Neighborhood Voices
A Lincoln Park Climate and Water Impacts Survey
January 2024
Neighborhood Voices:  
A Lincoln Park Climate and Water Impacts Survey

Authors and Contributions
Jessy Carlson¹, Maia Sowers², Morgan Bliss³, Madison Rodman¹, and Tiffany Sprague⁴

¹ University of Minnesota Sea Grant College Program, ² Ecolibrium3 Climate & Energy VISTA (2022-2023), ³ Ecolibrium3 Rain Ready Housing Specialist VISTA (2021-2022), ⁴ University of Minnesota Duluth Natural Resources Research Institute

The authors contributed to the report as follows: project funding acquisition: M. Rodman, T. Sprague; survey conception and design: M. Bliss, M. Rodman, T. Sprague; survey data collection: M. Bliss, M. Sowers; data entry and analysis: M. Sowers, J. Carlson; interpretation of results: M. Sowers, J. Carlson, M. Rodman, T. Sprague; primary report authors: J. Carlson, M. Sowers; report review and editing: J. Carlson, M. Rodman, T. Sprague.

Acknowledgements
This report was prepared in collaboration with the University of Minnesota Sea Grant College Program using federal funds under award NA18OAR4170101 Amend.19 from the National Oceanic and Atmospheric Administration’s National Sea Grant College Program, U.S. Department of Commerce. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Oceanic and Atmospheric Administration’s National Sea Grant College Program or the U.S. Department of Commerce.

One Block at a Time: Community-driven planning and implementation of multi-benefit green infrastructure in marginalized neighborhoods across the Great Lakes. Community survey on water and climate challenges. UMN IRB STUDY00016716, Not Human Research determination.

To learn more about this project visit: z.umn.edu/OneBlock or contact Madison Rodman, Resilience Extension Educator, University of Minnesota Sea Grant College Program, at mrodman@umn.edu.

Report completed January 2024. This material is available in alternative formats upon request. Additional report reviewers: Amy Schrank, Kelsey Prihoda, Marie Thoms

©2024 Regents of the University of Minnesota. All rights reserved.
Produced by the University of Minnesota Sea Grant College Program. Duluth, Minnesota.

University of Minnesota Sea Grant College Program
31 West College Street
Duluth, MN 55812
Email: seagr@d.umn.edu
Phone: (218) 726-8106
seagrant.umn.edu
# Table of Contents

Authors and Contributions....................................................................................................................2
Acknowledgements.................................................................................................................................2
Table of Contents................................................................................................................................3
Executive Summary...............................................................................................................................4
Introduction..........................................................................................................................................5
Methods...............................................................................................................................................

- Survey Development..............................................................................................................................7
- Distribution and Recruitment of Respondents........................................................................................7
- Analysis...................................................................................................................................................8
  - Multiple-Choice Questions....................................................................................................................8
  - Open-Ended Questions.......................................................................................................................8
Results...................................................................................................................................................8

- Demographics.....................................................................................................................................8
- Multiple-Choice Questions...................................................................................................................11
  - Issues People Care About.................................................................................................................11
    - Climate Impacts..............................................................................................................................11
    - Flooding.......................................................................................................................................12
    - Urban Green and Blue Spaces.........................................................................................................15
    - Urban Green and Blue Spaces as Green Infrastructure............................................................17
  - Solutions and Responses..................................................................................................................18
    - Climate Impacts..............................................................................................................................18
    - Flooding.......................................................................................................................................18
    - Urban Green and Blue Spaces.........................................................................................................21
  - Open-Ended Questions.......................................................................................................................22
    - Solutions and Responses................................................................................................................22
      - Flooding.....................................................................................................................................22
      - Urban Green and Blue Spaces.......................................................................................................24
    - Other Responses............................................................................................................................27
Discussion................................................................................................................................................28

- Climate Impacts................................................................................................................................28
- Green and Blue Spaces.......................................................................................................................28
Conclusion..............................................................................................................................................29
Works Cited...........................................................................................................................................30
Appendix A: Community survey on water and climate challenges.........................................................31
Executive Summary

At the westernmost point of Lake Superior, the Lincoln Park neighborhood extends southwest from the downtown district of Duluth, Minnesota. The Lincoln Park community is proud of its industrial heritage, which is rooted in the St. Louis River and the Port of Duluth-Superior.

In Lincoln Park, climate change is making intense precipitation events more frequent, and this trend is projected to increase in the future. Impervious surfaces, such as roads, parking lots, and rooftops, reduce the absorption of stormwater across the neighborhood. Large rain events, impervious surfaces, and the neighborhood’s topography amplify the risk of property damage and negative human health impacts due to flooding.

In 2022, a survey of residents’ perspectives and observations was conducted in order to better understand community perspectives on solutions and challenges related to flooding in the neighborhood. The results of this survey suggest that respondents are concerned about increased flooding in their communities. Survey respondents reported that they feel it is the responsibility of the city and state to manage the problem, but also reported that they want more information about what they can do to mitigate the risk themselves. Additionally, they reported that they value existing green and blue spaces, and want more of them; they also stated that they feel it is important that these spaces serve to manage stormwater in addition to providing social benefits to community members. This document reports the results of that survey.

While the sample size of this survey (n=75) was small, the results suggest a larger-scale survey, perhaps to inform current and future city project planning processes, would be a worthwhile investment. If such a survey were undertaken by the city of Duluth or other entity, it might be beneficial to ask which actions residents think the city should take to mitigate flood risk in Lincoln Park. It could also be helpful to ask which actions residents would be willing to take themselves and what type(s) of support they would need from the city to accomplish those actions.
Introduction

At the westernmost point of Lake Superior in Minnesota is Duluth, a city of 86,000 people. Within Duluth, the Lincoln Park neighborhood extends southwest from Duluth’s downtown district, along the St. Louis River Estuary and the Port of Duluth-Superior (Figure 1). This steep, rocky, hillside neighborhood is home to over 6,000 residents, who are more racially diverse, less likely to have completed high school, more likely to rent their homes, and less likely to have health insurance than average for all city residents combined. Neighborhood residents also, on average, have poorer health outcomes, higher unemployment, higher poverty rates, and greater risk of involuntary displacement than what is average for the city as a whole (U.S. Census Bureau 2023).

