CLIMATE JUSTICE FOR WILMINGTON: SUMMARY REPORT

BY ERIKA FURLONG

Delaware Nature Society

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ACKNOWLEDGEMENTS

This report was created thanks to a generous gift from the estate of June MacArtor. June was a champion of environmental causes in Delaware, and one of the state's most prominent environmental attorneys. Delaware Nature Society is proud to honor her legacy.

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ABOUT

Delaware Nature Society

Delaware Nature Society (DNS) was founded in 1964 to teach Delawareans about nature. More than fifty years later, DNS is a leading voice for conservation and protection of natural resources in Delaware. DNS's staff continues to connect Delawareans to nature at their four main sites: Ashland Nature Center, DuPont Environmental Education Center, Abbott's Mill Nature Center, and Coverdale Farm.

June MacArtor

June MacArtor (1930-2013) earned her bachelor's degree in Sociology from the University of Tennessee, Knoxville, where she met her husband Frank. After living in California, June, Frank and their four children settled in Delaware. June decided to attend law school after she was discouraged from working on pollution control due to her gender. She completed her J.D. at Villanova University and then spent most of her career as a deputy attorney general for the Delaware Department of Justice, where she created the first Environmental Unit, housed in DNREC's headquarters. She was an authority on Delaware's Coastal Zone Act. She developed regulations and provided legal support for the environmental laws of the 1970s. She also taught courses at both University of Delaware and Widener University. Throughout her career, June received numerous awards, and she eventually became very active on DNS's board and chaired its Advocacy Committee.

The Author

Erika Furlong is an environmental planner for the State of Delaware, a lawyer for Garrison Environmental Law Practice and an adjunct instructor at Wilmington University. She moved to Delaware in high school and has a bachelor's degree in biological sciences and French from the University of Delaware. She earned her J.D., *cum laude*, from the University of Georgia, where she worked as an extern for the Environmental Protection Agency and a summer associate for an international law firm that specializes in environmental and food & drug law. Prior to law school, she led a team of volunteers and interns to organize a water and public health conference that was held at the United Nations. She also worked as a science analyst for an environmental and pharmaceutical mass tort firm in New York City. She began writing this paper during her time as DNS's June MacArtor Fellow.

CLIMATE JUSTICE

Climate Justice means that no one should bear a disproportionate share of the burdens of Climate Change. Wilmington faces more than its share of Climate Change consequences and has many communities whose social, economic, and physical features make them particularly vulnerable to such consequences. In this paper, Delaware Nature Society recommends responses to address Climate Change vulnerabilities using a Climate Justice framework. This is a companion to *Climate Justice: For a Prosperous & Sustainable Wilmington*, a report that provides greater detail about Wilmington's Climate Change vulnerabilities and possible solutions. The purpose of both reports is to educate the city, its state and federal partners, industry, advocates and citizens about what they can do to protect the city to make it prosperous and sustainable for future generations.

WILMINGTON'S CLIMATE VULNERABILITIES

The Earth's climate is changing in ways that are a threat to the city. Sea level rise, storm surges, extreme weather, and increased temperatures will pose a threat to people and property, and they will exacerbate the city's problems with poverty, violence and unemployment [1,2].

