

Community Perceptions of the Environmental Remediation Effort in the Milwaukee River Estuary

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ABSTRACT

The Environmental Protection Agency (EPA), Wisconsin Department of Natural Resources (DNR), and Milwaukee County Parks Department have been working on an environmental remediation project that seeks to remove chemical contaminants and pollution from the Milwaukee River. The purpose of this research is to discover community member's perceptions on the quality and safety of the Milwaukee River, and determine whether their perspectives on safe and desirable uses of the river differ from those of the organizations overseeing the Great Lake Legacy Act (GLLA) project. The results from this study show that the communities in the project area believe that the quality of the river has improved but it is still unsafe in some ways. This study shows that understanding the perceptions about quality, safety and uses of the river can improve the relationship between remediation organizations and the affected community.

INTRODUCTION

Rivers are an important ecosystem because they provide a source of freshwater, habitat for wildlife, and many benefits to humans, including food, recreation, transportation. Many societies found their beginnings near rivers. As human civilizations became adept at using the natural resources afforded by the river, populations grew. Growing populations leveraged technological advances, including changes in transportation (such as cars and buses), to increase residential and industrial development. The unforeseen consequences of many of these changes were undesirable changes to rivers ecosystems. Waste from industrial factories, pollution from homes, and sewage present threats to rivers that flow through urban areas (American Rivers, 2014). As a result, most rivers continue to be degraded to the point where they are not functionally able to support the ecosystems and the human populations that depend on them. These rivers are

less able to provide food for people and the recreational value degrades as it becomes risky to interact with such rivers. Some rivers become clogged with waste and sewage; and at worst, these rivers can become public health hazards and a danger to human life.

The focus of this paper is the Milwaukee River, in Wisconsin. The Milwaukee River has been challenged agricultural, industrial, and residential pollution legacies consistent with urban rivers. The Milwaukee River has been polluted with sewage from the city of Milwaukee and neighboring communities, toxic waste from industrial buildings, and various other pollutants. This has caused wildlife populations to decline, interactions with the river to decrease, and a rise in concern for human health when interacting with the river (Li et al., 1998). The degradation of this river brought it to the attention of the International Joint Commission in 1987 and the commission designated

the Milwaukee Estuary as an Area of Concern (AOC) as one of 43 other sites across the U. S. and Canada. The Great Lakes Legacy Act of 2002 (GLLA) provided updated guidelines for cost-sharing in remediation for sites that are partially or wholly in the U.S. as a response to what had been slow movement to action, with only one AOC location in the U.S. de-listed between 1987 and 2002. The Milwaukee Estuary boundaries were expanded in 2008 in order to address additional sites that contributed significant loads of contaminated sediment to the estuary. The DNR worked with community stakeholders to create a Remedial Action plan in 1991, later updated in 1994 and 1999. The DNR has made significant progress towards improving the conditions in the AOC since then but the area continues to be under stress (Wisconsin DNR, 2014).

To remove pollution, the Wisconsin DNR, and Milwaukee County Parks have been working together on the Great Lakes Legacy Action (GLLA) sediment remediation project in the Milwaukee Estuary-Lincoln Park. The GLLA sediment site is located on the Milwaukee River, the surrounding communities are the town of Glendale and the city Milwaukee (Figure 1) (EPA, 2012c). This project seeks to remediate additional sites that added significant loads of contaminated sediment to the Milwaukee Estuary AOC and restore it to its original, if not improved, state (Wisconsin DNR 2014). Projects like these not only affect the environment but also affect people who live in the surrounding communities. Therefore, this paper examines community member's perceptions of the river and the remediation work associated with the AOC.

