ELIZABETH, NEW JERSEY

The City of Elizabeth is a small urban municipality located along the Newark Bay in New Jersey, South of Newark Airport, with the Elizabeth River cutting across it. It is surrounded by other highly urbanized communities such as Linden, Union and Newark, all of which devote a large portion of their land to industrial uses. Elizabeth’s stormwater management relies entirely on a combined sewer system. While the city’s combined sewer permit allows for only 4 overflow discharge events per year, more than 50 overflow discharge events take place in a normal year, exposing ecosystems and communities to vast amounts of polluted water. In October 2020, the city released its new Long Term Control Plan (LTCP) for its combined sewer system. In this plan, long term measures are specified to reduce the amount of CSO discharges. Currently in the process of being approved after undergoing public review, this LTCP represents a great opportunity to incorporate green infrastructure and environmental justice considerations into the planning of Elizabeth’s stormwater management practices.

IDENTIFYING THE CHALLENGES IN ELIZABETH

The City of Elizabeth is a small urban municipality located along the Newark Bay in New Jersey, South of Newark Airport, with the Elizabeth River cutting across it. It is surrounded by other highly urbanized communities such as Linden, Union and Newark, all of which devote a large portion of their land to industrial uses. Elizabeth’s stormwater management relies entirely on a combined sewer system. While the city’s combined sewer permit allows for only 4 overflow discharge events per year, more than 50 overflow discharge events take place in a normal year, exposing ecosystems and communities to vast amounts of polluted water. In October 2020, the city released its new Long Term Control Plan (LTCP) for its combined sewer system. In this plan, long term measures are specified to reduce the amount of CSO discharges. Currently in the process of being approved after undergoing public review, this LTCP represents a great opportunity to incorporate green infrastructure and environmental justice considerations into the planning of Elizabeth’s stormwater management practices.

DEMOGRAPHICS

<table>
<thead>
<tr>
<th>DEMOGRAPHICS</th>
<th>NEW JERSEY SOCIAL VULNERABILITY INDEX</th>
<th>ELIZABETH SOCIAL VULNERABILITY INDEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Area</td>
<td>12.3 mi²</td>
<td>% White: 12.2</td>
</tr>
<tr>
<td>Total Pop</td>
<td>137,298</td>
<td>% Below poverty: 17.6</td>
</tr>
<tr>
<td>Median HH income</td>
<td>$48,407</td>
<td>% w/ a Disability: 6.7</td>
</tr>
<tr>
<td>% Black</td>
<td>19.5</td>
<td>% w/o Health Insurance: 22.7</td>
</tr>
<tr>
<td>% Latinx</td>
<td>65.0</td>
<td>No. of Buildings: 17,399</td>
</tr>
<tr>
<td>% Asian</td>
<td>1.90</td>
<td>Miles of road: 255.5 (1.7 mi²)</td>
</tr>
</tbody>
</table>
ELIZABETH, NEW JERSEY

BASELINE FLOODING RESULTS

Aggregating Results to the Census Block Group Level

Max. Flood Depth
- Water Bodies
- Green Space
- $d > 4''$
- $d > 1'$
- $d > 2'$

Flood Risk
- Very Low
- Low
- High
- Very High

Areas Flooded
- Total Area Flooded $> 4''$: 1.3 mi$^2$, 2.2 mi$^2$
- Road Area Flooded $> 4''$: 0.3 mi$^2$, 0.4 mi$^2$
- Total Area Flooded $> 1'$: 0.06 mi$^2$, 0.13 mi$^2$
- Buildings Flooded $> 4''$: 1130, 1734
- Residential Prop. Flooded $> 4''$: 772, 1234

10 year, 1-hr Storm (2.10'')
100 year, 1-hr Storm (2.97'')

INCHES

10 yr. storm

100 yr. storm

Depth
- >2'
- 1'
- 4''
- 2''
The results of our city-wide analysis show that flooding may not be impacting low income communities and communities of color disproportionately. Areas with a higher exposure to flooding show lower vulnerability according to specific indicators, such as access to health insurance, car ownership, and risk of language isolation. However, as demonstrated by the Social Vulnerability Index map on p. 1, the overall social vulnerability of Elizabeth is remarkably high. The lack of significant differences between differently exposed communities should not lead to the conclusion that Elizabeth is free of environmental justice issues related to stormwater and flood risk management. A closer look at specific neighborhoods in Elizabeth reveals that each of their demographic and socioeconomic characteristics imply different needs and vulnerabilities. We focus on three neighborhoods identified as case studies by Groundworks Elizabeth’s Climate Safe Neighborhoods Project: Elmora, Port, and Bayway. The three neighborhoods experience similar flooding overall, with Elmora suffering the highest impact on its roads and residential parcels. This comparison shows that social vulnerability is manifested differently in Elmora and Port. A high percentage of Elmora’s population lacks health insurance and may be suffering language isolation, while Port has a much higher poverty rate and percentage of households without a car. Bayway does not show significantly high indicators compared to the rest of the neighborhoods. This data leads to the question: How can such specific vulnerabilities be accounted for when planning for green infrastructure?

### Key Takeaway 1: Different Neighborhoods, Different Needs

To better understand how environmental justice issues play out in Elizabeth, we ask the following question: “Are communities that are more exposed to flooding also more socially vulnerable than those that are less exposed?” To answer this, we simulated two baseline 1-hour storms - a 10 year storm and a 100 year storm. We then grouped census blocks and block groups in quartiles of percent area flooded with more than 4 inches in each scenario, to assess the potential differences in flood exposure among different socioeconomic and racial groups. For more details about our methodology, visit our [project website](#).

**Data Resolution:**
Resolution of the simulation: 2m
Computed infiltration in Green Areas: Yes
Accounted for buildings: Yes
Accounted for soil textures: No
ELIZABETH, NEW JERSEY

KEY TAKEAWAY 2: ELIZABETH’S PROPOSED LTCP OVERLOOKS ENVIRONMENTAL JUSTICE, FLOOD RISK AND GREEN INFRASTRUCTURE

According to Elizabeth’s LTCP, published in October 2020, there are no environmental justice considerations that require attention for the implementation of the plan. However, the LTCP presents no baseline analysis of environmental justice issues in regards to the city’s current stormwater and combined sewer systems. In addition, it does not account for differential social vulnerability across communities (e.g. as we do in takeaway 2) during the implementation of the plan and the siting of interventions. In addition, the plan focuses on the mitigation of CSO discharge events, while the mitigation of flood risk is only considered tangentially. In the LTCP, green infrastructure is deemed a non-viable type of intervention, and only a small pilot program is proposed instead of a larger, comprehensive plan to integrate it into the city’s stormwater management. In coordination with local non-profits such as Ironbound Community Corp., New Jersey Futures and Future City Inc., the Urban Systems Lab submitted an appeal to the LTCP identifying the “need for an in-depth, systematic analysis that addresses the injustices of the current situation.” Read our appeal here.

DISCUSSION/CONCLUSION

Elizabeth’s LTCP approval process presents a chance to tackle the stormwater-related challenges of the city. However, the plan’s draft does not properly address the fact that Elizabeth’s population is highly vulnerable (even if no significant difference was observed between more and less exposed populations), and that drivers of vulnerability vary across the city, meaning that the needs of each community are different. The realization of the LTCP entails a huge investment of money, time and resources. By ignoring the connection between water quality, flood risk, race, income, and environmental justice, we run the risk of not only leaving the problem unresolved, but reinscribing existing distributional justice issues.