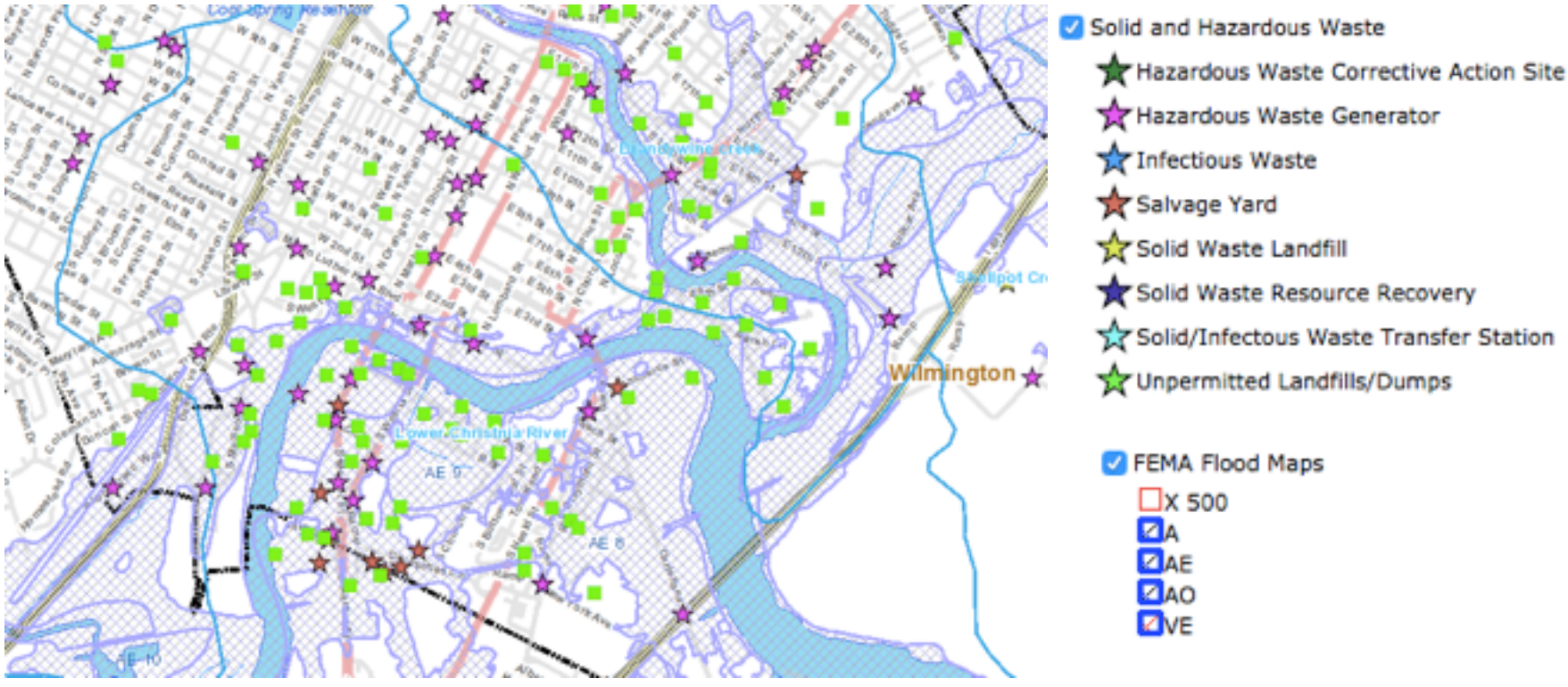
Wilmington Overview

The City of Wilmington is an economic driver for the state with a history of being a hub for industrial and chemical manufacturing. Despite being home to many of the world's largest corporations, and seat of the Delaware Court of Chancery [3], the city has struggled with high rates of poverty and violence in recent years [4]. These issues lead some to contend that economic development must take priority over other issues, notably Climate Change. Yet, Climate Change's consequences are inextricably intertwined with social issues like poverty and violence. The city can and should find common solutions to both its socioeconomic challenges and Climate Change.

The Threat Of Rising Water

Wilmington is located at the confluence of two tidal rivers. Many city neighborhoods are vulnerable to increased precipitation, extreme storm events, and flooding due to sea level rise [5]. The city already has to contend with stormwater and water quality issues created by overburdened infrastructure. So what should the city expect from sea level rise?

- Wilmington's minority and low-income neighborhoods will be hardest hit. In both east and south Wilmington, where poverty rates are as high as 32%, substantial inundation is expected [6, 7]. See the Sea Level Rise maps on the next page.
- Sea level rise and storm surges could damage or destroy homes and businesses, fundamentally reshaping neighborhoods and diminishing tax revenue. University of Delaware researchers estimate there are $582 million dollars' worth of properties vulnerable to sea level rise in New Castle County alone [8].
- The Port of Wilmington, one of the biggest employers in the area, is extremely vulnerable to sea level rise. An estimated 36 to 73% of the Port could be inundated by 2100 [9].
- Evacuation routes, public transportation, infrastructure, and hazardous waste sites are vulnerable to flooding, particularly in south and east Wilmington [10]. The map below shows waste sites that are located in floodplains (areas that tend to be particularly vulnerable to sea level rise and extreme weather).