With such major changes to the way in which the affected communities in the estuary area interact with the rivers, members of these communities are likely to have strong opinions about their interactions with the project's mandates. What are member's perceptions about the quality and safety of the Milwaukee River? Do their views on the uses of the river differ from that of the organizations overseeing the GLLA project? In answering these questions, this paper will use, as its primary data source, data from interviews with people who live and work in the AOC area to reach its stated goal. The purpose of this paper is to determine to which extent communities in and around the estuary area of the Milwaukee River hold positive or negative perceptions about the quality and safety of the river in light of the

intervention instituted by the GLLA remediation project and to analyze differences in views of the uses of the river. The results from this study will allow for better understanding of how the success of an environmental remediation project, from an environmental standpoint, may differ from that of the surrounding community, so that in the future when there are environmental remediation projects such as the GLLA, the communication of goals and progress between the project managers and the affected community can be improved.

Figure 1
GLLA Project Site.



LITERATURE REVIEW

Population growth, agricultural transition, and access to the Great Lakes contributed to pollution in the Milwaukee River. When the city first began in 1846, Milwaukee's population was merely 9,508 people. The population more than doubled in four years and by 1860 the population increased to 45,246 people, which made it one of the top twenty cities in the U.S. This population increase was due to the flood of immigrants that migrated to Milwaukee in order to be a part of their booming wheat industry Wisconsin was the second biggest wheat state in the country and shipped more wheat than any other place in the world. There was intense competition for markets with Chicago, Racine, and Kenosha. Eventually Chicago won out due to their position on major railroad lines and Milwaukee's wheat industry slowly declined. By the middle of the 1870's, Milwaukee was losing its wheat trade market completely to Minneapolis and St. Paul, Minnesota. Milwaukee, fortunately, had an

alternative in manufacturing. The manufacture of steel and iron became the dominant industry in the city and took over the dying wheat trade (Milwaukee County Historical Society, 2011).

Towards the end of the 19th century, the United States became the world's leading industrial nation, emerging as a leader in meatpacking, timber, steel production, and mining (Milwaukee County Historical Society, 2011). Milwaukee became a center of modern manufacturing, producing finished consumer goods from the raw materials they previously extracted. The city had the advantages of an expanding urban market, a steady income of immigrant labor, and easy access to materials and customers through the continuously improving transportation system. Due to this increase in industry, the city was steadily taken over by powerful companies, which came along with large factories and plants (Wisconsin Historical Society, 2014).

Some major companies centered in Milwaukee were the Milwaukee Iron Company, Public House Best Brewing Company, and the Allis-Chalmers Company. Production of iron on a large scale began when the Milwaukee Iron Company opened in 1870. This company provided a base for the expanding foundry and machinery industry in Milwaukee. Founded in 1861, the Allis-Chalmers Company constructed industrial machinery and would transform the flour-milling industry in the 1880's. By the 1880's the Allis-Chalmers Company was Milwaukee's largest industrial employer and building a world reputation as the center of heavy machinery for power plants, mines, and public utilities. Public House Best Brewing Company. was the leading beer brewing company in Milwaukee and had breweries spread throughout the city. Milwaukee was filled with large companies such as these, and many smaller ones as well (Wisconsin Historical Society, 2014). The industrial boom in the 19th century brought prosperity to Milwaukee and the surrounding communities but it also came with detrimental effects to the environment.

A majority of these factories and plants were situated along Lake Michigan or the Milwaukee River because it allowed for access to waterways for transportation of materials and products. These large companies focused on mass production and with this came tons of waste (Wisconsin Historical Society, 2014). The EPA defines waste generated from 17 different industry groups in the Standard Industrial

Classification. The waste includes organic and inorganic chemicals, primary iron and steel, plastics, resin manufacturing, glass and concrete, pulp and paper, stone, clay, and food products (EPA, 2012b). The companies were supposed to be responsible for safely collecting the waste and having it shipped to a treatment center for proper disposal. Instead, many of these industries were expelling the waste directly into the waterways (Li et al. 1998).

