Weathering Waste: Combined Sewer Overflows, Community Impacts, and Climate Change in New York's Capital Region

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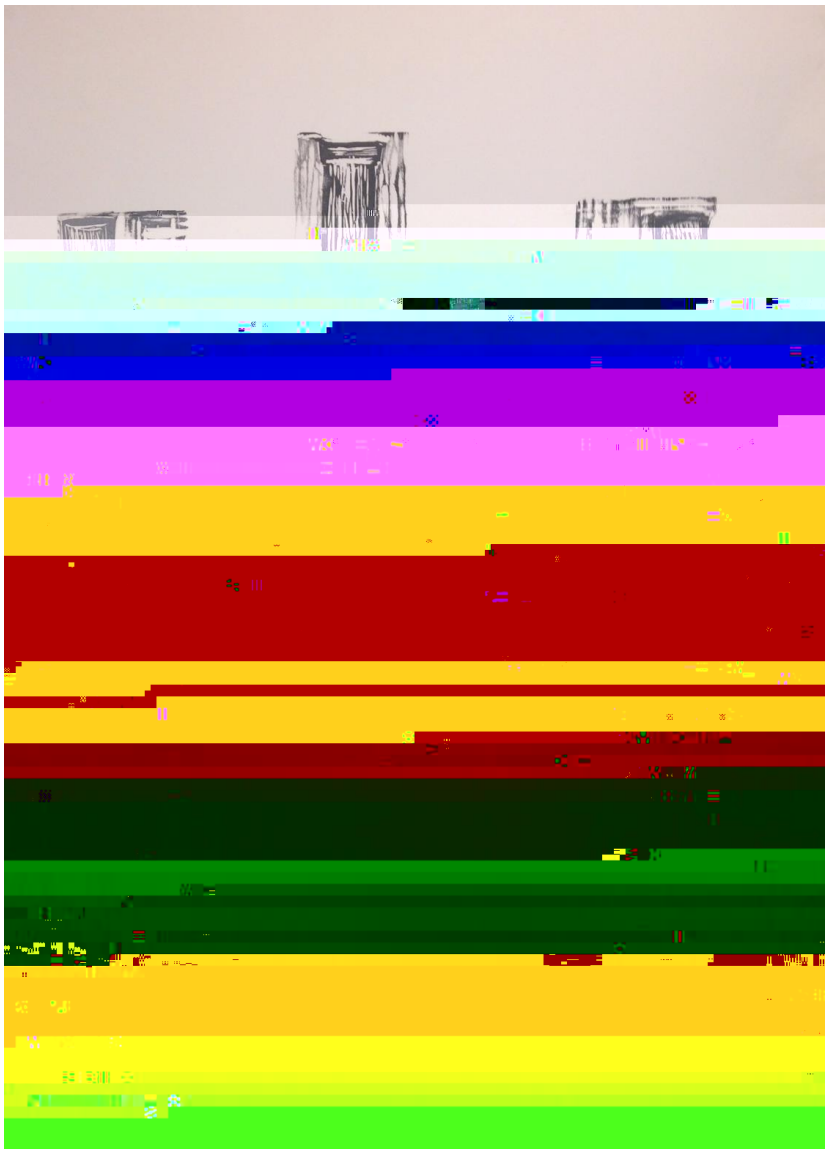

Environmental Studies and Science Senior Capstone
Skidmore College, Saratoga Springs, NY
May 7th, 2018

Overview

Combined Sewer Overflows (CSOs) have major impacts on water quality and communities. Our research took an interdisciplinary look at the impacts of CSOs in the Capital Region. The quantitative research focused on the water quality impacts of CSOs as well as the potential future impacts of climate change on these events while the qualitative research focused on community knowledge, engagement, and mitigation efforts. Collectively, we came up with recommendations for addressing the Capital Regions CSO issues.

Quantitative Abstract

Currently, little to no data exists on the impacts of CSOs on winter water quality. Additionally, the impacts of climate change on

Hudson water and riverfront activities. Boundaries between different approaches to CSO mitigation are discussed in the context of the implementation and equity of green infrastructure and outreach efforts. There is noticeable gap in project collaboration and coalitions between alternative and official adaptation, mitigation, and management initiatives. In conclusion, we suggest a more holistic approach to combined sewer management that accounts for greater socio-ecological equity, increases collaboration between all stakeholders, and considers alternatives to traditional sewage management practices.