The Lincoln Park community is proud of its industrial heritage, which is rooted in the river and the Port of Duluth-Superior. Lincoln Park’s close proximity to the St. Louis River Estuary is also important to the area’s Native American communities. The St. Louis River and its wild rice (maanoomin) play a central role in Ojibwe origin stories (Fond du Lac Band of Lake Superior Chippewa 2022; Turnstone Historical Research 2015). Water defines this neighborhood.

Duluth’s changing climate is impacting the neighborhood. Intense precipitation events are more frequent and this trend is projected to increase (Minnesota Department of Natural Resources State Climatology Office 2022, Minnesota Climate Adaptation Partnership 2023). Impervious surfaces constrain the neighborhood’s creeks (Lake Superior Streams n.d.), and the neighborhood contains approximately 200 contaminated industrial sites (Bay West n.d.). Increased flooding in this context amplifies the risk of property damage, habitat loss, and negative human health impacts. For more details on the Lincoln Park neighborhood and climate change impacts please see An Overview of the Lincoln Park Neighborhood: Vulnerability and Resilience 2024.

In 2018, the University of Minnesota Sea Grant College Program (MNSG), Ecolibrium3, the Duluth Superior Area Community Foundation, Udac, the University of Minnesota Duluth Natural Resources Research Institute (NRRI) and staff from the city of Duluth came together to collaborate on water quantity and quality challenges as the Lake Superior Team of the Great Lakes One Water Partnership (GLOW). The GLOW partnership was a multi-year, basinwide initiative focused on engaging 28 shoreline community foundations as a force multiplier to advance a new era of water management to benefit people and businesses in the Great Lakes Basin. The Lake Superior GLOW team (2018 - 2024) worked to build community-government partnerships with the assistance of community foundations to address extreme weather events in the Lincoln Park neighborhood.

From 2020 to 2023, AmeriCorps VISTA volunteers were key members and helped build the capacity of the Lake Superior GLOW team. In 2020 and 2021, AmeriCorps Rain Ready Housing Development Specialist Christina Schalchter conducted a pilot community-based participatory research project on the Lincoln Park neighborhood’s connection to water resources (unpublished data 2021). Schalacter’s work indicated that community members had a positive association with water, a need for increased water access, and concerns about water quality. Results from Schalacter’s work demonstrated further
community engagement on watersheds, water use, and flood preparedness could be a beneficial next stage for GLOW.

In 2021, to continue supporting these efforts, MNSG secured funding for the “One Block at a Time: Community-Driven Planning and Implementation of Multi-Benefit Green Infrastructure in Marginalized Neighborhoods Across the Great Lakes” project from the National Sea Grant Office. The One Block project goals were to address water equity priorities using green stormwater infrastructure in four Great Lakes communities, including the Lincoln Park neighborhood of Duluth, Minnesota. The first step of One Block was to better understand community perspectives on challenges and solutions related to flooding in the neighborhood. In 2022, a survey of residents’ opinions and observations was developed and conducted. This document reports the results of that survey.

Lincoln Park and Neighborhoods in Duluth, Minnesota Sharing the 55806 ZIP Code

![Map of Duluth's neighborhoods](image)

**Figure 1.** Map of Duluth’s neighborhoods that are included in the 55806 ZIP code boundary. Official neighborhood boundary data provided by the city of Duluth.
Methods

Survey Development

In 2022, Minnesota Sea Grant developed and conducted a survey questionnaire (hereafter, survey) to better understand community challenges relating to water and climate in the Lincoln Park neighborhood of Duluth, Minnesota. The survey (Appendix A) was developed in collaboration with Rain Ready Housing Specialist AmeriCorps VISTAs and with feedback from the Lake Superior GLOW team and the One Block project team. The resulting survey contained 26 questions divided into four sections, including:

1. Challenges - Climate challenges residents face
2. Water challenges - Impacts of water damage and flooding, what respondents have done to mitigate impacts, and beneficial solutions
3. Green spaces visioning - Importance of different green spaces and their purposes, and what respondents would like more of in their neighborhood
4. About you - Demographic and socioeconomic information

The University of Minnesota Institutional Review Board (IRB) reviewed the survey and provided a non-human research designation (UMN IRB STUDY00016716, Not Human Research).

Distribution and Recruitment of Respondents

Two AmeriCorps VISTAs distributed a paper and an electronic Qualtrics survey at seven community outreach events over the course of four months between August 2022 and November 2022. Survey locations were chosen specifically to reach a variety of Lincoln Park residents. These locations included the Lincoln Park Farmers’ Market, located at the Harrison Community Center, and two apartment complexes in the Lincoln Park neighborhood. Respondents were informed that the survey would take approximately ten minutes to complete and that they would be compensated $2, in the form of a novel $2 bill, for completing the survey.

We received 102 completed surveys: 97 paper surveys and 5 electronic surveys. Approximately 30 completed surveys were collected from the apartment complexes: 20 from the income-restricted Lincoln Park Apartments and 10 from the Midtowne Manor public housing complex. Seventy-two were collected at the Lincoln Park Farmers’ Markets.