A study done by Li et al. (1998) analyzed the impact of industrialization in the Milwaukee area on the environment. From the results of the study, it was concluded that the Milwaukee river was polluted with Polycyclic Aromatic Hydrocarbons (PAHs) and Polychlorinated Biphenyls (PCBs) due to the waste from industry in Milwaukee (Li et al. 1998). These chemicals are a danger to aquatic wildlife, such as fish, who absorb the chemicals into their fat, humans who interact with the water, either through recreational activities or the consumption of the water and fish, and to the overall quality of the river. PCBs also bioaccumulate, meaning they build up in animal tissues as they progress up the food web. PCB levels increase with each step up the chain, which is why the EPA announced guidelines on how often people should eat fish caught in contaminated rivers (PBS Frontline, 2009). The pollutants continuously entered the Milwaukee river for decades until the input of waste began to slow once the Great Depression hit the United States in 1929 (Wisconsin Historical Society, 2014).

By the turn of 19th century, there were over 821 manufacturing establishments in the city of Milwaukee alone and though the number saw significant decrease with WWI and the attendant Great Depression, thereby reducing pollution into the waterways, the Milwaukee River did not get much relief because of legacy pollution. The great polluting industrial period dumped many contaminants into the river which continued to be polluted with no concerted effort to clean it up. When the Great Depression began, Milwaukee was hit especially hard despite its diverse industries. Factories closed, wages dropped, and unemployment skyrocketed. Employment in Milwaukee focused on jobs in factories and plants, so when these shut down the number of people who had jobs fell by 75%. A severe drought then hit the Midwest in the 1930's,

crippling Wisconsin’s agricultural industry. Milwaukee, like the rest of the United States, began a slow road to economic recovery after the U.S’s entrance into World War II in 1941 but the industrial reign of the 19th was over (Wisconsin Historical Society, 2014).

Though the industry slowed down in Milwaukee, which meant less factories and plants polluting the river, there were still legacy pollutants that plagued the region. Legacy pollutants come from sources that are no longer actively discharging chemical contaminants into the environment. Old industry is a prime example of sources of legacy pollutants because although the factories may have shut down the pollutants they previously expelled are still present in the affected site. These pollutants are often persistent in the environment because they are hard to break down and often not soluble in water (Hartman & Rockwell, 2011). PCBs generally settle in the sediment on the bottom of rivers or other bodies of water. This persistence is also the reason why many legacy pollutants remain in the environment long after the source disappears. In rivers, these pollutants can stay trapped in the sediment for centuries (PBS Frontline, 2009). These qualities make them a hazard to plant and animal (including human) health (Hartman & Rockwell, 2011).

Due to the contamination of the Milwaukee River, which was caused by the improper disposal of industrial waste into the river for decades, the EPA, the Wisconsin DNR, and the Milwaukee County Parks Department began working on the GLLA sediment project. Cleaning up the contaminated sediment in this area is considered essential to restore the Milwaukee Estuary and remove it from the AOC list. The goals of the project are remediating the contaminated sediments in tributaries and near shore waters of Lake Michigan, controlling nonpoint source pollution, improving water quality for recreation, and enhancing fish and wildlife habitat and populations (Wisconsin DNR, 2014.). The International Joint Commission (IJC) lists the beneficial uses of the river that they believe to be impaired (Table 1). From studying the table below, the main uses for the river are: fish and wildlife habitat, recreational activities, aesthetics, fishing, and food. Long histories can mean that the public, or some segments of the public, have strong relationships with the river and that these can be both supported by clean-up efforts, or dissolved because of them. For example, work in Washington D.C.

demonstrates that effort to clean up pollution in the Anacostia River was perceived as action designed to further segregate and impoverish the city's black community (Williams 2001) uses are extremely important in understanding how the organizations overseeing the project view the river because these may differ from the surrounding communities’ views.

Table 1

Eleven beneficial uses identified by the International Joint Commission are impaired or suspected to be impaired for the Milwaukee Estuary AOC (SEH/ECT 2008).