Each year, waterways in the United States are contaminated with 850 billion gallons of raw, untreated sewage. The vast majority of this discharge is legal, in the form of Combined Sewer Overflows (CSOs), a result of the widespread use of outdated and inadequate sewer systems across

improved in recent years, CSOs remain a major challenge. As these upper Hudson cities experienced massive industrial growth in the twentieth century, they struggled to provide adequate infrastructure to match in the rapid urban expansion. It is the legacy of these old pipes with which these communities must now contend.

urtesy of the EPA.

Water Quality Impacts

CSOs have been listed as the number one water quality concern in many communities (DEC, 2017). They not only decrease the recreational and municipal value of the water bodies where discharge occurs, but they also present a public health issue. Several studies have shown that CSO events significantly increase concentrations of *Escherichia coli (E. coli)* an1 (own)] TJ E

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While nitrate, ammonium, and phosphate are all nutrients naturally found in ecosystems, their concentrations can also be increased due to human activities such as agriculture or CSOs. High levels of nitrate in surface water, specifically water used for drinking and cooking can have negative human health impacts, such as blue baby syndrome. In addition to having adverse health impacts in humans, aquatic life can also be impacted at high concentrations of nitrate in the water. Aquatic animals living in water with high concentrations of nitrate and having long exposure times to this water can be adversely impacted as oxygen becomes unavailable to them (Camargo et al., 2003). Large concentrations of phosphate in surface water can cause algal blooms and speed up eutrophication which creates anoxic conditions for aquatic life in the impacted water body which can lead to fish kills (EPA, 2017). Furthermore, toxins discharged from CSOs can also build up in

As discussed above, both fecal pathogens and emerging contaminants are a dire public health concern for these communities, and their collective impacts are not fully understood. Due to the emerging nature of these contaminants, the distribution and severity of the health impacts of CSOs thus remains largely unknown. Following the impacts of CSOs downstream, we see that

..entangled with the lives of nonhuman creatures and the future

disparities as increased precipitation, combined with the flashiness of urban hydrology, threatens to both increase and intensify future CSO events. While climate change has become a central subject of global political concern, climate justice is rarely discussed at the urban scale (Bulkeley et al, 2013). Work towards ecologically resilient urban futures must also include careful consideration of the ways in which the changing climate is manifested in urban water flows. In contrast to the dominant climate change imaginary, where climate is abstracted from everyday experiences, the rising contamination of CSOs may force us to reconsider the intimacy and nearness of the changing climate (Giggs et al, 2016).

Climate Change Impacts

Published research, international, and national institutions have recognized the reality of

seeing increases in CSOs under the Hadley Model climate projection. The decrease in CSO events considered the effectiveness of mitigation measures, should they be implemented. In general, the great variability of precipitation trends across New England points to more localized studies being used to predict possible trends. A study observing the impact of climate change on CSOs in Southern Quebec found that despite a 40% decrease in mean flow of the St. Lawrence River, a

communities of color (Christian-Smith, 2012; Perreault, 2012). However, due to the high cost of these large-scale infrastructural changes, alternative approaches to dealing with CSOs are increasingly considered. The more common tactic to address increased urban water flows is the implementation of green infrastructure projects, such as rain gardens, vegetated swales, green roofs, and porous pavements. These green spaces increase rainwater infiltration and slow the movement of water through the urban landscape, thereby helping to reduce runoff and thus CSO

It is important to analyze the different communities that are impacted by these CSO mitigation sites, and consider their varying social (in)accessibilities. Where green infrastructure is placed, and the new kinds of relationships that form as a result, impacts both its mitigation effectiveness and persistence. Placement considerations should include both ecological effectiveness and social relevance. To implement this dual goal, both political will and social capital are necessary to maintain the ecological benefits of green infrastructure over time (Davis, 2011). Long-term commitment is also necessary to ensure that the production of new environmental amenities does not produce ecological gentrification through the displacement and exclusion of certain populations from urban green spaces (Dooling, 2009).

The agency of the nonhuman components of water management schemes is also a vital aspect of understanding CSO mitigation. Rewilding outside of human efforts may play a key role in increasing rainwater retention, as new kinds of plants move into the vacant lots and abandoned sites of post-industrial urban landscapes (Lorimer, 2008). Through the interaction between human

produced, altering the forms of risk that are monitored and managed (Jones et al, 2014). The forms

municipal laborers, engineers, nongovernmental organizations (NGOs), state regulatory agencies,

systems shape how they are known and managed.