Wilmington's Sea Level Rise Maps

Existing Conditions

1 Foot Sea Level Rise

2 Feet Sea Level Rise

3 Feet Sea Level Rise

4 Feet Sea Level Rise

5 Feet Sea Level Rise

Extreme Weather

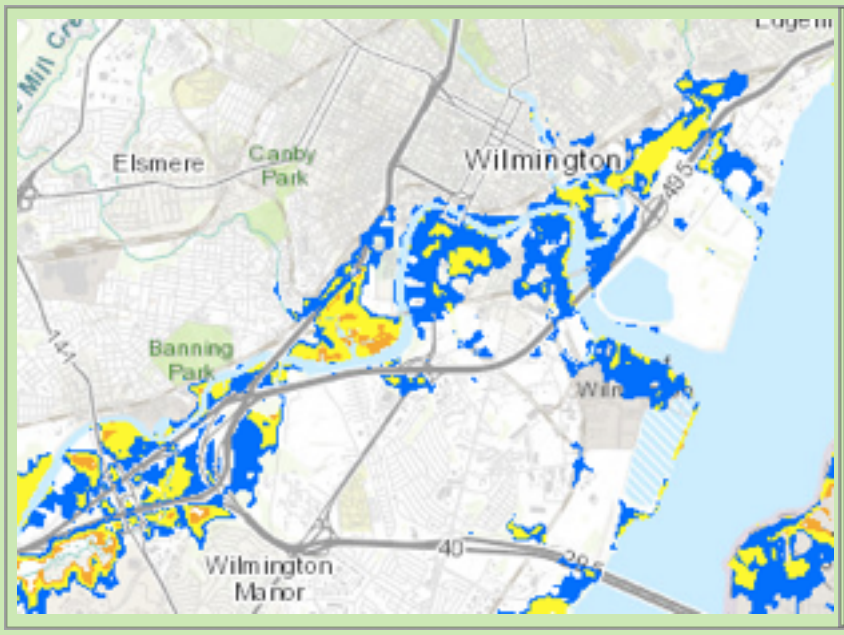
High intensity storms are expected to become more prevalent on the East Coast [11]. When these storms hit, they can disrupt access to transportation and services, physically harm those who do not (or cannot) heed early warnings, and cause billions of dollars' worth of damage [12].

- Superstorms, like Sandy, and hurricanes Harvey, Irma and Maria could become a more common occurrence, threatening human lives and damaging homes, businesses, roads, bridges, evacuation routes, energy infrastructure, supply chains, and the Port of Wilmington. They can also prevent residents from lifting themselves out of poverty [13].
- Storm surges, fueled by rising sea level rise and more intense storms, will become more common and more harmful.
- Environmental justice communities are more likely to be negatively impacted by extreme weather shocks because many residents have to draw on all of their resources to rebuild.

Extreme Weather Consequences

- Injuries and loss of life
- Property damage to homes, businesses, government offices
- Loss of income for residents/businesses
- Damage to infrastructure (electricity, transportation routes, telephone lines/ towers)
- Interruption of services (health care, government offices, emergency responders)
- Disruption of supply chains (gas, food, medical supplies)
- Exposure to pollution
- Residents may choose to leave rather than rebuild

Storm Surge Predicted by Hurricane



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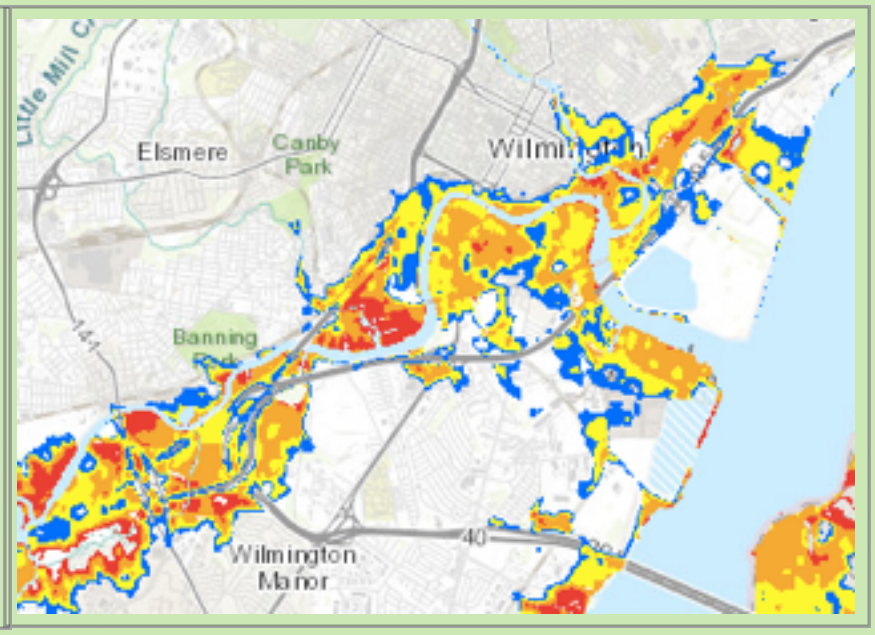