Impaired Beneficial Uses
Eutrophication or undesirable algae
Beach closings/recreational restoration
Fish tumors or other deformities
Degradation of aesthetics
Bird or animal deformities or reproductive problems
Restrictions on fish and wildlife consumption
Degradation of benthos
Degradation of phytoplankton and zooplankton populations
Restrictions on dredging activities
Loss of fish and wildlife habitat
Degradation of fish and wildlife populations

METHODOLOGY

We collected qualitative interview data in order to understand the thoughts and perceptions of the community members. Qualitative data includes any information that cannot be captured numerically. Three major categories of qualitative research are in-depth interviews, (these can be either at the individual level or at the group level), direct observation, or written documents (Trochim, 2006). In this project, in-depth interviews were used for data collection in order

to get an understanding of the community member's thoughts and perceptions concerning the remediation process. Following the interview process the interviews were transcribed word for word so that the data could be accurately analyzed. Once the interviews were transcribed they were uploaded into a computer qualitative analysis software called Atlas.ti (Atlas.ti 2014). This program was used to code the transcriptions, which categorized themes and perspectives on various topics. Once the information was coded, conclusions and results were drawn from the data.

Identifying Interviewees

Interviewees were identified using issuecrawler, a publicly available generates a network of links around a theme based on shared weblinks between organizational website. The issuecrawler results generated from the EPA homepage for the Milwaukee Estuary-Lincoln Park AOC (<http://www.epa.gov/greatlakes/aoc/milwaukee/index.html>) helped to identify formal organizations with interest in environmental remediation projects in Milwaukee or could represent the surrounding communities and their thoughts and feelings concerning change in the river. From here, we also aimed to read community leaders from other social service organizations (e.g. churches, after school programs, and social work agencies) as well as residents likely to interact with the river and whose views of the river that might be less directly related to the remediation priorities established by the EPA, Wisconsin DNR, and the Milwaukee County Parks Department.

Once the initial search was completed, contact information was obtained for the prospective interviewees so that they could be informed about the project and determine if they would like to participate in the study. Contact information, including telephone numbers or emails, was found from webpages associated with the prospective interviewees, such as the official websites of their occupation. The individuals were then contacted by a research team member, educated about the purpose and objective of the project, and asked if they were willing to participate. If they were interested in participating, contact information for the team was exchanged with them and more details on the project and the process of being interviewed were explained.

Interviewees were also recruited going directly from community centers in the cities of Milwaukee and

Glendale, Wisconsin. The research team distributed flyers that described the project's purpose and objectives and asked for community members who had an opinion on the GLLA project, changes in their community, or on the environment. Contact information for the research team and the research project's website was included so that prospective interviewees could contact the team and begin the interview process.

Once interviewees were identified, an interview date and time were scheduled. At the completion of the interview, the interviewers used a technique called snowball sampling to identify prospective interviewees. Snowball sampling is peer referral where interviewees recommend other individuals who they believe may be valuable to the research or could provide insight on the topic discussed. One person refers someone, who refers another, and so it becomes a snowball effect that allows for the research to reach a wide variety of interviewees (Bailey, 2008). Having a range of interviewees can provide varying viewpoints on the topic and introduce new information to the study.

In-Depth Interviews

Once the interviewees are identified, the interviews can begin. The purpose of the interview is to discover the interviewees' thoughts and perceptions about the chosen topic through specific questions and discussions. The information from in-depth interviews can be collected in multiple ways which include stenography, audio and/or video recording, and written notes (Cumming and Norwood, 2012). In this project the interviewees were audio and video recorded as a part of their interview. The use of both methods allowed the keeping of contemporaneously accurate and organized information. The footage will later be a part of a documentary which will be used to educate the public about the findings from this research. Interviewees were allowed to ask questions and stop the interview process at any moment. Interviewees were not bound to answer any question they did not want to answer so that they could feel comfortable and in control at all times.

The interview questions focused on the respondents' personal background, their thoughts about their communities and the environment, and

their thoughts about vulnerable populations within their communities. The interview questions followed these themes but the process allowed for questions to vary between different interviewees based on the characteristics of the respondent such as their occupation. Oftentimes, follow-up questions were asked of the interviewee in response to an answer which introduced new information or ideas. The interviewees were individuals who live and work in the GLLA project site. The interviewees varied in occupation, involvement with the community, and residency (Table 2). The differences in interviewees allowed for a range of views, thoughts, and perceptions about the same topics. The interviews are central to this research project because the analysis and conclusions derive from the responses given during this process.

