that represents the tugboat, towboat, and barge industry, submitted public comment to the Illinois Pollution Control Board presenting accident statistics on recreation boaters (Muench 2011). In their comments they say that 90% of all recreational boating accidents involve boaters with no formal training with half of those accidents being alcohol related. Recreational boaters without formal training, AWO argues, may not know how to safely and appropriately operate and recreate in proximity to large vessels. “For example, a recreational boater may not realize how fast a commercial vessel travels, the distance it takes the commercial vessel to stop , or the effect of a wake created by a towing vessel” (Muench 2011, 2). The AWO also claims that the narrow and winding character of the Chicago River poses safety issues. The AWO and other operators do not want an increase in recreation to occur due to safety as well as economic concerns and urged the IPCB to incorporate training requirements in the event of a use designation change (Muench 2011, 2-3). Tour boat operators who operate large vessels in the downtown portion of the Chicago River also expressed similar concerns about the safety and awareness of recreational users of the Chicago River (Muench 2011, 2).

Non-human actors have also played a significant role in the network of the Chicago River in both environmentally positive and negative ways. Fish and wildlife (Figure 20 and Figure 21) populations and the number of species have steadily increased in the river bringing support and protection for the river as a habitat. In contrast, unhealthy microorganisms from sewage entering the river have helped to create the narrative of the dirty polluted river. Various environmental groups have focused on the river as habitat for their support of the river during this current process and debate (Friends of the Chicago River 2011a, 4; Friends of the Chicago River 2012a,

1; Friends of the Chicago River 2012b, 2; Metropolitan Water Reclamation District of Greater Chicago 2006, 1).



Fig. 20

Fish swimming around Fish Hotel on Main Branch of the Chicago River.
Photograph by Jayti Srivastava.



Fig. 21

Birds and Turtles on the South Fork of the South Branch of the Chicago River.
Photography by Garrett Wolf.

It is the pollution though that tends to galvanize the general public in its ire for polluters and desire for a clean and safe river. Pollution has the power to disgust people and thus drive them to fight for change (Figure 22). This is seen in the environmental movement of the 1960s and 1970s with activism related to both large scale environmental damage effecting whole ecosystems as well as smaller scale issues impacting individuals and their local environment. Representative events of these large and smaller scale events that lead to activism and change include the Santa Barbara Oil spill, the Cuyahoga River catching on fire, and Rachel Carson's work in *Silent Spring* (2002 [1962]) regarding DDT (Hoffman 1999, 353; Christie 2007, 534). In Chicago the environmental movement was locally related to work by the Metropolitan Water Reclamation District of Greater Chicago disinfecting wastewater and generally protecting the Chicago River. The awareness of the local environment was also promoted by Robert Cassidy's article in the late 1970s (Cassidy 1979). Pollution as an actant continues to be utilized to support the agenda for a cleaner and healthier Chicago River. In this situation the US EPA letter that threatened changing the use designations of the river raised water quality to a prominent public issue. The letter led to newspaper articles and nightly news reports the increased attention on various government studies looking both at water quality as well as human use of the river. This increased attention and scrutiny prompted greater public concern with water quality and influenced how people thought about the river and its environmental influences. In addition, recreational users, such as small power boat operators, canoers, kayakers, and possibly swimmers in the future, have an interesting relationship with the river.

Friends of The Chicago River a not for profit group that has been extremely vocal about improving river health and does a lot of work with all the Chicago communities along the waterway. In addition to river advocacy, they also have educational programs and have planners



Fig. 22

Pollution and Debris in the Chicago River.
Photograph by Garrett Wolf.

that work with many government agencies to try and serve the Chicago River (Friends of the Chicago River 2011b; Friends of the Chicago River 2012c).

The residents of both neighborhoods are also influential actors in this network. However, before we explore the roles of residents, I shall present the results of the surveys conducted in both neighborhoods, which provide insight into uses, interactions, and environmental perceptions of the neighborhoods. These elements, particularly environmental perceptions are important in understanding the role of residents in the network as well as what influences particular actions by residents.

5.3 Survey Results

In addition to the various agencies and environmental actors (including fish and wildlife), the residents of the Loop and Bridgeport are integral actors in the network that produces the Chicago River. They are important especially for their interaction with the river and how that influences the production of the Chicago River for other actors (i.e. how does community resident's use of the river impact decisions by the Illinois EPA or Metropolitan Water Reclamation District of Greater Chicago) as well as how the residents produce the river in their own mind and how that in turn impacts their opinions and actions towards the river and the actors, who are within the network, that produces the river. These were some of the issues that I discussed with residents of the two neighborhoods in surveys that I conducted. The first portion of the survey dealt with residents' interaction with the river, the river's importance to the community, and potential impacts of the US EPA letter and mandate to the river and relevant agencies. These questions and the associated answers help to provide insight into the feelings

and understandings of some residents of these neighborhoods and can be analyzed to gain insight into how residents participate in the network that produces the Chicago River and how the Chicago River is produced by residents through its importance to the neighborhood and how residents feel about government agencies involved with the Chicago River.

Through these surveys, I found that residents of the Loop canoe, kayak, power boat, and commute on the water as well as walk, run, bicycle, eat, live, and work along it as well as cross it. For residents of the Loop, the Chicago River has become an established visual amenity and an increasingly popular recreational amenity. Part of the river's growing importance can be attributed to the city government's investment in the river, largely promoted and driven by Mayor Richard M. Daley, the most recent former mayor. This investment, coupled with the Loop's growth as a residential neighborhood created a situation in which both public interest, private development, and political will were working to produce the river as a visual and economic amenity. This progress in turn allowed for the potential of the river as a recreational amenity to grow.⁶ This is part of the reason for the US EPA letter and involvement and the change in the use designation of the entire Chicago River system as primary contact waters, with the exception of the South Fork of the South Branch, a designation that must be met by 2016 (Girard 2011b, 1). For some residents of the Loop, the Chicago River has even become the city's "second coast"⁷, making the river the second major water amenity for Chicago in addition to Lake Michigan. This shows how the river has grown in importance to residents of the Loop. This certainly illustrates how far the river has come since its days when the smells of sewage wafted over the waters.