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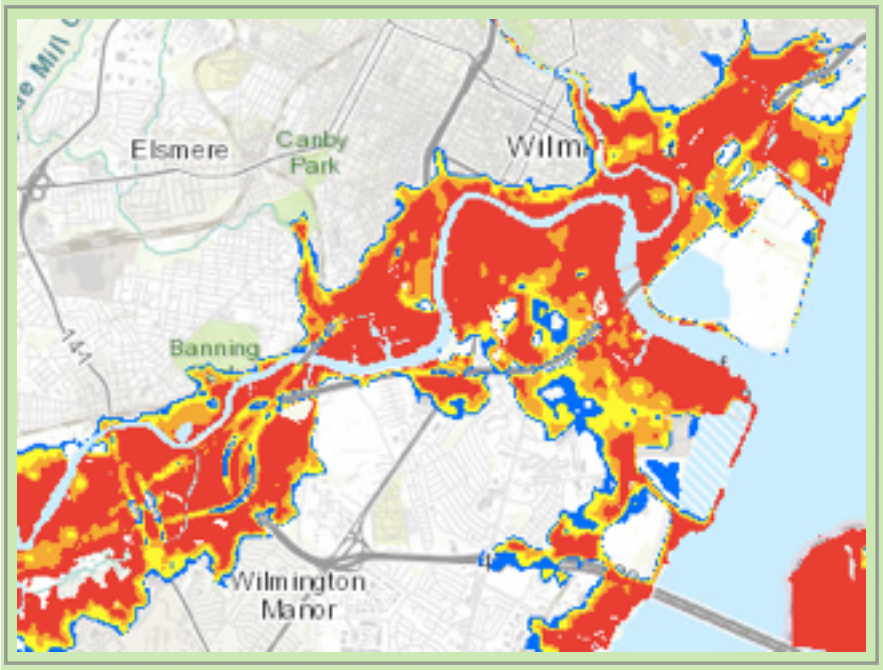

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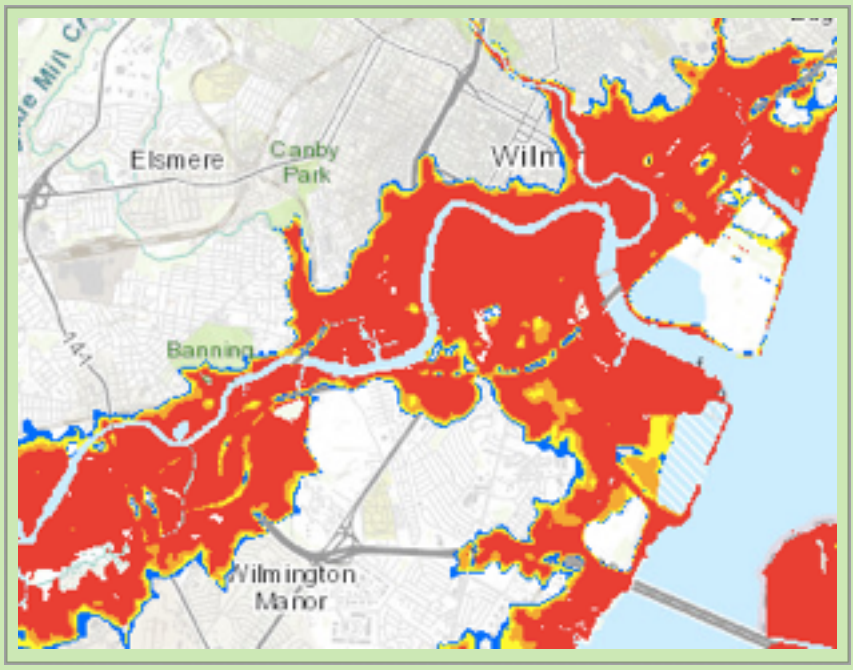