Table 2
Characteristics of interview participants.

Identification Code	Occupation	Gender	Resident in AOC ^b
10A	NGO	Female	Yes
24A	CL	Male	Yes
37A	CL	Female	Yes
40A	CL	Male	Yes
69A	NGO	Female	Yes
71A	NGO	Female	Yes
74A	NGO	Male	Yes
98A	CL	Male	Yes
115A	CM	Male	Yes
123A	NGO	Female	Yes
127A	CM	Male	Yes
130A	CM	Female	Yes
131A	CM	Male	Yes
132A	CM	Male	Yes
133A	NGO	Male	Yes
134A	NGO	Male	Yes

^aCM=Community Member, CL=Community Leader,
NGO=Non-Governmental Organization Employee
^{*}Community is defined as the Milwaukee Estuary AOC in Wisconsin

^bArea of Concern

Transcribing

Once the interview was completed, the process moved on to the transcription stage. Transcribing is when the recording of an interview is copied into written form. This step of the process can take many hours depending on the length of the interview, speed of the transcriber, and the level of detail in the transcription. The level of detail depends on the depth of analysis the researchers are aiming for. Once the interviews are transcribed they can then be analyzed and conclusions can be drawn (Stanford University, 2011).

The interviews transcribed for this project were either done by one person or split between multiple individuals depending on the length and difficulty in understanding the information. The transcribers listened to audio or video recordings of each interview and simultaneously typed what they heard. The transcription included all dialogue spoken, only excluding words like “um”, and “you know” that didn’t add additional meaning to the interview. The interviewers and interviewees names were replaced with “interviewee” and “interviewer” to protect the identity of all parties involved. The words that the transcriber didn’t know how to spell or that were unclear, were typed in red font. Any parts of the interview that the transcriber could not hear was noted with [inaudible]. After the interviews were completely transcribed the team reviewed them to make sure that there were no mistakes. The team listened to either the audio or video file while simultaneously going through the transcription to look for discrepancies. This process was done for every interview conducted during this research project.

Coding

Once the interview was transcribed it was uploaded into Atlas-ti, a computer software program used for coding. The purpose of Atlas-ti is to help researchers analyze and categorize qualitative data. This program includes tools that allow the user to locate, code, and annotate findings in the documents (Stanford University, 2011).

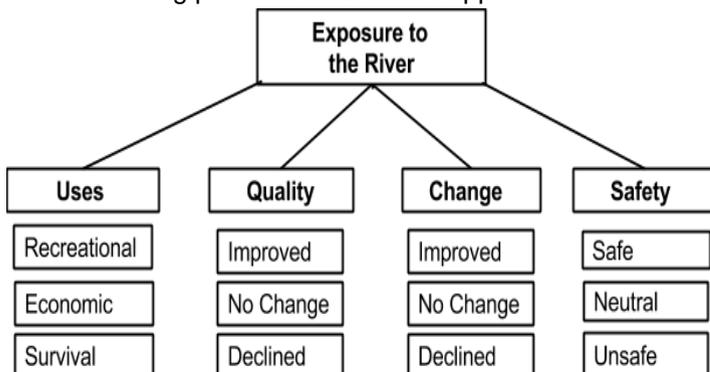
Coding is a process for categorizing qualitative data and for describing the implications and details of these categories. A code is a word or phrase that represents a certain theme or type of information. The

research began with open coding which is a broad code, and selected parts of the document that fits this category. The process then moves to selective coding where one codes for specific themes within that broader topic. The researcher can find common themes, weigh their importance, and evaluate them in order to understand the relationship between the interviews (Cumming and Norwood, 2011).