⁶ From an interview with Ozana Balan King, Director of the Bridgehouse and Chicago River Museum for Friends of the Chicago River, July 26, 2011 on matters regarding people's use of the river and Friends involvement. Transcript on file with author.

⁷ From an interview with Jamil Khoury, resident of the Loop, August 3, 2011, on matters regarding Loop resident relationship to the Chicago River. Transcript on file with author.

Members of the Bridgeport community with whom I spoke interact with the river in different ways, than residents of the Loop. Far fewer people whom I interviewed in Bridgeport interact with the river regularly, or at all. These residents talked about taking their kids down to the river, fishing from the banks, canoeing, walking across bridges that spanned it, and sitting on its banks watching it. Fewer respondents from Bridgeport interacted with the river as regularly as those in the Loop, 23 of 53 compared to 40 of 51. Also, I believe certain answers reflect demographic differences between the two neighborhoods. A number of respondents from Bridgeport spoke about taking their children down to the river while only one respondent from the Loop spoke about that as an interaction with the river. This I believe is partly due to Bridgeport's character as a neighborhood with a large number of families and a growing population of young professionals with children. The Loop on the other hand, while a growing residential neighborhood, primarily attracts young professionals with no children and older residents with grown children (Chicago Loop Alliance 2011, 2; Zillow 2000, 1).

Another major difference is how Bridgeport residents feel the Chicago River creates the identity and defines the character of Bridgeport. In the Loop, people had almost unanimously positive feelings toward the river and talked about it as an amenity, whereas residents of Bridgeport were split about half and half on whether the river contributed to a positive or negative identity. Some residents believe the river reflects negatively as a dirty, industrial, sewage laden body of water, and described it as "gross", "dirty", and "nasty". Others, however, saw the river in a different context, as very historically important, while others took pride in the ownership of the river saying, "it may be dirty, but it's ours", still others acknowledged its problems, but saw much future potential in what the river can mean for the neighborhood.

Similar to the previous issue of the river's impact on identity, almost all respondents from the Loop were overwhelmingly positive in their response to whether they thought the US EPA mandate would improve the Chicago River. Respondents from Bridgeport were much more skeptical. While most approved of the idea, almost all felt it would not have as big of an impact or as immediate of an impact as they believed the government agencies and news media have expressed. Though skeptical, many took the attitude that the mandate "can only help" and that it would create cleaner and safer river conditions. Based on comments from the surveys, it appears that the skepticism toward the US EPA mandate stems from previous attempts at environmental improvement or economic development, which have not been delivered as promised.

Though respondents in Bridgeport believed the US EPA mandate would result in improvement, however slight, they were much less positive about how the US EPA mandate would impact the attitude of government agencies and other entities involved with making changes that could impact the Chicago River. Most respondents felt that the city did not care about the river or at least the river as it impacted the Bridgeport neighborhood. Others believed the government agencies would be frustrated by the cost of cleaning the river and would resist federal government involvement. This too is in contrast with the Loop where residents expressed the belief that government agencies had genuine concern for the Chicago River and were committed to achieving a cleaner river.

The differences in answers lead me to believe that the responses suggest social and environmental justice issues. Respondents in Bridgeport expressed to me that the city and other government agencies were significantly less interested in helping poorer neighborhoods or cared about the river as it related to these neighborhoods. Respondents in Bridgeport felt the city was only interested in the river as it affected wealthier residents and areas with higher tourist traffic.

This seems to be related not only to this issue of improving the water quality of the Chicago River, but also past issues for which the city has not responded equally to issues effecting neighborhoods of differing socio-economic make-ups. This was particularly interesting to hear in Bridgeport, which has only relatively recently become a more diverse neighborhood and was home to five of the last eight mayors serving for sixty-six of the last seventy-eight years. This includes the most recent former mayor who did not run for reelection in 2011 and had previously served from 1989 to 2011. Bridgeport has long been known for its political involvement and connectedness through patronage jobs and community improvements, though that seems to have declined over the past two decades. It is this history that made it interesting to hear from long time Bridgeport residents about the disparity in city government interest between the Loop and Bridgeport.

The next series of questions deals with social and environmental justice issues as well as the actor or actors that residents perceive to exert control on the network that produces the Chicago River. The control believed to be exerted by an actor/actors has implications for social and environmental justice as well as perceptions of the network and the real implications of those perceptions of the entire network. The answers to the questions were interesting, particularly because it helps to place where residents put themselves within the network. It speaks to the amount of control residents believe they exert on the network, which in some ways seems inconsistent with the results or the actions of other actors in the network. These results present potential contradictory views of who exerts control on the network compared to the view of some expert governmental actors (via interviews with representatives). An example of the contradiction can be explored specifically through the process of passing disinfection for the

Chicago River and who is most responsible for that action.⁸ The questions dealing with these issues included: Does the city of Chicago government focus river improvements on particular communities, and why? Have changes to the Chicago River been utilized to serve particular interests, and how? Who or what is the primary user of the Chicago River? Who or what exerts control of the Chicago River? (Appendix B).

The first two questions deal with social and environmental justice issues and, many answers supporting common understandings that communities with higher socio-economic status tend to experience more favorable treatment and that generally it is interests from or responding to his community that are served (Harvey 1993 [1973], 15, 52-53). However, a sizeable portion of answers point to other interests being served which provides an opportunity for understanding how the involvement of other actors impacts the thinking about social and environmental justice, actor network theory, and urban political ecology.