In response to uneven governmental involvement in mitigating CSOs, and the uncertain effectiveness of these interventions, many communities are organizing on a more local level. Forms of community involvement range from rainwater retention techniques to citizen science

practices of urban environmental management is through the use of participatory risk assessments to build a better picture of community vulnerabilities to climate change (Aalst et al., 2008).
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monitoring and managing urban environmental change presents a critical form of citizen involv

other matter, waste infrastructure is designed to make these flows disappear (Larkin, 2013). The sewers not only cleanses the city of pathogens but also makes its own intervention invisible in a kind of imaginary sanitation. Once venerated as an engineering solution, the sewer system slowly morphed into obscurity. The Capital Region cities continue to rely on many of those original pipes laid in the late 19th and early 20th centuries.

With this more general public amnesia for waste infrastructures comes a lack of funding for maintenance and repair. As a result, these inherited pipes fall into disrepair and the large-scale changes needed for growing cities were never made. Thus while centralized waste management was intended to promote new standards of cleanliness, it also inadvertently resulted in more diffuse, insidious forms of contamination. City residents are alienated from the ways their waste flows into environments elsewhere, and waste contamination becomes an unseen business-as-usual aspect of everyday life. CSOs illuminate this hidden issue; they hold the potential to disrupt the sanitizing imaginary that waste infrastructures produce. In overflowing the system, they reveal the n

with the rise of the environmental movement, when the Hudson was frequently described as an

communities contain 92 CSO outfall locations, with an annual discharge of 1.2 billion gallons of untreated wastewater. In the event of an overflow, a mixture of stormwater and wastewater in these communities is released into either the Hudson River or the Mohawk River (Pool, 2011). Since the Albany Pool program is under the management of multiple parties, the communities established the Albany Pool Communities Corporation; a nonprofit that takes some pressure off

collaborative system that these municipalities have developed in response to the ubiquity of outdated combined sewers in the area.

-depth understanding of the research area through data triangulation, including water quality measurements, precipitation

Map of water sampling locations, with site names and GPS coordinates.

To test for phosphate, the ascorbic acid method was used. A 10 ppm standard phosphate solution was made using DI water and potassium phosphate, and a standard curve was created. Then a potassium antimonyl tartrate solution was mixed with 1.3715g of potassium antimonyl tartrate and DI water. An ammonium molybdate solution was mixed using 20g of ammonium molybdate and 400ml of DI water. Finally a 0.01M ascorbic acid solution was made using 1.76g of ascorbic acid and DI water. A combined reagent was made by mixing 50 ml of 5M H_2SO_4, 5ml of potassium antimonyl tartrate solution, 15 ml of ammonium molybdate solution, and 30 ml of ascorbic acid solution. 50 ml of sample or solution was mixed with 8 ml of the combined reagent in an erlenmeyer flask. After 20 minutes the sample was transferred to a spec cell and read using a spectrophotometer at 880nm. Standards ranged from 0 to 0.5 ug/L and were mixed using a phosphate stock solution and DI water.

Exploration into Climate Change

Data on climate change in the Capital Region was gathered from a variety of sources and compared. Additionally, previously collected precipitation data was gathered from NOAA, and data on CSO events was collected from the NYSDEC. The number of CSO events per month was counted and compared to the number of precipitation events that occurred that month. To determine precipitation the number of rain events in the 72 hours prior to a CSO event were tallied. Then the total number of precipitation events for each month were counted.

Qualitative Instrumentation and Data Analysis

Semi-structured Interviews

We conducted interviews with key stakeholders involved at every stage in the urban ecology of sewage, following the lifecycle from production, treatment, contamination, prevention, and remediation. These interviews were gathered using key informant sampling and snowball sampling techniques utilizing other the internet and other key informants depending on the interview group. The main interview groups included wastewater treatment plant employees, state-level actors, grassroots organizers, and community members.

The name of each interviewee, length of the interview, and what subcategory (see subheadings below) the interviewee fell under was compiled into a stakeholder chart for reference. From the responses data was coded to identify emerging themes that were noticed. These themes were organized to capture issues surrounding CSO management at every stage, from community infrastructure, to sewage facilities, to community organizations, remediation efforts, and health outcomes.