Our intent when distributing the survey was to capture results from the Lincoln Park neighborhood. Our proxy for the official neighborhood boundary was the 55806 ZIP code. Completed surveys that listed the 55806 ZIP code as the respondent’s address were included in the analysis. 55806 covers all of Lincoln Park and a large portion of the nearby Central Hillside neighborhood (Figure 1). It is assumed that most, if not all, respondents who listed 55806 as their residential ZIP code lived in or near the Lincoln Park neighborhood due to the targeted survey distribution method (i.e. contacting respondents in person at apartment complexes in the Lincoln Park neighborhood and at the Lincoln Park Farmers’ Market). However, when referring to the study area, the 55806 ZIP code will be used.
Analysis

Of the 102 surveys received, 75 were usable and included in the analysis. All survey data were digitized and validated for completion. Of the surveys not used, three surveys were excluded from analysis because they were blank, one survey was excluded because the respondent was under the age of 18, and 23 surveys were excluded because the respondent did not work or live in the 55806 ZIP code.

Of the 75 usable surveys, two respondents specified they worked but did not live in 55806 and these survey responses were included because these individuals spent a significant amount of time in the neighborhood.

Survey responses were analyzed as follows:

Multiple-Choice Questions
1. Responses were sorted by question and then counted to determine the sample size (n) for each question.
2. The relative frequency of each response was calculated and rounded to the nearest whole percent.

Open-Ended Questions
1. Responses that included multiple answers were split so that each answer was counted individually. For example, if a response was “I built a rain garden, and I had my basement sealed” it was reported as two responses: (1) built a rain garden (green infrastructure) and (2) basement sealed (gray infrastructure/home improvement).
2. Each response was assigned to one category that was developed by the researcher based on patterns identified in the responses in order to describe themes observed in the responses.

Results

Demographics

More than half of survey respondents were female (69%) and White (82%). Most respondents rented their homes (64%) and earned less than $30,000 per year (57%). Thirty three percent (33%) lived alone and 29% lived with one other person. Forty nine percent (49%) had a high school diploma and no college degree. Nine percent (9%) were over the age of 65; ten percent (10%) were between the ages of 18 and 24. The two largest age groups in the survey respondent pool were 25 to 34 (22%) and 55 to 64 (22%)

Compared to the city of Duluth as a whole, the survey respondent pool was disproportionately female (69% versus 51%). Respondents, on average, were younger than the city average (9% over the age of 65 versus 16% over the age of 65 in Duluth) and less likely to have a college degree (22% versus 41%). Income and home ownership rates for the respondent pool were both lower than city averages (median income: less than $30,000 versus $63,545 for the city as a whole, home ownership: 29% versus 61%). Racial distribution of survey respondents was similar to racial distribution of the city as a whole (82% versus 89% self-identifying as White).
Table 1. Demographics and socioeconomic variables of 75 survey respondents from the Lincoln Park neighborhood in Duluth, MN compared to demographic and socioeconomic data representing averages for the city of Duluth as a whole. Data for Duluth is sourced from Census Bureau QuickFacts.

<table>
<thead>
<tr>
<th>Demographic Attribute</th>
<th>Duluth</th>
<th>Survey Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>86,619†</td>
<td>n/a</td>
</tr>
<tr>
<td>Race: White Alone</td>
<td>89%§</td>
<td>82%</td>
</tr>
<tr>
<td>Sex: Women</td>
<td>51%§</td>
<td>69%**</td>
</tr>
<tr>
<td>Age: 65 years and older</td>
<td>16%§</td>
<td>9%</td>
</tr>
<tr>
<td>High School Graduate or Higher</td>
<td>95%§</td>
<td>96%</td>
</tr>
<tr>
<td>Bachelor’s Degree or Higher</td>
<td>41%§</td>
<td>22%</td>
</tr>
<tr>
<td>Home Ownership Rate</td>
<td>61%§</td>
<td>29%</td>
</tr>
<tr>
<td>Average Number of People in Household</td>
<td>2§</td>
<td>2*</td>
</tr>
<tr>
<td>Median Income</td>
<td>$63,545§</td>
<td>Less than $30,000*</td>
</tr>
</tbody>
</table>

*Due to binned survey categories we summarized household size and income data of our respondents with a median class value.
†2020 Census Data
§ US Census Bureau Population Estimates Program, updated annually
¶American Community Survey 5-year Estimates, updated annually
**This survey asked for gender rather than sex. This reported value therefore represents the relative frequency of respondents who self-identified as female from a list of five potential gender identifications. See Appendix A, question 22.
Figure 2. Demographics and socioeconomic variables of 75 survey respondents from the Lincoln Park neighborhood in Duluth, MN
Multiple-Choice Questions

We grouped the multiple-choice question results into two categories: 1) issues people care about and 2) solutions and responses. Issues people care about included questions about how respondents feel about climate impacts, flooding, and urban green and blue spaces. The solutions and responses section contained questions about how people respond to climate impacts or what solutions they wished to see implemented that related to flooding and to urban green and blue spaces.

Issues People Care About

Climate Impacts

We asked survey participants about which climate change impacts they have already seen in their neighborhood and which impacts they expect to see in the future. Over half (54%) said they have already seen changes to growing seasons, and almost half (44%) reported experiencing more heat waves and changes to water quality (Figure 3). Participants expect to be impacted in the future by changes to water quality (44%), changes to growing seasons (39%), and more frequent large storms (38%) (Figure 4).

![Figure 3. Frequencies of responses to the question “Which of the following have already impacted you in your neighborhood?” are shown in the graph. A total of 70 respondents answered this question and participants could choose multiple answers.](image-url)
Figure 4. Responses to the question “Which of the following do you believe will impact you in the future?” A total of 64 respondents answered this question and respondents could choose multiple answers.