Whether the Chicago city government focuses improvements on particular communities brought a wide range of answers from residents of the two neighborhoods. In the Loop just over half of the residents felt that the city did not focus river improvements on particular communities, and that the city looked at the whole river in the same or a similar way, acting accordingly. The remainder of Loop respondents said, yes, that the city does focus on particular communities, specifically the Loop and Near Northside.⁹ Answers from Bridgeport resulted in over eighty percent of respondents saying that the city definitely focuses river improvement in particular neighborhoods. Those who believed that the city did not focus river improvements on particular communities differentiated water quality improvements from improvements on the

⁸ From an interview with Terrence J. O'Brien, President of the MWRDGC, January 19, 2012 on matters of the MWRDGC's involvement with the Chicago River and responses to the US EPA involvement. Transcript on file with author.

⁹ From an interview with Jamil Khoury, resident of the Loop, August 3, 2011, on matters regarding Loop resident relationship to the Chicago River. Transcript on file with author.

banks of the river, saying that the river downtown is just as dirty as it is on the South Side. More commonly people talked about huge differences between river improvement citing racial and class disputes as well as the fact that when people visit the part of the city they are likely to be in downtown and thus that is where the city's focus resides. One survey respondent illustrates the most common positive answer because "the city cares about rich people." This answer displays the historic understanding of the social and environmental justice in Bridgeport as well as a clear point of view on how residents of Bridgeport view the city government's activities.

Responses to whose interests are served by changes to the Chicago River provided a wide variety of answers and insights into whom or what people think holds sway when it comes to changes to the river. Answers in the Loop tended to be more diverse and included city government, developers, residents, recreation, industry, shipping, tour boat operators, but I think the most interesting answer I received was that the environment was the interest that was being served--people equated that to fish and wildlife as well as the river itself. I believe all of those answers are telling as to where people believe the priorities within the network that participates in the production of the river lie, but the environment is the only one that gives agency to non-human actors. This to me speaks to a shift in what can be a part of producing space and I think it is a positive direction to understand that the interests of the environment can be and are served simultaneously with its participation in network production. This does not discount the potential that humans can be involved as a voice or through activism in fighting for environmental interests, or that environmental interests can also serve human interests, but that the priority of environmental interests, either through action or perception, displays an understanding of the environment and its elements as significant actors in the network that is the Chicago River and its urban political ecology.

In Bridgeport, I focused on how interests of larger disembodied economic entities dominated, with real estate developers were the most often mentioned. However, just as in the Loop, though not in the same quantities, respondents did say that environmental interests were being served particularly in light of the US EPA letter. These responses are interesting to place in the historic-spatial context of Chicago and environmental issues more broadly. The Chicago River is no longer a heavily industrial river and the river has changed dramatically in use, both on and along the river, which has created a situation that allows room for environmentalists and their issues to become the priority. This is also a result of a changing environmental consciousness both within the city as well as societally.

Another response that illustrates the shifting attitude toward the river is that the interests of canoers and kayakers or similar recreational groups are being served. Just over fifteen percent of Loop respondents answered that recreation interests were being served. It is not surprising that the Loop residents and government entities are starting to view recreation as significant uses and influences of the river as much of the discussion dealing with the US EPA letter deals with making the Chicago River clean enough for recreation including changing use designations for primary contact recreation (Holst 2010, 1-2; Girard 2011b, 1). In addition to those efforts, their influence on other entities and growing public awareness is simply the growth of recreation on the river with over 10,000 canoers and kayakers paddling on the river in 2010 (Dennis 2001, 1).¹⁰

Respondents in Bridgeport also acknowledged that recreation interests were being served, but not to the extent in the Loop. The Chicago River at Bridgeport does not get as much paddling traffic as the North and Main Branches of the river, though a new boat launch is proposed due to

¹⁰ From an interview with Ozana Balan King, Director of the Bridgehouse and Chicago River Museum for Friends of the Chicago River, July 26, 2011 on matters regarding people's use of the river and Friends involvement. Transcript on file with author.

increased demand (Mayor 2011, 1). The acknowledgement of increasing recreation and its importance to and impact on the Chicago River also contribute to people's view of the primary uses of the Chicago River.

An interesting aspect of the answers to this question is that fewer people answered that a non-human actor, sewage, was the primary user, despite people answering that environmental interests were those being served. It was also interesting that more members of the Bridgeport community answered that a non-human actor was the primary user though this actor expresses an interesting view connecting it to social and environmental justice issues. This illustrates two things. First, while environmental interests may be served, the purpose for actions is seen as human use. Second, the statement shows that the decision making process regarding the Chicago River is understood by Bridgeport residents to be unrelated to their interests. By focusing on environmental issues Bridgeport residents feel the Loop and government agencies are making these changes for their own agenda's, just as they those decisions have been made throughout Chicago history, marginalizing and disenfranchising Bridgeport residents. The result is the inequitable participation in the decision making process.

Respondents in the Loop focused primarily on four user groups, two recreational and two large vessel groups: recreators included both paddling and power boat users, while large vessel user groups included river tour boats, and industrial barge traffic. These user groups line up consistently with some of those actors whose interests are being served, except for those users of the banks of the river inclusive of developers, runners, diners, whom respondents do not appear to consider users.

Bridgeport respondents answered similarly, though weighting industrial traffic higher and tour boat traffic lower than the Loop. The fourth major user identified in Bridgeport and the only

non-human actor was sewage. This is an interesting response and exhibits an understanding that sewage is a part of the network that produces the Chicago River. The answers illustrate that actants such as sewage, which are not traditionally understood to have agency, do in fact exert a recognizable and acknowledged influence on the network that produces the Chicago River. I believe it shows that sewage, just as any element in or along the river, is a user and actant. A statement regarding how sewage's presence had a negative impact on the desire for and participation in river recreation often accompanied the identification of sewage as a user. The significance of the inclusion of sewage and the higher rate of industrial shipping are the social and environmental justice implications. It suggests an understanding by residents that their neighborhood is not as hospitable to them as the Loop is to its residents due to economic and environmental uses and interests.