II. State-led Initiatives and Local Government

Interviews with individuals involved with state-led initiates will include the Capital District Regional Planning Commission, Albany Pool (including Martin Daley, Director or Water Quality Programs and Regional Planner), officials from the Department of Environmental Conservation (Hudson River Estuary Program), and local government officials. In order to compare and contrast the approaches, agenda setting, and initiatives implemented in communities, interviews were conducted with local officials from the Albany Pool Communities and were focused on addressing CSO mitigation and adaptation. Across the communities there are differences of number of CSOs, population, industry, diversity, and income.

various social constructions provided a lens into the diverse forms of hydro-relationality at play in the production, use, and dispersal of wastewater through CSSs. Looking at both the representations of both the Hudson River and waste, we considered their roles in the formation of urban waste regime (Gille, 2010). Ultimately, this opened our research to investigating the impact these constructions have on what kinds of knowledge are considered valuable, and what types of mitigative or adaptive action are subsequently taken.

Site Visits and Participant Observation

The completed site visits to various urban environments provided a lens into the ongoing negotiations of meaning as well as the human and nonhuman relationships taking shape around CSO events and management. To gather our observations for later analysis, we took field notes, and collected audio recordings a
particularly attuned to the potential discrepancies between the different discourses surrounding these sites and actual community uses. Additional field locations include Albany Pool meetings, community workshops, and public areas situated on the Hudson River waterfront.

Action Research

Our study involved action research, a collaborative method of research that incorporates stakeholder participation. Action research confronts environmental and social issues on a systematic level to remedy these issues and to ensure reciprocity for the stakeholders (Schneller & Irizarry, 2014). In order to facilitate a relationship of greater reciprocity with the communities in which our research was situated, we shared our research findings through a variety of outlets

Nutrient Analysis

Phosphate levels were between 0.143 and 0.267 ppm. There is variation between all the locations sampled, as well as dates sampled meaning that there is no one site that is always higher or lower than the other locations we sampled at. The month with the highest phosphate concentration was January (Figure 7).

Graph showing the average phosphate concentration for all sampling dates. The r^2 for the standard curve

This graph shows number of CSO events per month in orange, and number of precipitation events 72 hours prior to a CSO event per month in blue ($p = 0.000$, $df = 52$).

cycle. Without testing for total nitrogen it is difficult to determine the true reason for why ammonium levels were higher in December and January. Determining acceptable levels of ammonium and phosphate proved difficult because neither the EPA nor New York DEC has any

are regulated in New York State waters by a narrative water quality standard rather than a

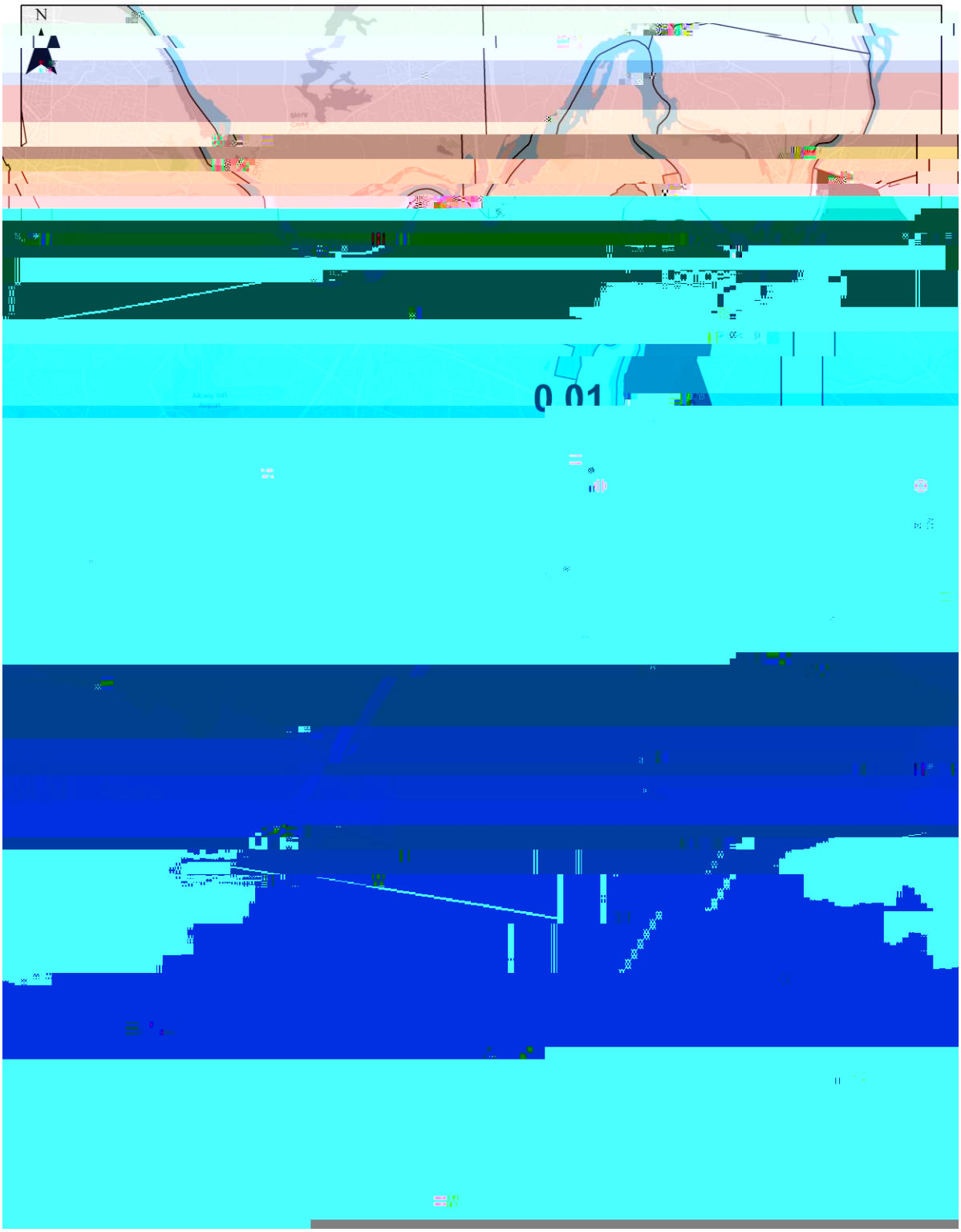
that result in the growths of algae, weeds, and slimes that will impair the waters for their best