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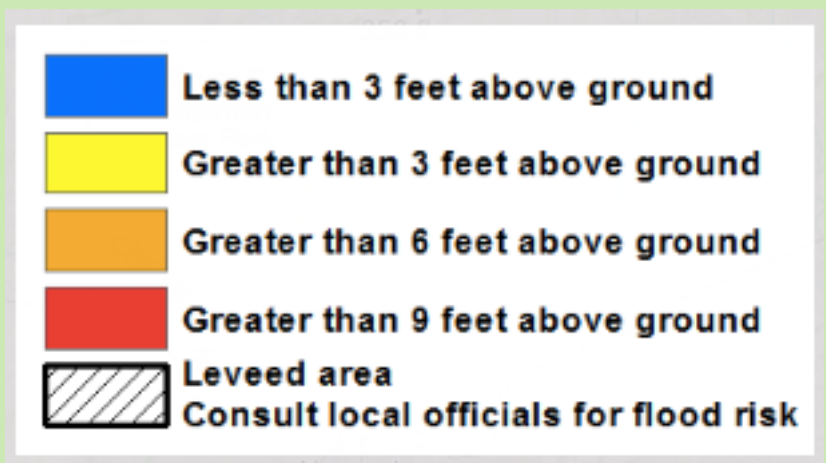
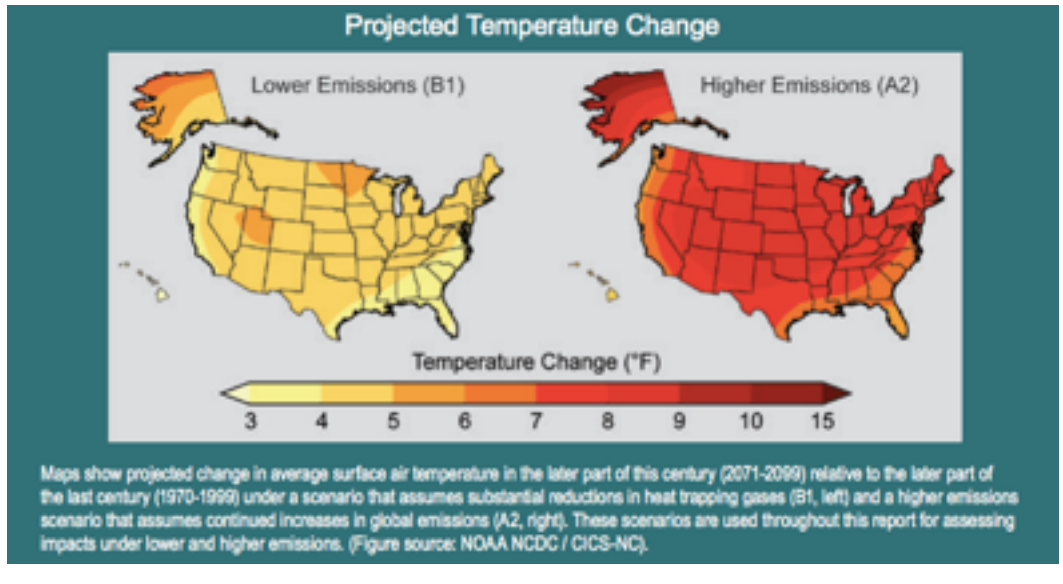


Extreme Heat

Delaware is already known for its hot, humid summers, but these conditions could become more pronounced in coming years.

- By the end of the century, there could be 50 to 65 days over 95°F every year [14].
- As a densely populated area with a lot of paved surfaces, Wilmington will likely be hotter than the rest of Delaware [15].



Maps show projected change in average surface air temperature in the later part of this century (2071-2099) relative to the later part of the last century (1970-1999) under a scenario that assumes substantial reductions in heat trapping gases (B1, left) and a higher emissions scenario that assumes continued increases in global emissions (A2, right). These scenarios are used throughout this report for assessing impacts under lower and higher emissions. (Figure source: NOAA NCDC / CICS-NC).

- Extreme heat can cause increased respiratory illness, heart attacks, and death [16].