The presence of social and environmental justice issues presented by answers to the previous questions by Bridgeport residents is further established by responses to the final question of the survey, also speaking with actors whom people consider to be particularly influential actors in the network that produces the Chicago River. The final question of the survey is: Who or what do you believe exerts control over the Chicago River? Responses particularly in Bridgeport were very telling in respect to how they feel about their own involvement in exerting control over the Chicago River and what types of actors exert influence. Responses to this and the previous questions help to understand the feeling of members within the communities on the undue influence of certain actors on the Chicago River and their community as well as the communities' own potential impact on the Chicago River.

In the Loop, most respondents believed that they (the citizen and the voter) exert the most control over the Chicago River by making their desires for the river and its health a priority and

voting for mayor's and aldermen who support improving the health of the Chicago River. This displays both the confidence of the residents as well as the disparity between the Loop and Bridgeport as it relates to social justice. This disparity is exhibited through the varying opinions of the amount of influence by each resident group. A few respondents in the Loop also cited the government entities, especially city government as the entity that controls the river, only fewer still saying that economic interests controlled the production of the river.

In Bridgeport the answers were overwhelming directed toward government entities, particularly city government, and economic interests. While a few citizens, generally newer residents to the neighborhood did answer that they (the citizen and voter) exerted the most control over the production of the river. The belief that government and economic interests control the production of the river and produce a river that does not respond to the needs and desires of the resident's exhibits the understanding of the residents of Bridgeport that inequity exists between the Loop and Bridgeport. (Harvey 1993 [1973], 122). There is potential for residents of Bridgeport to co-opt environmental improvements and awareness for themselves and for social causes. By being major supporters of these causes Bridgeport could situate themselves on a leading edge of social and environmental equity and shifting the traditional relations of power. Bridgeport residents are in a particularly opportune situation to take this cause and shift relations of power because of the environmental quality issues that remain in the South Fork of the South Branch of the Chicago River (Bubbly Creek).

5.4 Environmental Perception and the Role of Residents

In determining the role of residents I used responses from my surveys with residents and interviews with representatives of some of the other actors. However, it is important to also understand the residents' environmental perceptions because their perceptions are influential in the role of residents in the network. Through these surveys, whose results I have already discussed, I found that residents of the Loop canoe, kayak, power boat, and commute on the water as well as walk, run, bicycle, eat, live, and work along it as well as cross it, though use varies between neighborhoods. For residents of the Loop, the Chicago River has become an established visual amenity and an increasingly popular recreational amenity. Due to increased activity and opportunities, the environmental perception in the Loop is quite positive, even being called a "second coast"¹¹ and all that that would imply. This is part of the reason for the US EPA letter and involvement and the change in the use designation of the Chicago River, excluding the south fork, as primary contact waters. Others also cite the massive increase in species of fish and other wildlife as reasons for supporting river health. Loop residents were generally quite familiar with the US EPA's activities and supported them for both the wildlife and recreational reasons many also cited its historical importance to Chicago's development as a global city, This increase in activity and opportunity reflects the residents view of how the river contributes to the identity of the neighborhood. In surveys with residents in the Loop they had almost unanimously positive feelings toward the river and talked about it as an amenity and an important part of the face of the city to visitors.

¹¹ From an interview with Jamil Khoury, resident of the Loop, August 3, 2011, on matters regarding Loop resident relationship to the Chicago River. Transcript on file with author.

Members of the Bridgeport community interact with the river in different ways, than residents of the Loop, though interaction is nonetheless common. Far fewer people with whom I spoke in Bridgeport interact with the river regularly, or at all. Those residents who did interact with the river primarily talked about, fishing from the banks, canoeing, walking across it, and sitting on its banks watching it.

Another major difference is how Bridgeport residents feel the Chicago River creates the identity and defines the character of Bridgeport. Residents of Bridgeport were split about half and half on whether the river contributed to a positive or negative identity. Some residents believe the river reflects negatively as a dirty, industrial, sewage laden body of water, and described it as disgusting in a variety of ways. Others, however, saw the river in a different context, as very historically important. Still others, took pride in the river, while some acknowledged its problems, but saw much future potential in what the river can mean for the neighborhood. It is important to recall these responses because they express the perceptions of respondents.

Therefore, I should describe Bridgeport as having two major perceptions of the environment -- one of a history of degradation that is unlikely to change caused by industrial use and government neglect and the other one of improvement and interaction of residents inspired by declining industrial use and federal, state, and local focus on improving the quality of the river.

These perceptions taken in conjunction with residents' responses to who controls the production of the river help to understand how the residents see their own role in the network. In the Loop most respondents believed that they have the most control over the Chicago River, which they exert by supporting public officials who represent their views inclusive of improving

river health and supporting recreation. This view of their own impact and role illustrates the disparity between the Loop and Bridgeport and calls to mind issues of social justice. These answers point to the active involvement of residents of the Loop in the urban political ecology network of the Chicago River as well as their belief that their activism and use of the river makes a positive impact.

In Bridgeport it appears that the actual impact of residents does not parallel their perceived role or influence on the network. Bridgeport residents perceived most control to be government or economic entities. However, the changes in use designations, albeit only for the South Branch and not the South Fork, suggest that residents do have a greater impact on the production of the Chicago River. In fact, some residents of the river believe that they exert control over the river in a similar fashion as Loop residents suggested. It would seem that the residents who perceive the river as dirty and the government as uninterested in helping are speaking from their experience and historical knowledge of the actions taken for an industrial river, while residents looking to create something new in an increasing post-industrial city are finding and exerting a new control over the production of the river.

The surveys conducted help to gain an understanding into how the residents of these two communities understand various relationships in which they participate, to produce the urban political ecology of the Chicago River. In addition, responses help to see how residents' perceive their influence on the network as well as their historical-spatial circumstance and how that influences their position within the network. All of these help to view the environmental perceptions, role within the network, and social and environmental justice issues at the heart of the continued contested space that is the Chicago River.