the levels of nutrients that we detected in our water samples difficult because of the lack of a numeric standard to compare to,

time and high turbidity levels

mitigating the summer events, while water quality is being impacted year round by CSO events and these impacts are likely to get worse.

The predicted changes in precipitation discussed above pose a serious threat to water quality and CSO communities. Despite this, Albany Pool is basing



Survey respondent distribution in Albany Pool communities - Percent response to: which community are you a part of or reside in? (n=117)

Sewer Management: The Political Structures

Engineering Expertise

In the Capital Region, wastewater management decisions have been made based on both institutional and experiential knowledge. Prior to the formation of the Albany Pool, these different municipalities often operated in isolation. This disunion is ingrained in governmental memory, as publi

communication, 2018). While the separate Sewer Districts in Rensselaer County and Albany County had been formed in the late 1960s, there was little communication or collaboration between them until they were brought together through Albany Pool. Yet while the political structures governing these sewers across the river were disunited, the workers and managers involved in the management of the wastewater itself had developed social networks that laid the foundation for -river

relationship which became useful once they were required to collaborate to fulfill the consent order. Likewise,

by the fact that the DEC employee at the time was a former college classmate of the plant operator. Conversations between former college classmates, between parallel positions across the river, in comradery at wastewater conferences all became part of the social networks that mapped on top of sewer networks and informed how new kinds of collaborations took shape.

The successes of the Albany Pool negotiations--both between federal, state, and city level governing bodies as well as inter-municipal collaboration--were partly due to the ways in which the technical expertise of City Engineers and sewage treatment plant managers were prioritized. Through their lived experience with the complexities of the wastewater system, these technical experts bring additional kinds of knowledge beyond the regulatory and legal knowledge of the political figures involved in the process. As a result of the priority given to the sewage treatment plants, Albany Pool was able to significantly reduce the cost of compliance. Upgrades at the plants meant that they were able to treat more water at a high standard and reduce the number of violations. Albany Pool was able to significantly reduce the cost of compliance with the consent order by encouraging improvements to sewage treatment plants, which were funded by external grants and increase in tax contributions from wastewater customers.

This framework for knowledge sharing is especially important where some communities have more resources, longer-term experience, and new technologies that are changing how the sewers are understood and managed. The high cost of maintaining and updating waste management infrastructure has been a primary concern from the outset. From the decision to install combined, rather than separated, sewer systems in the first place, to their subsequent neglect and disrepair, lack of funding has been a primary challenge. Through sharing funding, the formation

the Executive Assistant

incomplete, and dependent on the expertise of long-time employees who take this knowledge with

NYS DEC, it was discontinued due to lack of ongoing financial support (USGS, Personal

did not support the full diversity of voices on the issue. The disparity between local concerns and official outreach efforts remains an ongoing challenge to Albany Pool efforts to engage the public about CSOs.