Flooding
Almost half of respondents (41%) said they were somewhat worried about future water damage to their living space, while 27% said they were not at all worried (Figure 5). About a third of respondents said they are worried (30%) or somewhat worried (31%) about future flood damage to their community (Figure 6). Almost half (45%) felt it was important to reduce future water damage to their living space (Figure 7) and a third said it was important (36%) or very important (36%) to reduce future flooding in their community (Figure 8).
Figure 5. Responses to the question “How worried are you about future water damage to your living space (the house or apartment you reside in, along with the rest of the property such as your basement, garden, shed, etc.)?” A total of 74 respondents answered this question.

Figure 6. Responses to the question “How worried are you about future flood damage to your community? (Community here can mean the roads you drive on, the parks and stores you visit, etc.)” A total of 75 respondents answered this question.
Figure 7. Responses to the question “How important is reducing future water damage to your living space?” A total of 74 respondents answered this question.

Figure 8. Responses to the question “How important is reducing future flooding in your community to you?” A total of 74 respondents answered this question.
Urban Green and Blue Spaces

Participants reported the most important green spaces in their neighborhood were parks (89%), bodies of water (87%), and trails (85%) (Figure 9). Almost half of respondents (49%) said they visit local parks all the time (multiple times a week) (Figure 10). A quarter of respondents said they recreate near water very often (27%) or all of the time (27%) (Figure 11).

Figure 9. Responses to the question “What urban green spaces are important to you in your neighborhood?” A total of 75 respondents answered this question, and respondents could choose multiple answers.
Figure 10. Responses to the question “Do you visit local parks? Never (0 visits): Rarely (less than 5 visits a year); Sometimes (about 1 visit per month); Very often (about 1 visit per week); All the time (multiple times per week)” A total of 74 respondents answered this question.

Figure 11. Responses to the question “Do you recreate in or near local creeks, streams, rivers, ponds or lakes? Never (0 visits): Rarely (less than 5 visits a year); Sometimes (about 1 visit per month); Very often (about 1 visit per week); All the time (multiple times per week). A total of 70 respondents answered this question.
**Urban Green and Blue Spaces as Green Infrastructure**

Many respondents reported that they felt it was important that green spaces also address water damage or flooding. Forty percent (40%) reported that they felt this was important, and 35% reported that they felt it was very important (Figure 12).

![Bar chart showing responses to the question](image)

**Figure 12.** Responses to the question “How important is it to you that these green spaces also address water damage or flooding?” A total of 75 respondents answered this question.
Solutions and Responses

Climate Impacts

Half of the respondents (49%) said they had already made changes to their day-to-day living as a result of the challenges covered in the survey. The other half (51%) said they had not made such changes (Figure 13).

Figure 13. Responses to the question “Have you already made any changes to your day-to-day living as a result of any of the challenges listed above?” A total of 71 respondents answered this question.

Flooding

Most respondents (82%) reported that they thought that the city or state governments are responsible for managing flooding in the community (Figure 14). Sixty-four percent (64%) said they have never taken any actions to reduce flooding or the impacts of water to their living spaces or community (Figure 15). When these respondents (48 in total) were asked why they had not taken any actions, 38% of their responses were “didn’t know what to do” (Figure 16).
Figure 14. Responses to the question “Who do you think is responsible for managing flooding in your community?” Respondents could choose multiple answers. A total of 73 respondents answered this question.

Figure 15. Responses to the question “Have you ever taken any actions to reduce flooding or the impacts of water to your living space and/or community?” A total of 75 respondents answered this question.
Figure 16. Responses (61) to the question “If you answered no, what limited you from taking action?” Respondents (48) could choose multiple answers. A total of 61 respondents answered this question.
**Urban Green and Blue Spaces**

We asked “Which urban green spaces and features would you like to see more of in your neighborhood?” Respondents’ most frequent responses indicated that they would prefer that empty lots be converted to small parks (78%), flower gardens (74%), and nature playgrounds (73%) (Figure 17).

![Bar chart showing responses to the question “What urban green spaces and features would you like to see more of in your neighborhood?” Respondents could choose multiple answers. A total of 74 respondents answered this question.](chart.png)

**Figure 17.** Responses to the question “What urban green spaces and features would you like to see more of in your neighborhood?” Respondents could choose multiple answers. A total of 74 respondents answered this question.
Open-Ended Questions

Solutions and Responses
The open-ended questions focused exclusively on solutions and responses to climate impacts, whereas the multiple-choice questions also asked about participants’ observations of and feelings about climate impacts. The open-ended questions were grouped into two categories: 1) flooding and 2) urban green and blue spaces. Flooding questions included asking participants their thoughts about solutions that would benefit their communities and whether they had taken any actions to reduce future flood damage. The urban green and blue spaces questions covered improvements that respondents indicated should be made into neighborhood green spaces and which purposes those spaces should serve. Respondents were allowed to submit multiple comments and these responses were pooled for each question. The percentages for each multiple-choice answer below represent the number of responses in a category divided by total number of responses received for that question. Note that the percentages used to report the open-ended responses do not represent the number of respondents.

Flooding
One third (29%) of respondents indicated that city gray infrastructure and maintenance would be the best way to reduce the impact of water damage and flooding in their community. A quarter of respondents (25%) suggested that green infrastructure would be beneficial (Table 2). Nearly half of responses (43%) indicated that the respondent had made gray infrastructure improvements to their home in an effort to mitigate future flood damage to their homes (Table 3).
Table 2. Responses to the question “What solutions do you think would be most beneficial to you or your community to reduce the impact of water damage or flooding?” Responses listed in tables are presented as written by survey takers.