6. Conclusions

From the responses to the survey questions we can see how the Chicago River is created, and what actors that influence the river dominate the minds of Loop or Bridgeport residents. Understanding how these actors come together to form the network that produces the urban political ecology of the Chicago River in terms of environmental production and perception helps to gain insight into what galvanizes people, what gets their attention, how the public visibility of an actor impacts their perceived influence on the network, and how people see their own involvement in the network.

The differences in responses between the Loop and Bridgeport also, speak to issues of social and environmental justice. These provide examples of how injustice is spatialized in the city, meaning how they are distributed in the city and how they are related to historic-geographic processes. These injustices are a product of historic-spatial processes and often manifest themselves in differing environmental conditions (Merrifield and Swyngedouw 1997, 11; Katznelson 1997, 46). These responses and the analysis of the reproductions of the urban political ecology of the Chicago River also help to explain the potential discrepancy between perceptions and the ability to influence the network. In addition this analysis can provide insight into what can be effective in shifting power relations among network actors.

This historico-spatial process of the production and reproduction of the Chicago River illustrates how environmental and social changes co-determine each other. In other words, these processes show how environmental changes result in social changes and vice versa to produce hybrid socio-environments. Since natives first identified the prairie through which the river flowed as a place to gather food “natural and cultural landscapes began to shade into and reshape one another” (Cronon 1991, 25). The Chicago River in subsequent iterations has catalyzed:

settlement, shipping, sewage, public health as well as been impacted: widened, channelized, dredged, turned into a sewer, reversed. All of these changes are the continuous results of the ecology, economics, culture as well as the physical and social environment influencing and acting with and upon each other. Each change influenced all of the actors within the network, reproducing the entire network, and allowing future reproductions to occur. Any change within the network alters the production of the network as a result of the changing relations within the network and the potential changes to actors as a result of these shifting relationships. We can observe the co-determination occurring within the current situation as well as declining industry, changing environmental regulations, social activism, improving water quality, returning aquatic and non-aquatic wildlife and other factors each of which has altered the network in a particular way. At this point an increasingly post-industrial Chicago has evolved where water quality, recreation, and wildlife are driving forces of change as opposed to shipping or sewage conveyance. It is not that these elements are no longer a part of the network they simply no longer exert the same influence over the network as they have in the past, showing how power has shifted and networks reproduced through the historic-spatial processes of the Chicago River and its urban political ecology. Power is no longer exerted by the industries that dominated the production of the river for much of its history. Power has shifted to government authorities, environmental interests, as well as residents. Economic interests do play a role in the network, but they no longer exert the dominance they once did.

The types of physical and environmental changes, and resulting outcomes of those changes are connected to the historical, social, cultural, political, and economic conditions and institutions that participated in the network that produced changes. Historical-geographical analysis of the production of urban “nature” provides insights into the uneven power relations

through which urban “natures” become produced and can provide opportunities to understand how to transform these power relations (Heynen et al.2006, 12). In this current study, uneven power relations are visible in a number of relationships. Prior to the US EPA letter it seems that the MWRDGC had significantly more influence over the production of the Chicago River than they do following regulatory changes that shifted influence to the Illinois Pollution Control Board via the US EPA and social awareness. The US EPA letter brought the attention to the Chicago River that allowed those acting in favor of use designation changes and aggressive improvement of water quality to shift the relations of power in their direction and achieve regulatory change in both state and city laws. This situation shows how power relations have shifted and how they may continue to do so, for the further benefit of the citizens of Chicago and the health of the Chicago River.

Uneven power relations are also visible in the comparison of the Loop to Bridgeport. It appears that when viewed as individual networks that produce and influence their own portion of the Chicago River that the Loop has a much greater influence within its network than does Bridgeport. Viewed through a social and environmental justice lens we see that historical and socio-economic issues are the predominant cause of this disparity. However, it is also apparent that while residents of the Loop certainly feel as if they exercise a greater control over the production of their portion of the Chicago River, a number of residents in Bridgeport also feel that way, but understand that they need to utilize different tactics to shift the power relations to gain more control in the production of their portion of the Chicago River. This can occur through increased use of political clout, but is more likely to be exercised through tapping into environmental issues and increasingly presenting the river as being in a post-industrial state requiring that changes to river usage and quality respond to those changes. This is largely what

has happened to this point, and been successful in impacting essentially half of Bridgeport's river frontage. The South Fork of the Chicago River provides other challenges both for regulatory bodies, environmental groups, as well as the residents of Bridgeport. The stockyards that historically polluted this area still impact the water quality today because of polluted sediment. In addition, the Racine Avenue water treatment facility contributes effluent to the South Fork from its location just north of Pershing Road. Another contributing factor to the lower quality of this section of the river, and a major part of the reason that this portion of the Chicago River was not re designated as a primary contact waterway is that there is little to no current along this stretch of the river due to historical alterations to the Chicago River and the construction of canals at the confluence of the South Branch and South Fork. More research and planning are being done and are necessary to determine the best course of action for this portion of the river.

Social-environmental metabolisms produce a series of both enabling and disabling social and environmental conditions. The resulting conditions are often contradictory because they may enhance the social and physical environment in some places for some humans and non-humans, and they can also deteriorate the social and physical environment in other locations for other entities. This is the reality of shifting power relations. In this particular network production it would seem the MWRDGC's social environment has deteriorated as its public perception has taken a hit. The resulting tax increases to construct or retrofit plants to disinfect water may adversely impact certain residents of Chicago and Cook County, some of whom rarely or never use the Chicago River. It remains to be seen therefore what the overall economic impacts will be. Increased recreation will likely have a positive economic effect, however, large vessel operators on the river have expressed their concern that the increased recreational traffic will slow them

down negatively impacting their businesses and affecting the customers they serve downstream who rely on their various products and timely delivery of them (Muench 2011, 2-3).