Education & Outreach Efforts

As the public opposition to the Beaver Creek Project exemplifies, education and outreach has remained a continuous struggle for those working within the water quality field and on occasion even provides barriers to implementing projects. As our survey results showed, 57 % of espondents

flect a small subset of the population, a number of respondents engage in water activities, such as rowing, fishing, and swimming. As contact with the water increased, knowledge of CSOs decreased. Even when speaking with individuals attending an environmental symposium, the percentage of panel attendees familiar with CSOs reflected our survey, with roughly two-thirds being unfamiliar with the term.

Education on water quality can be sporadic depending on the agent, and those leading education and outreach efforts do not often come together to form coalitions to maximize their reach and pool resources. In conversations with employees of the Albany County Stormwater Coalition, NYSDEC Hudson River Estuary Program (HRE), and Albany POOL, there were multiple outreach and education projects over the years; however, joint projects were infrequent

therefore not seeking assistance. The Stormwater Coalition has in the past provided brochures and reverted to educating problem areas via informational pamphlets or relying on action from the municipality governments (N. Heinzen, personal communication, 2018).

Municipalities have used a variety of means to spread information regarding important developments, including those about water quality. Multiple communities have local Facebook pages to spread information, a mechanism that agencies such as the Stormwater Coalition have yet to take advantage of (N. Heinzen, personal communication, 2018). Other communities, such as Green Island distribute newsletters:

> Our village newsletter goes out to every resident in Green Island with an electric account, but every unit has an electric bill and in that electric bill is a newsletter, we do alert our residents about CSOs, about the Pool communities, about stormwater, about best practices. That is our strongest way of reaching the entire population of Green Island. (M. Alix, personal communication, 2018)

individuals consuming the fish (NYS Department of Health, 2016). The educational approach must be culturally relevant and sufficiently urgent for individuals who are more vulnerable to potential negative health effects. The NYS DOH has partnered with organizations that provide services to newcomers, such as Latinos Unidos of the Hudson Valley, the U.S. Committee for Refugees and Immigrants, and the Chinese-American Planning Council. Through these partnerships, they have

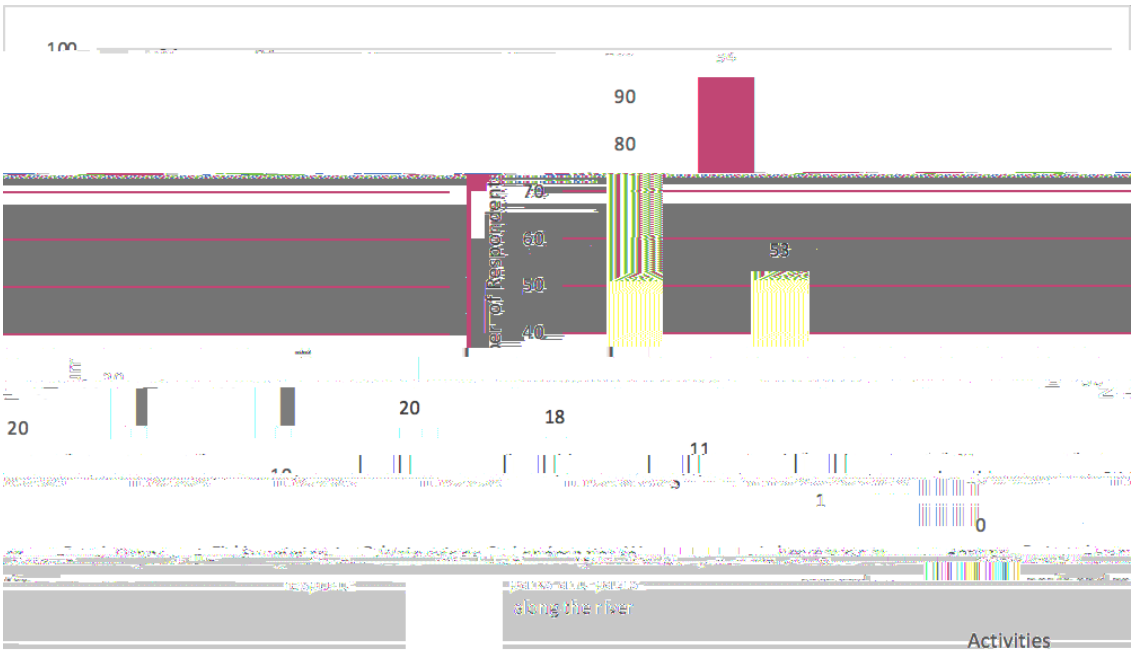
quantitative, and qualitative research in the context of Troy was presented to an audience of