<table>
<thead>
<tr>
<th>City gray infrastructure/city maintenance (29%)</th>
<th>Green infrastructure (25%)</th>
<th>Home gray infrastructure/home improvements (12%)</th>
<th>Outreach, education, communication (12%)</th>
<th>City planning and capacity-building (2%)</th>
<th>Individual stewardship/behavior change (2%)</th>
<th>Not sure (8%)</th>
<th>Other (12%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Improved infrastructure</td>
<td>• Less grass and more plants - soil water absorbs into the ground</td>
<td>• Funds for improving housing to prepare for heavy water and better drainage systems.</td>
<td>• Community outreach</td>
<td>• I think Duluth is doing pretty well - but anticipating more 100 year floods and planning structures for it</td>
<td>• Stop putting trash and waste in the waters</td>
<td>• Unsure</td>
<td>• Stop climate change</td>
</tr>
<tr>
<td>• good street drains</td>
<td>• More native green spaces</td>
<td>• Foundation support</td>
<td>• Inform the community how I can help</td>
<td>• Stop putting trash and waste in the waters</td>
<td>• I don’t know</td>
<td>• none</td>
<td></td>
</tr>
<tr>
<td>• Better sewer holes</td>
<td>• more living/green surfaces, less concrete</td>
<td>• Landlords- need to waterproof basement + walls</td>
<td>• Education, help us learn what we can do</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• I’m not really sure</td>
<td>• Living on a hillside makes things difficult,</td>
<td></td>
</tr>
<tr>
<td>• Improve water lines-street broke open watermain</td>
<td>• Limit altering natural waterways</td>
<td>• Hired DBS to fix my basement - floor dentin tile installed 2021 (55000-560001)</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• not sure</td>
<td>• Collected water used in arid states, cities, towns</td>
<td></td>
</tr>
<tr>
<td>• Drainage</td>
<td>• Replant more trees-address moving on hills.</td>
<td>• more sound structural accomodies [sic]</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• use water safely and smartly</td>
<td></td>
</tr>
<tr>
<td>• Proper storm drainage</td>
<td>• Building a mall on top of miller creek is an example of what not to do</td>
<td>• Making sure the basement is sealed in the corner so water won’t leak inside the basement</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• Infrastructure</td>
<td>• Having some slough areas to ameliorate flood waters would be nice but be difficult without major disruption.</td>
<td>• Water collected that cannot be absorbed</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• better, more suitable infrastructure</td>
<td>• Water collected that cannot be absorbed</td>
<td>• rain gardens</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• better sewer system</td>
<td>• rain gardens</td>
<td>• rain gardens</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• a retaining wall of sorts at the bottom of Lincoln Creek so water is contained and future erosion along with damage to the lil [sic]overpass is manageable</td>
<td>• better engineered community gardens</td>
<td>• plants</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• clean the streets</td>
<td>• more trees, natural areas</td>
<td></td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• More street sweepers</td>
<td></td>
<td></td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• make more water exit on streets/mills</td>
<td></td>
<td></td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
<tr>
<td>• re-directing water</td>
<td></td>
<td></td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Knowledge is power so spread the know to as many as you can</td>
<td>• Collect water used during drought years</td>
<td>• flood proofing</td>
<td></td>
</tr>
</tbody>
</table>

23
Table 3. Responses to the question “Have you ever taken any actions to reduce flooding or the impacts of water to your living space and/or community? If you answered yes, what action(s) did you take?” Responses listed in tables are presented as written by survey takers.

<table>
<thead>
<tr>
<th>Home gray infrastructure/home improvements (43%)</th>
<th>Green infrastructure (26%)</th>
<th>Talking to landlord (9%)</th>
<th>Other (22%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Sump pump</td>
<td>● Tree &amp; shrub planting soil erosion prevention</td>
<td>● Called landlord, nothing happened</td>
<td>● picked up litter on my hikes/walks</td>
</tr>
<tr>
<td>● gutters</td>
<td>● planting native plants</td>
<td>● I talk to my landlord about the water with lead</td>
<td>● I respect the earth</td>
</tr>
<tr>
<td>● Installed gutters</td>
<td>● Landscaping</td>
<td></td>
<td>● helped bag a house by rain</td>
</tr>
<tr>
<td>● Drain tiles</td>
<td>● Fix landscaping around foundation</td>
<td></td>
<td>● Putting important items higher, not placing items where I know it leaks, etc</td>
</tr>
<tr>
<td>● Routing water runoff away from the house</td>
<td>● collecting roof water</td>
<td></td>
<td>● water management in yard</td>
</tr>
<tr>
<td>● keeping the water out of our basement</td>
<td>● terracing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Removing plants from near foundation of house</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>● Looking at sealant services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>● french drains</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>● gutter on garage</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Urban Green and Blue Spaces

When asked to identify the most important thing that could be improved with regard to the urban green spaces in their neighborhood, most respondents (18%) indicated landscaping and gardening as important for neighborhood improvement. Respondents also prioritized increasing and expanding green spaces (14% of responses) and improving inclusivity and accessibility (13% of responses) (Table 4). Respondents were also asked to finish the sentence “It is important that urban green spaces …” One fifth of respondents (18%) indicated it was important that green spaces exist. Seventeen percent of respondents suggested that green spaces should be inclusive and accessible, and 17% of respondents indicated that they should add social benefits and social value (Table 5).
Table 4. Responses to the question “What is the most important thing that could be improved with the urban green spaces in your neighborhood? Please describe.” Responses listed in tables are presented as written by survey takers.