When viewed from an environmental or user perspective these deteriorations are not often seen, or viewed as insignificant, but the alterations of the environment in favor of certain entities often results in adverse impacts on other entities. It is important to see the myriad linkages throughout the social and physical environments and how these connections result in impact on various entities. The processes of metabolic change are not socially or ecologically neutral. The resulting conditions from particular socio-environmental change can undermine the stability of certain social groups (large vessel operators, communities or businesses that rely on the goods shipped using the river, residents whose taxes will be raised, and even the impact on the budget of government entities responsible for participating in changes). Additionally, as illustrated in other networks and outcomes in the history of the Chicago River social groups as well as places or ecologies can be undermined. The reversal of the Chicago River is an example of this. While the quality of Chicago's water supply and the Chicago River greatly improved by sending its effluent downstream toward Joliet and St. Louis, these places now encountered that waste, degrading the quality of their own water (Hill 2000, 129). This reversal also had negative impacts on the North Branch of the Chicago River. As this portion of the river no longer flowed out into Lake Michigan its flow slowed causing negative environmental impacts on the river and adjacent communities. Another example is the use of chlorine as a disinfectant in the 1970s and 1980s, which reduced the risk from disease spreading bacteria, but negatively impacted the water quality for wildlife and drinking water (Hill 2000, 226). Political-ecological analysis of urbanization and its associated processes reveals the contradictory nature of the process of

metabolic circulatory change and exposes potential conflicts or undermining that are a part of socio-environmental change (Heynen et al. 2006, 12).

An important aspect of this study, and urban political ecology more broadly, is using networks and relational thinking to analyze the issues of agency and the relations of power. My study asks the question: Who controls the production of the Chicago River? By asking this question and not embarking on the study with an answer already known allows for agency to be extended to any number of individuals and groups of humans and non-humans (Mitchell 2002, 53; Robbins and Sharp 2006, 123). This, however, "does not mean introducing a limitless number of actors and networks, all of which are somehow of equal significance and power" (Mitchell 2002, 53). Rather it is the responsibility of the researcher to analyze and evaluate the agency of actors and potential actors in order to form an urban political ecological network. In this way Timothy Mitchell and Paul Robbins suggest that nature speaks. Nature does so by producing specific kinds of human subjects whose practices have ecological consequences and causes (Robbins and Sharp 2006, 123). In the urban political ecology of the Chicago River this has manifested in the actions of any number of human subjects both group and individual. Most of these human subjects develop in response to how they interpret what nature to be saying, or perhaps what is most convenient for it to say. By interpreting the Chicago River as saying it is a highly engineered waterway that serves shipping and sanitary purposes; the state agencies of Illinois could continue to interpret the Chicago River as an industrial river with no need to accommodate human contact and thus no need to improve the water quality. This interpretation brings in the potential influences of money in the form of undesirable tax increases, to be avoided, and market capitalism, to be promoted (Robbins and Sharp 2006, 123). On the other hand, the water quality of the river also speaks to its possible misuse and neglect by many

entities throughout its history. To many, this was heard as a need to make changes to improve the water quality both for the river itself as well as the changing uses of the river in increasingly post-industrial Chicago. This has resulted in changing use designations and changing regulatory and physical relationship between human and water contact.

This historico-spatial process of the production and reproduction of the Chicago River illustrates how environmental and social changes co-determine each other. I have discussed how the river arrived in its current state and some of the current actors involved in the production of the Chicago River's urban ecology, but as we can see the river and its production is very dynamic and the actions of those actors continue to produce versions of the river that paint in an increasingly positive and healthy picture. The Illinois EPA report suggesting they will change the river use designations, the Metropolitan water reclamation district vote to begin disinfection of wastewater that enters the river, the city of Chicago announcing that they will be building boat houses and launches to increase access to the river. These changes act to change perceptual and physical production of the river.

In this current study, uneven power relations are visible in a number of relationships. Prior to the US EPA letter it seems that the MWRDGC had significantly more influence over the production of the Chicago River than they do following regulation changes that seem to have shifted influence to the Illinois Pollution Control board via the US EPA and social awareness. This situation shows how power relations have shifted and how they may continue to do so, for the further benefit of the citizens of Chicago and the health of the Chicago River. Uneven power relations are also visible in the comparison of the Loop to Bridgeport. It appears that when looked at as individual networks that produce and influence their own portion of the Chicago River the Loop has a much greater influence within its network than does Bridgeport. Viewed

through a social and environmental justice lens we see that historical and socio-economic issues are the predominant cause of this disparity. However, it is also apparent that while residents of the Loop certainly feel as if they exercise a greater control over the production of their portion of the Chicago River, a number of residents in Bridgeport also feel that way, but understand that they need to utilize different tactics to shift the power relations to gain more control in the production of their portion of the Chicago River.

Residents catalyze much of this change, particularly younger residents who seek to help shape their increasingly post-industrial city. In the Loop this is driven as I mentioned by residents who do not want a dirty, smelly, gross river running through their neighborhood and want to enjoy the river whether their looking at it from their window, crossing it en route to somewhere, jogging along it, or recreating on it. Many also support a vision of an urban river as a habitat for fish and other wildlife and not simply as a means of industrial traffic and sewage conveyance. The driving force behind perceptual and physical productions in Bridgeport are young professionals and the families who grew up in the community and want to turn it into a neighborhood that moves more assertively into post industrial Chicago, as well as young professionals who are entering the neighborhood through gentrification and much like the residents of the Loop have a certain vision of what they want their urban neighborhood to be. The changes made and announced thus far and the continually dynamic production of the urban political ecology of the Chicago River bode well for the improvement of river health and recreational opportunities as well as continued research.