This research began open coding with the code “Exposure to the River.” Each transcription was read and whenever the Milwaukee River was discussed, or simply mentioned, it was coded for “Exposure to the River.” Exposure to the river can be thoughts, feelings, and interactions associated with the river that the respondent expresses. Once every transcription was coded broadly the research team went over the coded sections and found recurring topics and themes. More specific codes were then created in order to begin selective coding. An example of this process is the codes used when coding for the perceptions of the quality of the river. The code “Quality” was used to note that the interviewee was describing the quality of the river. The subcodes “Improved,” “No Change,” and “Declined” were then used to describe the interviewees’ specific perception of the quality of the river (Figure 2). Each transcription was coded to identify common themes and connections. This was done by analyzing when certain codes were mentioned, what the interviewee was saying about that topic, and the relationship between what others had to say about the same topic. A coding map was created to represent all the codes that would be used in the coding process, beginning broadly and then becoming more specific (Figure 2).

Figure 2

Figure shows the codes and subcodes developed during the coding process. Main codes appear in bold.



FINDINGS

The purpose of this research was to discover the community’s perception of the quality and safety of the Milwaukee River as it underwent an environmental remediation project headed by the EPA, Wisconsin DNR, and Milwaukee County Parks Department. Second, this research also sought to discover the similarities or differences between the ways the organizations running the GLLA project has viewed the uses of the Milwaukee River and the way the surrounding communities have viewed it. The data for this project was collected by conducting interviews of people who live and work in the GLLA project area, which includes the city of Milwaukee and the town of Glendale. These interviews were coded in order to find trends and common themes throughout the data set. The coding summarized what each respondent’s thoughts on the quality and safety of the river were, and their views on change happening within the environment. Results demonstrate that recreational fishing dominates concern for the river, but that respondents are divided on whether or not the quality of the river supports safe fish consumption. Most respondents viewed the quality of the river as increasing. We discuss fishing-related results as well as themes that are not explicitly included in the GLLA, but are part of the Lincoln Park – Milwaukee Estuary remediation plan, like improving the park and the river as a place for recreation (Wisconsin Water Quality Management Program 1991).

Figure 3

This chart represents the number of times each code was coded during each respondent interview.

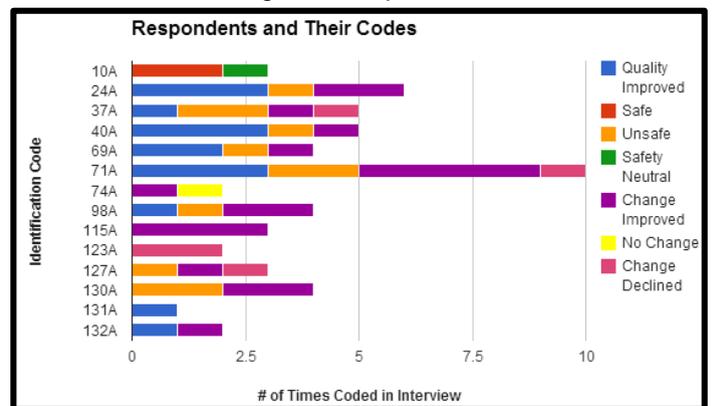
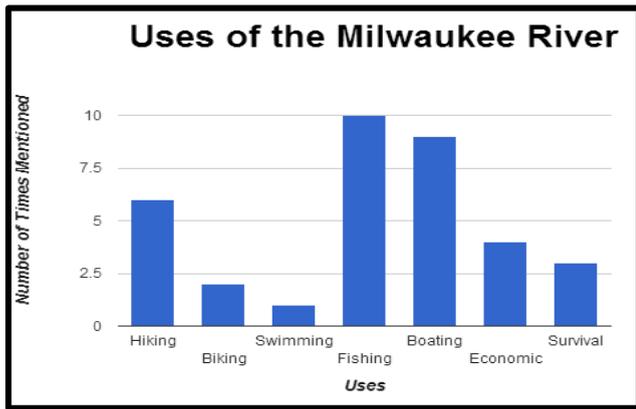


Figure 4

This chart shows the uses of the Milwaukee river that the coded in each interview.