| Landscaping/gardens for food production, aesthetics, or unspecified purpose (18%) | Increase/expand green spaces (14%) | Inclusive/inaccessible (13%) | City gray infrastructure/city maintenance (11%) | Benefit people/social value (9%) | Bathrooms, trash cans, water fountains (7%) | City planning and capacity-building (5%) | Individual stewardship/behavior change (5%) | Outreach, education, communication (2%) | Not sure (5%) | Other (11%) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| More community gardens | More green space | Local access updates (handicap) | Make them more user friendly, syringes on the ground are unfriendly | More trash cans/recycling around. | Less to no littering | Better maps |
| More community gardens | More trees | More that are walkable to everyone | Replace trees along streets | Water facilities | Have people better at dog poop pick-up. |  | No idea! |
| More community gardens | we need more! | Improved walkability/accessibility | Trailhead markings and maintenance | Restroom facilities | Mostly green area at Exeter & Pacific | Unsure |
| More community gardens | make some more parks | Making city more walkable more trails & parks | Replace all trees that are being cut down | Bathroom stations | limit waste in environment | I don't really know |
| More community garden spaces and funds for low income individuals. | Just let it grow! | easier access (have to cross London [sic] and figure out how to get down to lakewalk), there are some other parks nearby that are easier to get to though. | better service for the trees + roads + trails | more funding and people to keep up |  |  | Duluth is absolutely wonderful for parks and trails - five stars, private woods, homeless encampments are better. |
| A community garden would be awesome | More of them. | Walking spaces | take care of them |  |  |  | better quality of life |
| Allowing the boulevards to be garden spaces | More space | Wider sidewalks |  |  |  |  | Water runoff used for arid states |
| More trees |  |  |  |  |  |  | erosion control |
| more trees |  |  |  |  |  |  | love mother earth |
| landscaping around the apartment building |  |  |  |  |  |  | taking more care of our world, being more conscious & caring. |
| planting new life trees/gardens |  |  |  |  |  |  | |
Table 5. Responses to the question “Please finish this sentence: It is important that urban green spaces …” Responses listed in tables are presented as written by survey takers.

<table>
<thead>
<tr>
<th>Exist (18%)</th>
<th>Inclusive/accessible (17%)</th>
<th>Benefit people/social value (17%)</th>
<th>Increase/expand green spaces (13%)</th>
<th>Ecological value (13%)</th>
<th>City maintenance (12%)</th>
<th>Other (10%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>- that they exist</td>
<td>- accessible</td>
<td>- are welcoming</td>
<td>- Improve</td>
<td>- Native species</td>
<td>- are usable and maintained</td>
<td>- address empty lots?</td>
</tr>
<tr>
<td>- are put in cities like ours</td>
<td>- have access for all</td>
<td>- gather community</td>
<td>- get larger</td>
<td>- be biologically productive</td>
<td>- to be more tended to &amp; appreciated</td>
<td>- aren’t used just to make an area prettier, more inviting</td>
</tr>
<tr>
<td>- are available in Lincoln Park</td>
<td>- be accessible and asurdent (sp)</td>
<td>- truly serve the community in which they reside</td>
<td>- are more plentiful</td>
<td>- for the environmental health</td>
<td>- are maintained</td>
<td>- we need oxygen for fresh air</td>
</tr>
<tr>
<td>- are nothing unusual</td>
<td>- are accessible</td>
<td>- are for the homeless everybody</td>
<td>- expand</td>
<td>- provide better environmental stability</td>
<td>- are watered sufficiently</td>
<td>- trees</td>
</tr>
<tr>
<td>- are available</td>
<td>- Are accessible so everyone cares about them</td>
<td>- address the needs of local families</td>
<td>- continue to improve in Lincoln Park</td>
<td>- stay green to help neighborhood</td>
<td>- are taken care of</td>
<td>- stay green</td>
</tr>
<tr>
<td>- are available for others to see</td>
<td>- be accessible to all residents</td>
<td>- serve the community for community</td>
<td>- are everywhere</td>
<td>- improve the environment</td>
<td>- stay clean</td>
<td>- stay healthy and grow how our earth tends to grow!</td>
</tr>
<tr>
<td>- are created</td>
<td>- are kept accessible</td>
<td>- for community</td>
<td>- are plentiful throughout the community</td>
<td>- Stay as “natural” as possible</td>
<td>- are taken care of</td>
<td>- We should let the world, our earth knows what to do!</td>
</tr>
<tr>
<td>- be retained and created where possible</td>
<td>- are accessible to everyone</td>
<td>- for the mental health</td>
<td>- get more to help</td>
<td>- care more for the nature</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- are around</td>
<td>- are available to all</td>
<td>- are calm and clean places</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- is created in my community</td>
<td>- are available to all</td>
<td>- Provide shady places to cool from the heat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- are here in Duluth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Other Responses

When asked “Do you have any other thoughts or feelings you want to share?” almost half of the responses were too difficult to categorize (41%). Three respondents (18%) indicated a need for outreach, education, and communication, and 18% indicated a need for improved city maintenance. (See Table 6)

Table 6. Responses to the question “Do you have any other thoughts or feelings you want to share?” Responses listed in tables are presented as written by survey takers.

<table>
<thead>
<tr>
<th>Outreach, education, communication (18%)</th>
<th>City maintenance (18%)</th>
<th>Benefit people/social value (6%)</th>
<th>Bathrooms, trash cans, water fountains (6%)</th>
<th>Home gray infrastructure/home improvements (6%)</th>
<th>Infill (6%)</th>
<th>Other (41%)</th>
</tr>
</thead>
</table>
| ● how do I help support this in my community  
● educational programming  
● I’m curious to know where the “new” Lincoln Park plan is?  
| ● Cut trees need to be replaced  
● The streets need lights.  
● Sidewalks need to be fixed  
| ● Implement spaces for the homeless to safely stay out of extreme weather  
| ● water stations/bathrooms  
| ● Installed new sump pump  
| ● We’d love to see more parks and gardens in empty lots  
| ● I’m concerned about the states wanting our good water and the oil industry polluting it. My personal rental property is safe but the raging rivers are dangerous to many.  
● I’m a tree hugger  
● NA  
● Thanks!  
● It will get better!  
● Go green  
● we need to wake up and realize the impact of the wrongdoing and what we need to do in order to preserve the nature part of the ecosystem and so forth  