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Appendix A. US EPA Letter



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

APR 15 2010

REPLY TO THE ATTENTION OF: WQ-16J

RECEIVED
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APR 15 2010

STATE OF ILLINOIS
Pollution Control Board

PC# 290

Illinois Pollution Control Board, Clerk's Office
James R. Thompson Center, Suite 11-500
100 West Randolph Street
Chicago, Illinois 60601

Re: R2008-009 (A): In The Matter of: Water Quality Standards and Effluent
Limitations for the Chicago Area Waterway System (CAWS) and the Lower
Des Plaines River: Proposed Amendments to 35 Ill. Adm. Code 301, 302, 303 and 304
(Recreational Use Designations)

Dear Illinois Pollution Control Board:

U.S. Environmental Protection Agency has reviewed the October 2007 proposed revisions to water quality standards (WQS) pertaining to recreational use designations for the Chicago Area Waterway System (CAWS) and Lower Des Plaines River (LDPR) that are currently pending before the Illinois Pollution Control Board, and the Statement of Reasons in support of those proposed revisions. We offer the following comments for your consideration.

Section 101(a)(2) of the Clean Water Act (CWA) provides that "it is the national goal that wherever attainable, an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983." Section 303(c)(2)(A) of the CWA requires state WQS to "protect the public health or welfare, enhance the quality of water and serve the purposes of this [Act]." EPA's regulations at 40 CFR Part 131 interpret and implement these CWA provisions by requiring that WQS provide for CWA section 101(a) goal uses unless those uses have been shown to be unattainable, effectively creating a rebuttable presumption of attainability. See 40 CFR 131.5(a)(4), 131.6(a), and 131.10(j), and 131.20(a). The presumption may be rebutted through a use attainability analysis (UAA), which is defined at 40 CFR 131.3(g) as a "structured scientific assessment of the factors affecting the attainment of the use which may include physical, chemical, biological, and economic factors." In a UAA, the physical, chemical and biological factors affecting the attainment of a use are evaluated through a water body survey and assessment.

Federal regulations (40 CFR 131.10(j)) require a UAA whenever the state designates or has designated uses that do not include the CWA section 101(a) goal uses, when the state wishes to remove CWA section 101(a) goal uses, or when the state adopts subcategories of section 101(a) goal uses that require less stringent criteria. A state can only justify not including one or

more of the section 101(a)(2) goal uses for a particular water body by demonstrating through a UAA that the use is not attainable for one of the six reasons set forth at 40 CFR 131.10(g)

Federal regulations (40 CFR 131.20(a)) also require states to re-examine water body segments that are not designated for the uses specified in section 101(a)(2) of the CWA, including for "recreation in and on the water," every three years to determine if any new information has become available; and, if new information indicates that "recreation in and on the water" is attainable for water body segments that were not previously designated for such recreation, the state must revise its WQS accordingly. EPA commends Illinois for its current efforts to update the standards for these waters, in light of the fact that the last review of WQS for the CAWS and LDPR occurred in 1985.

At this time, Illinois Environmental Protection Agency has proposed use designations for all segments of the CAWS and LDPR that do not provide for recreation in the water; and has proposed use designations for certain of those segments that also do not provide for recreation on the water. Illinois EPA relies upon two of the six UAA factors specified in 40 CFR Part 131.10(g) to support its proposal:

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; [and]

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in attainment of the use.

Illinois EPA makes four primary assertions to support its proposed recreational uses. First, Illinois EPA asserts that untreated combined sewer overflows (CSOs) and undisinfected discharges from municipal wastewater treatment plants prevent recreation in the water. Second, Illinois EPA asserts that a number of human caused conditions--such as barge and other commercial boat traffic, vertical concrete walls, channelization, steep embankments, the fact that flow rates and pool stages are actively managed to prevent flooding and to maintain navigation, and the fact that development has resulted in limited shoreline access to certain waters--prevent recreation in (and, in some cases, on) the water consistent with the first factor listed above. Third, Illinois EPA asserts that many of these conditions (e.g. vertical concrete walls, channelization) also constitute hydrological modifications that preclude attainment of these recreational uses. Lastly, Illinois EPA provided in its Statement of Reasons information indicating that certain local governmental authorities have placed legal restrictions on recreational use of the CAWS and LDPR and lack definitive plans to implement measures to encourage recreation in the water.

Based upon the information in the UAA, and for the following reasons, EPA questions whether Illinois EPA has adequately demonstrated that recreation in and on the waters are not attainable for any of the six bases set forth at 40 CFR 131.10(g). First, human caused sources of pollution (specifically, CSOs and undisinfected discharges from municipal wastewater treatment

plants) can be remedied through construction and operation of storage, conveyance and treatment facilities. There also has been no demonstration that construction and operation of such facilities would either “cause more environmental damage” than the damage caused by allowing the continued discharge of pollutants (40 CFR 131.10(g)(3)), or “would result in substantial and widespread social and economic impact” (40 CFR 131.10(g)(6)). EPA notes that, in appropriate circumstances, states may be able to adopt revisions to WQS to address residual CSO discharges remaining after implementation of a CSO Long Term Control Plan, where the costs of elimination or treatment of such discharges would result in substantial and widespread social and economic impact. *See, e.g.*, EPA’s June 9, 2008, letter to the Indiana Department of Environmental Management, which can be accessed at <http://www.epa.gov/reg5oh2o/wqs5/IN%20CSO%20Rule%20Approval%20Letter.pdf>.

Second, the human caused conditions noted by Illinois EPA are not present in all segments of the CAWS and LDPR at all times, and the extent to which these conditions may impact recreation in and on the water can vary greatly from segment to segment. For example, barge traffic may not occur in all segments, the intensity of barge traffic may not be equal among all segments, and there may be certain times when barge traffic is less intense, such as holidays or weekends. Similarly, accessibility to the waterways may vary by segment, and even segments that are not directly accessible from the shoreline are accessible by boat. Moreover, there has been no demonstration that some or all of these conditions cannot be remedied or operated in a manner that would allow for recreation in and on the water. For example, place, time and manner restrictions could be placed on barge and commercial boat traffic, with complementary restrictions on recreational use.