knowledge of specific access points, which are in themselves still limited to small stretches, which continues to alienate residents (S. Kellogg, personal communication 2018). Improvements, though slow, have been made, both in Albany and other communities. Starbuck Island provides a large open green space on Green Island that many locals use, and the number of pedestrian bridges and paths have increased partially due to the implementation waterfront revitalization initiatives. Albany now has the Corning Preserve that serves as dock point, park and path connection. The Commissioner of the Albany Department of Planning and Development, Chris Spencer, mentioned tackling the barriers between communities and the Hudson River through lighting, innovative design, and sculpture, which try to naturally reconnect people to the waterfront (personal communication, 2018). Some of these actions have been successful, as a long-time fisherman

ersonal

communication, 2018).

New York Interstate 787 creates a physical barrier separating people from the river in many areas and providing only limited number of access points.



Select any and all activities that you do on the Hudson River. (n=150)

While 64% of respondents surveyed were unfamiliar with CSOs, there is general concern regarding overall water quality. In ranking Hudson River water quality, 61.42% of respondents ranked perceived pollution between 6 and 10 (0 being no pollution and 10 being extremely polluted). No respondents gave perceived water quality a ranking of 1 or 2.

A trend in our data showed that people most directly engaged/in direct contact with the water were less likely to know of combined sewer systems or CSOs. Analyzing the survey results showed that only 18% swimmers were familiar with CSOs. Fishers, which made up 13.25% of respondents including 20% of which fished for consumption, fared only slightly better. All respondents who fished for consumption were not familiar with CSOs. In total only 25% of fishers were familiar to CSOs. The lack of knowledge by those closely interacting with the river reinforced when speaking with a long-time catch and release fisher on the Hudson, who takes people on fishing excursions, noted that he was unfamiliar with CSOs and, while aware of different sources with water quality information, does not utilize them before going on the water (personal communication, 2018). The awareness of CSOs by these two groups is markedly lower than that of the respondents taken together, where 36% were familiar with CSOs.

Further, education sessions with recent immigrants and refugees fishing in the Hudson illustrated unexplored gaps in knowledge, access to information, and differing relationships to the river. As a result of local research, they have found that newcomers to the area, including immigrants and refugees, are often in close contact with the Hudson, yet know less of its superfund/pollution status (NYS Department of Health, 2016). Because our survey does not account for the potential differing levels of awareness of CSOs and pollution in

immigrant/refugee/non-native English-speaking communities, knowledge may be even markedly lower, putting these groups at increased risk.

Despite water quality improvements since the 1960s and the PCB dredging projects in recent years, there may be some perceptions of improving or safer water conditions. However, as the quantitative research illustrated, no samples passed the EPA water quality limits for both *E.coli* and *Enterro* levels, with levels and bacteria colony counts peaking after CSO events and failing 66% of the time in comparison with 59% of non-CSO samples. Perception and knowledge of the

We are at the end of the useful life of a lot of these facilities and

potential as an educational tool (M. Daley, personal communication, 2018, C. Spencer, personal communication, 2018, N. Heinzen, personal communication, 2018), possibly because it has the

Government agencies are often reluctant to partner with citizen groups, both due to a political imperative for rapid, single-issue response and concerns around liability were something to go wrong (Kellogg, 2013). Consequently, governmental agencies are commonly unfamiliar with community concerns surrounding green infrastructure practices and alternative approaches. The construction of a GI site in Watervliet entailed the removal of several mature trees. These trees had long been cared for by the local residents, as one tree grew older, the community moved sidewalk slabs to allow its roots to expand. The younger GI trees are aimed to grow into power lines overhead. Mature trees decrease runoff exponentially more than smaller trees through as their leaves intercept rainfall and root networks store water in the soil (MacDonagh, Smiley, and Bloniarz, 2012). Additionally, the project created a significant disruption in the community; the new sidewalk retains snow cover for longer, becoming a challenge for older residents in the winter and the construction disturbance in the street caused one resident to lose a tenant and local

space for water during high intensity rainfall events (Cover Crops, 2010). This both improves the health of the so

combined and separated systems, green infrastructure has taken a central position in mitigation efforts. However, beyond integration between governmental departments, it is also important to consider ways to integrate wastewater management throughout a neighborhood. More

in the public more broadly and within Albany Pool, as the LTCP fails to incorporate the longer-term processes of climate change with the more immediate considerations of regulatory demands.