Climate Change & Conflict

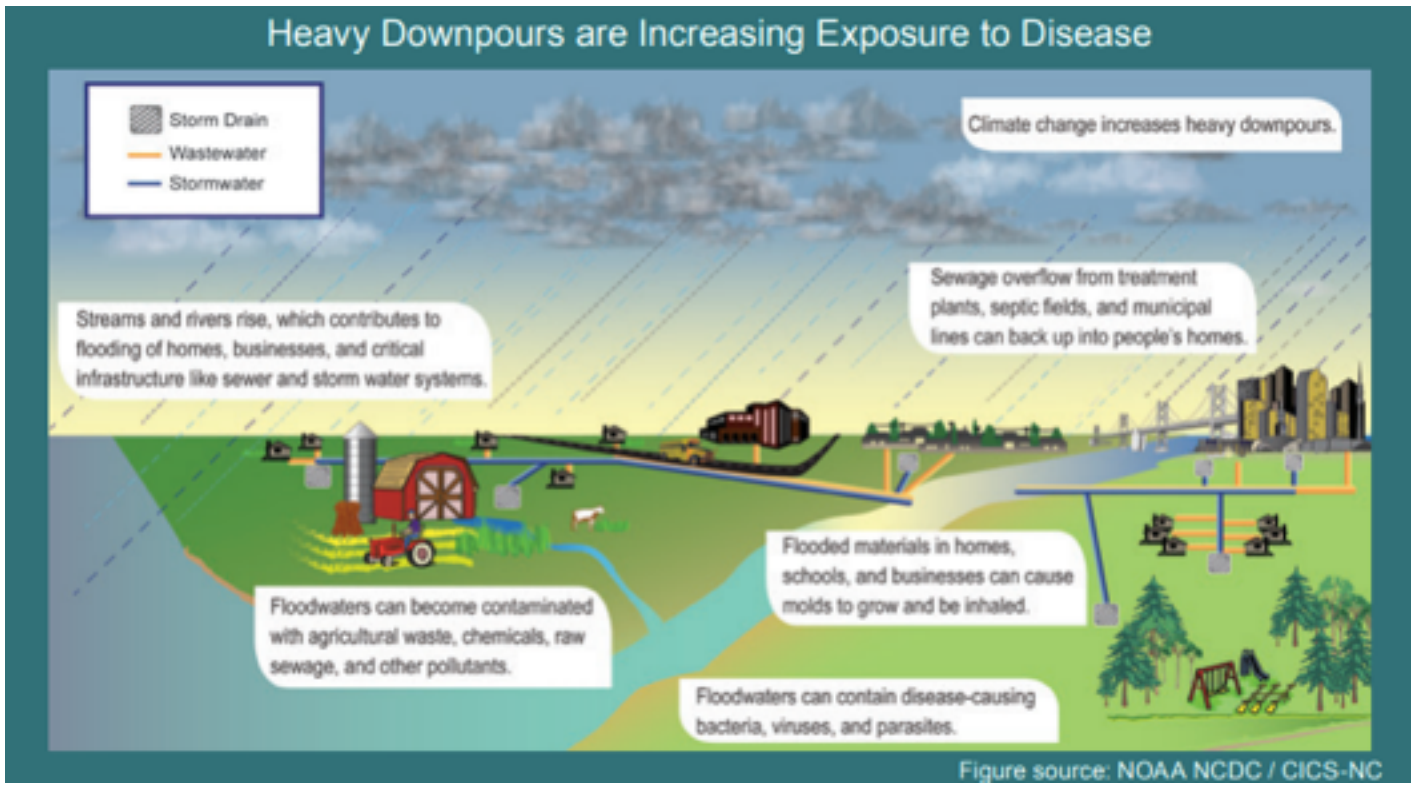
Research suggests that increased temperatures and precipitation will escalate rates of crime and violence.

- Climate Change could cause an 8-16% increase in interpersonal violence and a 28-56% increase in conflict by 2050 [17].

Health Consequences

Nearly a quarter of Wilmington residents live in poverty, twice the state and national averages, making them more susceptible to adverse health outcomes related to climate change [18].

- Increased flooding and precipitation could increase residents' exposure to pollutants, mold, allergens and vector-borne diseases.
- Climate Change is anticipated to decrease air quality, which could lead to even higher rates of respiratory illness and allergies [19].
- Extreme weather can cause stress and post traumatic-stress disorder, which in addition to affecting residents' psychological well being could compound other health problems [20].
- Vector-borne diseases (e.g., Lyme disease, West Nile virus, malaria, chagas, zika) are expected to increase as the geographic and seasonal distribution of ticks and mosquitoes is extended by warmer weather and increased precipitation [21].