Respondent's Thoughts on the Quality of the Milwaukee River

Interviewees were asked to express their thoughts on the quality of the Milwaukee River and discuss whether they believed it has improved, stayed the same, or declined (Figure 3). After analyzing the interviews and coding them, it was found that the community believes the quality of the river has in fact improved from the past. The broad code "Quality" was coded in 8 of the 14 interviews. In all 8 interviews, respondents expressed that they believed the quality of the river has improved while none indicated that the quality declined. When asked about the quality of the river, interviewee 69A responded, "So I would say improving, improving quickly, because there's a lot of effort being placed on it, keeping in mind that our environment is resilient, but it works slowly and that we have to be patient and that all of our efforts will be helpful." Given the responses derived from the interviews, people in the project communities tend to hold the view that there is improvement in the quality of the river due to the GLLA environmental remediation project.

Moreover, respondents not only recognize these changes, but approve of them as well. For example, interviewee 71A expressed that, "It's pretty amazing how good a lot of the rivers have become, and I do think that there's a difference and that things are generally getting better;" and interviewee 40A added, "The water quality has greatly improved. The access has really improved. The number of people using it has increased. Slowly but surely, the perception of the river is changing

as being clean." The interviews show that the GLLA is making a difference in the quality of the river and that the communities are recognizing and approving of these changes. It is important to understand the way the communities' view the ameliorative changes made by the GLLA because these changes have community-wide effects and defines how these communities interact with the river. The organizations in charge of environmental remediation projects should understand the effects of the changes they have implemented in terms of their ecological and community impacts when evaluating the success of the project. Understanding project impact as well as public perceptions and sentiments should be of equal importance in the overall achievement of restoration.

Respondent's Thoughts on the Safety of the Milwaukee River

Respondents were also asked to discuss their thoughts on the safety of the Milwaukee River because the GLLA project seeks to remove harmful chemical pollutants from the river, namely PCB's and PAH's. The code "Safety" was coded in nine interviews, of these, eight respondents indicated that they believed the river was unsafe, while only one expressed that they believed the river was safe to use. The main safety concern of community members is the consumption of fish that may be contaminated with these chemical pollutants.

Many respondents indicated that fishing in the Milwaukee River and then feed those fish to their families. During respondent 40A's interview, the respondent expressed this concern, "So I told you about the fisherman that was down here. And he's with his kids and they're playing. And he's going to catch fish and he's probably going to eat these fish. And he didn't know about PCBs. And I don't think many people do." This concern was also shown when respondent 24A recounted the reaction of another community member when they stated that they ate fish from the Milwaukee river, "You actually eat fish that you catch out of the Milwaukee River!? You must be craz—Or, are there fish in the Milwaukee River!?" It is clear that community members are worried about the chemical contaminants that may be present in the fish. It is important for the environmental remediation organizations to know these concerns so that they may

address these issues when creating project goals. Knowing these concerns can also allow organizations to educate the community about these chemical contaminants and the way they can keep themselves and their families safe during and after the remediation process.

Respondent Views on the Uses of the Milwaukee River

This research also looked to discover the similarities and differences between community members' views and the organizations overseeing the GLLA views on the uses of the Milwaukee River. The beneficial uses of the Milwaukee River that must be restored before the area can be delisted (Table 2). These include improving recreation, fishing opportunities, aesthetics, wildlife habitat, and wildlife consumption safety. Similarly, the community indicated that their main uses of the river include recreational activities, its economic value, and sustenance fishing.

There were multiple recreational activities expressed by respondents in their interviews as part of their interaction with the river. These include hiking, boating, swimming, and the most mentioned activity was fishing (Figure 4). The community makes use of the many parkways as they bike and walk alongside the river. When asked about the way they use the river, respondent 24A responds, "Fishing. Hiking, I guess—strolling is more like what I really is. In decent weather my wife and I like to just walk up and down the nice parkway we have here and see what's going on and observe nature while we're doing it." Fishing was the most mentioned activity in the interviews, and community members seem to enjoy it. Respondent 71A describes some interactions they observe with the river, "During steelhead migration, brown trout, salmon even has become a pretty big recreational fishery. There are people down there, in very expensive waders and every expensive fly rods, we see them fishing and enjoying themselves. I think the big difference is a lot of them are doing catch and release, maybe some of them are eating what they are catching, but it is more recreational." Both the action plan for the Lincoln Park – Milwaukee Estuary AOC and community members view the river as useful for recreational activities, which is important to know as the organizations work to restore these uses to functionality.