As sewage overflow continues to pollute the Hudson and Mohawk Rivers, it is important that clear and candid information be disseminated amongst the affected communities. The challenge is to ensure that individuals understand the public health risks posed by CSOs, while working to cultivate feelings of care and concern for the riverine systems. The current requirements for CSO mitigation are not enough to meet the needs of the Albany Pool communities. Thus, municipalities must reach beyond these policy provisions and develop more holistic mitigation. Our results illustrate the failure of current education and outreach efforts and show the need for new approaches and initiatives, with some focusing on revamping current notification systems and building collaboration and coalitions both inter-departmentally, at the district planning level, and inter-organizationally, between stakeholders from the grassroots to governing bodies. These new education and outreach efforts have the opportunity to inform and inspire, rather than push people to avoid contact with the river, and create a more robust and vibrant community surrounding riverfront and outdoor activities.

Appendix I: Interview Questions:

Wastewater Treatment Plant Manager/Employee:

How have CSOs frequency and/or intensity changed over the course of your work at this plant?

Have you already seen impacts from climate change? How so in your opinion?

What impact have you seen from recently created green infrastructure on CSOs?

What mitigation effort/policy change do you think would have the greatest impact/be the most beneficial?

Community and State-led Initiatives:

How do you determine where to place green infrastructure? Who determines this?

What forms of community engagement do you conduct? In what ways are locals able to voice their opinions or provide input?

To what extent have the effects of climate change been incorporated into the Long Term Control Plan? Is the Long Term Control Plan subject to alterations?

Do you believe that the Notifications System in place is adequate? Do you think that the public is aware of CSO events?

Grassroots Adaptation and Remediation Efforts:

What motivated you to begin this project?

Who do you hope will engage with your project?

What is your perception of the pros and cons of Albany POOL funded projects?

    1. Utilizing adjacent parks and paths, boating, watersports, swimming, fishing, other
3. On a scale of 1 (very clean) to 10 (very polluted) would you rank the Upper Hudson in the Capital Region?
4. In the case of a pollution event, on a scale of 0 (no information) to 10 (very well informed and clear information), how well do you feel informed?
5. What are your primary sources for this information? Check all that apply
    1. Local community leaders, the state government, local government, community organizations, state or nationwide non-governmental organizations, other
6. Are you familiar with the term: combined sewer system?
7. Are you familiar with the term: combined sewer overflow, or its abbreviation, CSO?
8.
9. [definition of CSO provided for survey takers]
10. Are you aware of any CSO events in the Capital Region
11.

Appendix 3: Water Quality Parameters By Site

Appendix 4: Key Stakeholders who participated in Semi-structured Interviews

Martin Daley*	Director of Water and Water Quality	Capital District Regional Planning Commission	January 8th, 2018
Tim Murphy*	Executive Director	Albany County Water Purification District	January 23rd, 2018
Kathy High	NATURE Lab Coordinator	The Sanctuary for Independent Media	January 15th, 2018
Scott Kellogg	Educational Director	Radix Ecological Sustainability Center	January 30th, 2018
Nancy Heinzen	Program Director	Albany County Stormwater Coalition	February 2nd, 2018
Jared Flagler	Advocate	Albany County Stormwater Coalition	February 2nd, 2018
Joe Cleveland	Technician Assistant	Albany County Stormwater Coalition	February 2nd, 2018
Joe Coffey*	Commissioner	City of Albany Department of Water and Water Supply	February 9th, 2018
Regina Keenan	Hudson River Fish Advisory Outreach Coordinator	New York State Department of Public Health	February 26th, 2018
Kathy Sheehan	Registrar, County and City Historian	Rensselaer County Historical Society	March 3rd, 2018
Paul Naumann	President	Rensselaer Polytechnic Institute Rowing	March 5th, 2018
Emily Vail	Watershed Outreach Specialist	Department of Environmental Conservation, Hudson River Estuary Program	March 8th, 2018
Chris Spencer	Commissioner	City of Albany Department of Planning and Development	March 13th, 2018
Ryan Palmer	Head of Center for the		

Sean Ward*	Executive Assistant to the Mayor	Village of Green Island	March 21st, 2018
Maggie Alix*	Building Inspector and Code Enforcement Officer Director of Parks and Recreation	Village of Green Island	March 21st, 2018
Gerry Moscinski*	Administrative Director	Rensselaer County Sewer District	March 29th, 2018
Anonymous	Long-time fisherman and excursion leader on the Hudson River	Private Citizen	April 9, 2018

**indicates member of Albany Pool Board*

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