Discussion

Climate Impacts

Our data suggest that most members of the Lincoln Park neighborhood understand that climate change is happening and that they can expect to see more impacts in the future. Almost all participants (93%) currently observe, and expect to observe in the future (95%), climate impacts in their community. The majority of participants (80%) have concerns specifically about flood damage to their community. However, our data also suggest that there is a gap in outreach and education that can provide information about how individual community members can help mitigate these future effects. For example, 51% of respondents had not done anything to mitigate flood damage to their homes and of those 51% the reason many (38%) gave for not making any improvements was that they “did not know what to do.” Relatedly, 12% of the responses to the open-ended question, “What solutions do you think would be most beneficial to you or your community to reduce the impact of water damage or flooding?” were requests for education or outreach. When asked the open-ended question “Do you have any other thoughts or feelings you want to share?” three people stated that they would appreciate more education, outreach, and communication.

The majority of respondents (82%) indicated city or state government is ultimately responsible for managing flooding in the community. When asked the open-ended question “What solutions do you think would be most beneficial to you or your community to reduce the impact of water damage or flooding?” 29% of respondents listed improvements to the city’s gray infrastructure or improved city maintenance of gray infrastructure. In response to this same question, twenty five percent (25%) of respondents indicated green infrastructure would be most beneficial. These data show how outreach and education could focus on how community members can be empowered to protect themselves from climate change effects and how they can advocate for their neighborhood through state and city government.

Green and Blue Spaces

Respondents overwhelmingly indicated that they value parks (88%), trails (84%), boulevard trees (82%), and neighborhood water bodies (86%), and that they frequently visit these places. Ninety nine percent (99%) reported they visit local parks and 90% recreate in or near local creeks, rivers, ponds, or lakes. Every respondent (n = 75) indicated that these places should also serve as stormwater management tools. Respondents indicated they would like to see more small parks (78%), nature playgrounds (73%), flower gardens (74%), community gardens (66%) and rain gardens (61%), fruit trees (70%), boulevard trees (68%), and trees in private yards (61%) in their neighborhoods.

Respondents would like neighborhood green spaces to be accessible and welcoming to all, and to provide social value in addition to ecological value. When asked the open-ended question “What is the most important thing that could be improved with the urban green spaces in your neighborhood?” 13%
of the respondents indicated improvements to inclusivity and accessibility, and 9% reported that improvements could be made to increase the social value of these spaces.

Conclusion

Lincoln Park residents who participated in this survey reported that they are concerned about increased flooding in their communities. They said they feel it is the responsibility of the city and state to manage the problem, but they also want more information about what they can do to mitigate the risk themselves. Additionally, they said they value existing green and blue spaces, and want more of them; they also said they feel it is important that these spaces serve to manage stormwater in addition to providing social benefits to community members. How might these conclusions shape our approach to building climate resilience in Lincoln Park?

In 2023, Minnesota Sea Grant (MNSG) and the University of Minnesota Duluth Natural Resources Research Institute (NRRI) presented these results to the community through a 10-person focus group composed of Lincoln Park residents, business owners, and community leaders, who expressed interest in mitigating neighborhood flood risk and envisioning solutions for the community. Focus group participants concurred with survey participants that climate change is impacting and will continue to impact their community; the risk of flood damage is a concern; they would like to do something about it with the help of the city of Duluth; and, they said they feel green spaces should be part of the solution. Building on this foundation, the group worked with MNSG, NRRI and the city of Duluth to address a persistent hyperlocal flooding problem identified by the group as a priority issue within their power to address.

While the sample size of this survey was small (n=75), and disproportionately female (69%), the results suggest a larger-scale survey of the community’s perspectives on climate impact mitigation would be a worthwhile investment. If such a survey were conducted in collaboration with the city of Duluth Planning & Development Division and Public Works & Utilities Department, survey questions could be tailored to be relevant for current and future city project planning processes. Knowing that this small sample of Duluth’s population expects the city to manage flooding issues, it might be beneficial to ask which actions they think the city should take to mitigate flood risk in Lincoln Park. It would also be helpful to ask which actions they would be willing to take themselves and what type of support they would need from the city of Duluth to accomplish those actions.
Works Cited


United States Census Bureau. (2023, August 1). *Census Tables.* https://data.census.gov/table

United States Census Bureau. (2023, August 1). *Census Quickfacts.* https://www.census.gov/quickfacts/

Appendix A: Community survey on water and climate challenges

The University of Minnesota Sea Grant program invites you to participate in a survey on the climate challenges faced by residents of Lincoln Park and solutions to address those challenges. Information you share will be used to guide future community focus groups on creating a rain-ready neighborhood and designing a future community project focused on green spaces.

The survey should take approximately 10 minutes to complete and you will be compensated $2 for completing the survey in person. Your responses will be confidential and results from the survey will be only shared in summary form.

If you have any questions or would like to stay involved with this project, please contact Madison Rodman at mrodman@umn.edu. If you would like to learn more about this project visit z.umn.edu/OneBlock

This survey was prepared by the University of Minnesota Sea Grant Program using Federal funds under award NA18OAR4170101 Amend. 19 from the National Oceanic and Atmospheric Administration’s National Sea Grant College Program, U.S. Department of Commerce.