Fishing in the Milwaukee River was described as being used for recreational purposes but also for

survival. There are areas in Milwaukee where families often rely on the fish from the river as a source of food. Respondent 71A expresses their concern as they describe the way some parts of the community rely on the fish from the river, "We have a lot of subsistence fishing in this city, still. In the lower Menominee River, there's people fishing every day of the year down there. I think removing a lot of PCBs, in places like Lincoln Park and the lower KK [sic], I think is hopefully helping these people who are fishing because a lot of these contaminants are getting into the fish. I think anything that we are doing to clean up the river is hopefully helping those people who are out there fishing and hoping to get something on the line so they can feed their family that night." The delisting targets indicate that the Milwaukee River should be safe for fish and wildlife consumption, which matches the sentiments of these communities. It is important for organizations to understand the way people depend on the river so that they may address issues that have been plaguing these populations as they remediate the site.

The Milwaukee River benefits the surrounding communities just by existing. During interviews, community members indicated that having the river in their community increased property value, tourism, and uplifted the economy. Respondent 98A describes the change they have witnessed as views on the usefulness of the river change, "One of the things that I think, since I've been here, I've seen a reinvestment in the downtown area, and it can be maybe best described as the river was more seen as a – where the businesses had their backdoors to the river, and they're facing away from the river and not really seen as a real natural asset. But that's been changing with downtown investment and the RiverWalk and new housing and incorporation of the river as a major attraction – an asset – which it is, but a lot has changed to make that possible."

Similarly, respondent 71A describes the way water systems are important to the economy in Wisconsin, "We have an 8-10 billion dollar water-based tourism economy in this state, we have the second highest fishing licenses and boating licenses in the country, I think next to Florida, it's a huge deal. As someone who's from Chicago, there's so many people from Illinois who have summer homes and cottages, who

come up here to recreate, and so many businesses, restaurants, hotels, that depend on that tourism industry. It was always supported, shoreline regulation, sound water management, always supported.” The aesthetic quality of the Milwaukee River is a delisting target that is very subjective. The community members expressed the importance of "having the river" as the opportunity to see it. This perception is related to the river as an important part of the tourism economy. Respondents perceive river views as an opportunity to attract tourism, which will benefit businesses that are located near the river.

CONCLUSIONS

The Milwaukee River has been degraded by pollutants from Milwaukee's industrial past, but the EPA, Wisconsin DNR, and Milwaukee County Parks Department have been working to correct these issues with the GLLA environmental remediation project. This research sought to understand the community perceptions of the quality and safety of the Milwaukee River, and to discover the differences in views on the uses of the river between the community and the organizations overseeing the GLLA project. Through in-depth interviews and the process of coding it was discovered that the community believes the quality of the Milwaukee River has improved, but that there are still concerns about the safety of consuming fish from the river that may be contaminated with chemical pollutants. The research also determined that both respondents from the community members and from groups that are involved in remediation view the river as important for recreational and economic activities, and as a source for food.

It is important for these organizations to understand the way the community views the changes in the environment due to the remediation projects, any concerns they have for their safety, and the way they view the uses of the area being remediated. By being aware of these matters, these organizations can create goals for the project that not only positively impact the environment and the estuary communities that are the focus of and most impacted by the remediation project. This research can help improve the way organizations view the relationship between the environment and the affected community surrounding an environmental remediation project. Remediation projects often focus on improving

the environment but the results of this paper shows that such projects should also pay as much amount of attention to how the surrounding communities are impacted and how their efforts are interpreted by affected communities. By factoring in and understanding the importance of environmental and the needs of surrounding communities, the overall success of an environmental project can be enhanced.

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