Food Insecurity & Energy Costs

Extreme weather, droughts, and related disruptions to supply chains could exacerbate problems with food insecurity and energy costs.

- Megadroughts and disrupted supply chains could make it more difficult and more expensive for residents to obtain healthy foods [22].

- Environmental justice communities already spend a larger proportion of their income on energy costs, and they are more likely to live in households where they lack control over energy efficiency [23].

Environmental Justice Implications

For the reasons described above, the social conditions of the city's residents is one of Wilmington's biggest Climate Change vulnerabilities [24].

- Nearly a quarter of Wilmington's residents live below the poverty level, and residents are much less likely to own their own home, making it less possible for residents to prepare for and respond to Climate Change consequences [25].
- The city already experiences high rates of violence, ranking among the most dangerous small cities in the country, due to poverty and high levels of unemployment [26]. Residents who are already living in poverty or unemployed will have to draw on limited resources to prepare for and respond to climate consequences.
- Despite being more vulnerable to Climate Change consequences racial minorities tend to contribute less to greenhouse gas emissions (e.g., black households emit 20% less than non-Hispanic whites) [27].

WILMINGTON'S CURRENT CLIMATE RESPONSE

Wilmington has already undertaken commendable efforts to address climate change. The city set a municipal greenhouse gas reduction goal and achieved it well ahead of the 2020 deadline. In 2008, Mayor James Baker signed an executive order that committed the city to enacting laws, performing audits and implementing policies to reduce the city's carbon footprint. Many of these activities were completed. Some initiatives stalled in the subsequent administration, but the city and state continued several positive climate programs, which include planting trees, increasing green

infrastructure, adopting stormwater policies to reduce impervious surface, making municipal waste management more efficient, increasing the energy efficiency of city vehicles and buildings, and implementing a heat warning system.

These efforts should be enhanced to incorporate more initiatives to protect Wilmington from rising waters and to reduce greenhouse gas emissions city-wide [12].

What's a Climate Action Plan?

Climate action plans:

- Identify risks and vulnerabilities,
- Set baseline and target greenhouse gas emission standards,
- Identify mitigation and adaptation strategies,
- Coordinate activities between different stakeholders, and
- Provide recommendations for implementation.

BOLSTERING THE CITY'S CLIMATE RESPONSE

State, local and private Climate Change measures are even more important now that the federal government is less committed to addressing the issue. Wilmington is integral to the state's overall climate efforts. The City should forge stronger relationships with state, federal, community, and private organizations to enhance Wilmington's response to Climate Change.

The city should form a sustainability office and adopt a new, free-standing climate action plan (separate from its Comprehensive Development Plan) to use as the basis for a coordinated community response.

Delaying additional action to address Climate Change will make the city more likely to lose income from economically productive areas due to property damage caused by flooding and disruption of commerce. It could also mean that the city will pay more to repair flood-damaged areas than it would to protect them early on. By

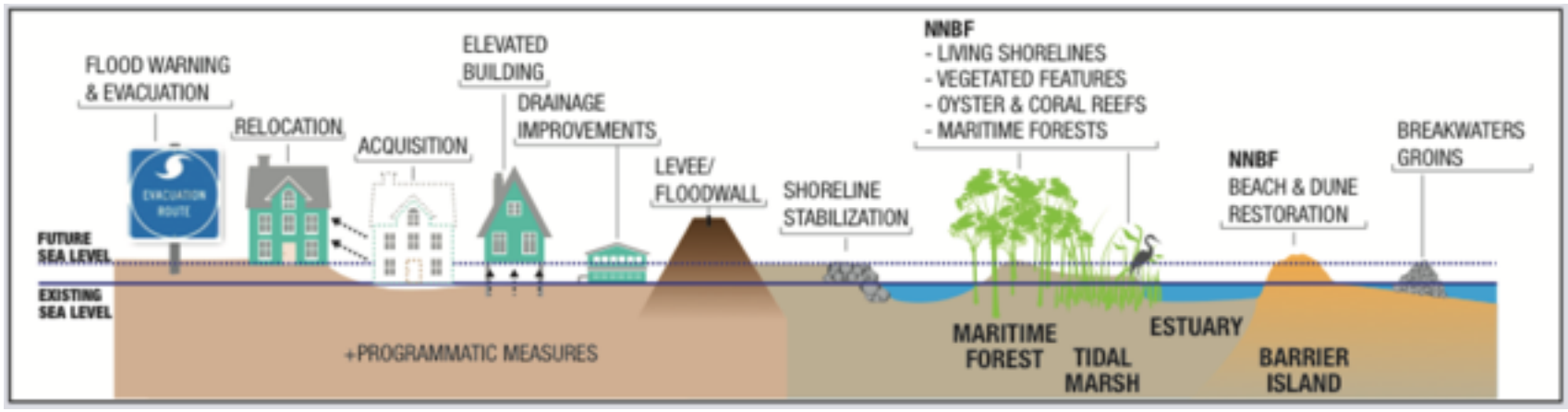
being a leader on Climate Change, the city can increase green job opportunities for residents and can attract more businesses to the area, many of which are increasingly concerned about sustainability and resiliency measures.