If you would prefer to complete the survey electronically, please scan this QR code or visit: z.umn.edu/OneBlockSurvey

![QR Code]
**Challenges:**

<table>
<thead>
<tr>
<th>1. Which of the following have already impacted you in your neighborhood?</th>
<th>2. Which of the following do you believe will impact you in the future?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Select all that apply</strong></td>
<td><strong>Select all that apply</strong></td>
</tr>
<tr>
<td>Drought</td>
<td></td>
</tr>
<tr>
<td>Heat waves</td>
<td></td>
</tr>
<tr>
<td>Warmer, shorter winters</td>
<td></td>
</tr>
<tr>
<td>Frequent flooding events</td>
<td></td>
</tr>
<tr>
<td>Frequent large storms</td>
<td></td>
</tr>
<tr>
<td>Changes in growing season</td>
<td></td>
</tr>
<tr>
<td>Changes to animal/plant species</td>
<td></td>
</tr>
<tr>
<td>Changes to recreation</td>
<td></td>
</tr>
<tr>
<td>Changes to gathering wild food (ex. plants, berries)</td>
<td></td>
</tr>
<tr>
<td>Changes to water quality</td>
<td></td>
</tr>
<tr>
<td>None of the above</td>
<td></td>
</tr>
<tr>
<td><strong>Other (please describe):</strong></td>
<td></td>
</tr>
</tbody>
</table>

3. Have you already made any changes to your day-to-day-living as a result of any of the challenges listed above?  

- Yes  
- No

If you answered yes, please describe the change(s) you have made:

**Water challenges:**

This section asks you to think about previous water damage to your home and flooding in your community. Duluth has already experienced flooding and large storms and scientists project these will continue and increase in the future.

<table>
<thead>
<tr>
<th>4. How worried are you about future water damage to your living space (the house or apartment you reside in, along with the rest of the property such as your basement, garden, shed, etc)?</th>
<th>Not at all worried</th>
<th>Somewhat worried</th>
<th>Worried</th>
<th>Very worried</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>5. How worried are you about future flood damage to your community? (Community here can mean the roads you drive on, the parks and stores you visit, etc.).</th>
<th>Not at all important</th>
<th>Somewhat important</th>
<th>Important</th>
<th>Very important</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>6. How important is reducing future water damage to your living space?</th>
<th>Not at all important</th>
<th>Somewhat important</th>
<th>Important</th>
<th>Very important</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>7. How important is reducing future flooding in your community to you?</th>
<th>Not at all important</th>
<th>Somewhat important</th>
<th>Important</th>
<th>Very important</th>
</tr>
</thead>
</table>
8. Have you ever taken any actions to reduce flooding or the impacts of water to your living space and/or community?

- Yes
- No
- Unsure

If you answered yes, what action(s) did you take?

If you answered no, what limited you from taking action? Select all that apply

- Time needed to complete project
- Expense of project
- Didn't know what to do
- Didn't have help to complete project
- No action needed
- Other (please describe): __________________________

9. What solutions do you think would be most beneficial to you or your community to reduce the impact of water damage or flooding? Please describe:

10. Who do you think is responsible for managing flooding in your community? Check all that apply.

- Me
- My neighbors
- Businesses
- City/state government
- Nobody
- Other (please describe): __________________________

**Green spaces visioning:**
This section asks you to think about urban green spaces in your neighborhood. Urban green spaces are outdoor areas in your neighborhood such as parks, gardens, trees, etc.

<table>
<thead>
<tr>
<th>11. Do you visit local parks?</th>
<th>Never (0 visits)</th>
<th>Rarely (less than 5 visits a year)</th>
<th>Sometimes (about 1 visit per month)</th>
<th>Very often (about 1 visit per week)</th>
<th>All the time (multiple times per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12. Do you recreate in or near local creeks, streams, rivers, ponds or lakes?</th>
<th>Never (0 visits)</th>
<th>Rarely (less than 5 visits a year)</th>
<th>Sometimes (about 1 visit per month)</th>
<th>Very often (about 1 visit per week)</th>
<th>All the time (multiple times per week)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| 13. What urban green spaces are important to you in your neighborhood? Select all that apply |
|---------------------------------------------------------------------------------|----------------|
| Parks                                                                           |               |
| Trails                                                                          |               |
| Creeks, streams, rivers, ponds and lakes                                       |               |
| Outdoor sport or recreation fields (ex. baseball fields, soccer fields)        |               |
| Community gardens                                                              |               |
| Trees along streets/sidewalks                                                  |               |
| Other (please describe):                                                        |               |

| 14. What is the most important thing that could be improved with the urban green spaces in your neighborhood? Please describe: |
15. What urban green spaces and features would you like to see more of in your neighborhood? Select all that apply.  
- Trees in yards
- Trees along streets/sidewalks
- Fruit trees
- Small parks (converted from empty lots)
- Nature playgrounds
- Flower gardens
- Community gardens
- Rain gardens
- Other (please describe): ____________________

16. How important is it to you that these green spaces also address water damage or flooding?  
- Not important
- Slightly important
- Moderately important
- Important
- Very important

17. Please finish this sentence: It is important that urban green spaces…

18. Do you have any other thoughts or feelings you want to share?

About you:

19. Which of the following best describes you? Select all that apply  
- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latinx
- Native Hawaiian or Other Pacific Islander
- White
- Other

20. What zip code do you live in? ____________

21. What is your age?  
- Under 18
- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65-74
- Above 75

22. How do you describe your gender identity?  
- Female
- Male
- Nonbinary/third gender
- Two-spirit
- Prefer not to identify

23. What is the highest level of education you have completed?  
- Less than high school
- High school/GED
- Associates degree/trade school
- Bachelor's degree
- Master's degree or higher

24. Which best describes your living situation?  
- Rent
- Own
- Different situation (please specify) ____________

25. What is your annual household income?  
- Less than $30k
- $30k-$49k
- $50k-$69k
- $70k-$100k
- More than $100k

26. How many people are in your household, including yourself? (Households are people you share decisions and resources with).  
- 1
- 2
- 3
- 4
- 5
- More than 5