Third, EPA notes that the UAA and public comments submitted on the proposed recreational use designations document widespread recreational use on the water (e.g., power boating, canoeing, kayaking, fishing and wading) at various times in nearly all segments of the CAWS and LDPR; and, to a lesser extent, recreation in the water (e.g., swimming, water skiing, tubing and jet skiing) in a number of segments. The fact that such recreational activities have been occurring in and on the water, notwithstanding the various human caused conditions and hydrological modifications that Illinois EPA cites in support of the proposed recreational use designations, suggests that (1) such human caused conditions and hydrologic modifications do not in fact prevent attainment of recreation in and on the water in all segments of the CAWS and LDPR and/or (2) recreation in and on the water is likely to be attainable, if the water quality limitations impacting the use are remedied, notwithstanding any current physical limitations that may be impacting the use.

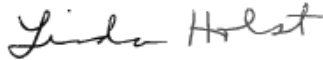
Fourth, EPA believes that information on recreational prohibitions and the current lack of local government plans to promote recreation in the water are of limited relevance in assessing the attainability of use designations consistent with the section 101(a)(2) goal uses and the UAA factors set forth at 40 CFR 131.10(g).

For the reasons described above, EPA recommends that Illinois revise its proposed recreational uses to include recreation in and on the water for all segments of the CAWS and LDPR. Alternatively, Illinois could use its existing information, plus any additional information that it wishes to present, to attempt to demonstrate, on a segment-by-segment basis, that

recreation in and on the water is not attainable for one or more of the reasons set forth at 40 CFR 131.10(g). Finally, EPA notes that, although the Illinois Pollution Control Board has chosen to separate its proceedings on Illinois EPA's proposed recreational use designations from its proceedings on criteria issues, Illinois will eventually need to adopt water quality criteria to protect all of its designated uses. 40 CFR 131.11(a).

If you have any questions, please contact Candice Bauer of my staff at (312) 353-2106 or at bauer.candice@epa.gov.

Sincerely,



Linda Holst, Chief
Water Quality Branch

cc: Marcia Willhite, IEPA

Appendix B. Survey

The survey typically takes 10-15 minutes to complete, depending on the depth of answers. After you complete the first page there is an option to save your survey and return to it later. If you decide to save and return later, please save the link that is provided upon exiting the survey.

Thank you for agreeing to take this survey. I am a graduate student at Louisiana State University. I am working on a research project regarding the Chicago River and what influences the river and its environment. In addition to information about the river I am also interested in how residents of the city perceive the Chicago River and particular issues surrounding it. Many of my questions ask what you think about particular issues. I would ask that you simply answer the questions as best you can. I am trying to gain an understanding through my research and this survey how people in Chicago understand and perceive particular issues or institutions and how they influence the Chicago River.
Thank You

Garrettwolf.com

No data that includes personal information will be used in any form that would allow the participant to be identified.

What Chicago neighborhood do you reside in?

What four streets surround the block you reside on?

What is your current occupation?

What is your current age?

Do you interact with the Chicago River?: Y/N

If YES, how do you personally interact with the Chicago River (you may provide examples of what the river means to you, how it is important in your life, and what activities you participate in on or near the river?:

If no, why?

Do you think the Chicago River contributes to the identity of your neighborhood?: Y/N

If YES, how does the Chicago River help create the identity and define the character of your neighborhood, and what is the Chicago River's importance to the development of the neighborhood?:

If no, why not?

Have you heard about the EPA mandate regarding the Chicago River and water quality?: Y/N

If yes, how do you believe the EPA mandate will impact the Chicago River?

If yes, how do you believe the EPA mandate will impact the attitude of Chicago city government toward the Chicago River?

Do you think the Chicago City government affects the Chicago River?: Y/N

If yes, how does the Chicago city government (including the Office of the Mayor) affect the Chicago River, and what is the city's attitude toward the Chicago River?

Does the City of Chicago focus river improvements on particular communities, and if so why?

Have Changes to the Chicago River been utilized to serve particular interests (such as political, economic, social, or environmental) historically or currently, and if so how?

Is the Chicago River part of nature?: Y/N

If yes, what makes it natural or what is natural about it?

If no, what makes it unnatural or what is unnatural about it?

How does the Chicago River influence how you think about Chicago and its environment?

What environmental issues, regarding the Chicago River, concern you the most?
How have the creation of open and recreational space along the river changed how you understand the Chicago River and environment in Chicago?

Who or what do you believe is the primary user of the Chicago River?

Who or what do you believe exerts control over the Chicago River (primarily or in any other capacity)?

Would it be alright if I contacted you for follow-up questions? If so what is your email address or phone number?

Are there any people who you think would be willing to take this survey and help me with my research?

Vita

Garrett Charles Wolf was born on in 1987, in Saint Charles, Illinois. He attended Lily Lake Elementary School, Howard B. Thomas Elementary School, Central Middle School, and graduated from Central High School with academic honors. He also graduated with honors from Louisiana State University in Baton Rouge, Louisiana, with a bachelor's degree in landscape architecture and minors in history and religious studies in 2010. He earned a second bachelor's degree in geography in 2011. While attending Louisiana State University, Wolf earned numerous awards and honors and held numerous leadership positions, including President of the Student Chapter of the American Society of Landscape Architects and Representative to the College of Art and Design College Council.

Following his exposure to economic geography through the lens of political ecology, wolf was inspired to pursue graduate studies at Louisiana State University under Dr. William Rowe. He was accepted into the graduate program in the Department of Geography and Anthropology in January of 2010 with a full teaching assistantship.

Highlights of his experience as a master's student in the Department of Geography and Anthropology at Louisiana State University include serving as President of the Geography and Anthropology Society, earning second prize in the paper competition at the Southwestern Association of American Geographers 2011 conference, and presenting his research at the Association of American Geographers 2012 Annual Meeting in a session on post-industrial cities.