CLIMATE ACTION PLAN RECOMMENDATIONS

An analysis of Wilmington's specific vulnerabilities elicited these recommendations. The full report provides greater detail.

Executive Level:

- Ensure that the city's culture, laws and policies incorporate Climate Change considerations into routine decision-making.
- Set a new goal to reduce Wilmington's greenhouse gas emissions by 40% by 2040 (compared to 2008 levels).
- Publish an executive order memorializing the city's highest-level commitments.
- Prioritize the highest impact responses and those that have multiple benefits.
- Review laws, ordinances and codes to identify climate opportunities.
- Create an office or new position to focus on climate work and to secure related funding.
- Designate a Climate Change point person in each department.
- Work with federal and state agencies to gain a better understanding of the city's vulnerabilities to climate change impacts.
- Join other cities and planning organizations in climate/sustainability groups to learn from other initiatives.
- Reach out to the community for advice and feedback.
- Monitor and publish the results of climate response efforts.



Resilience & Emergency Preparedness:

- Ensure that facilities that provide services during emergencies are not located in floodplains or other vulnerable locations.
- Create programs to prepare for flooding/ extreme weather vulnerabilities - e.g.,
    1. Limit Exposure - restrict development in high risk areas, enact hazard resistant construction codes, evacuate people and property
    2. Reduce Direct Impacts - implement community-wide protection measures (sea walls, dams, levees, living shorelines), bolster the built environment (enhance building codes, create redundancies in essential services), protect residents (shelters, drills, training to retrofit)
    3. Share Losses - create burden sharing programs (insurance, relief funds)

Pre-disaster Planning
Investing in pre-disaster planning can provide a return on investment of $8.50 per year in reduced property damage for each dollar invested.

- Work with Delaware Emergency Management Agency (DEMA), Federal Emergency Management Agency (FEMA) and the National Institute of Standards and Technology (NIST) to identify and address gaps in the city's response to extreme weather and flooding.
- Perform regular audits and desktop exercises to ensure Wilmington is prepared for emergencies.

- Advocate for stronger state and federal assistance to help prepare environmental justice communities.
- Ensure that the State Emergency Response Commission and DNREC's Coastal Zone Act program incorporate Climate Change considerations into emergency planning for heavy industry and hazardous waste facilities that are located in areas vulnerable to extreme weather and flooding.

Climate Justice Issues & Solutions:

- Develop a diverse climate coalition that has stakeholders from a range of social, economic, and racial backgrounds.
- Evaluate and further institute policies that prevent Wilmington's environmental justice communities from experiencing an unfair burden due to climate change impacts.
- Develop a long-term plan for how south and east Wilmington will be protected from sea-level rise.
- Identify programs that could help environmental justice communities save money while also reducing energy consumption (e.g., partner with non-profits engaged in weatherization assistance, expand access to solar energy).
- Consider supporting legislation to create novel funding mechanisms for energy upgrades and insurance coverage (e.g., PACE Legislation, index-based risk transfer products).

Mitigation:

- Commit to greenhouse gas emission reductions, for example, by setting a new goal to reduce the city's emissions by 40% by 2040 (using 2008 as the baseline).

Land Use & Planning:

Wilmington's Tree Canopy

Benefits of Trees

- Improve water quality
- Reduce flooding
- Improve air quality
- Sequester carbon
- Moderate temperatures
- Reduce energy demands
- Reduce maintenance costs (air quality, stormwater, streets)
- Increase property values
- Enhance profit of shopping districts
- Add aesthetic value
- Decrease crime
- Improve public health

- Increase Wilmington's tree canopy to at least 40%.
- Increase compact, mixed-use, land development, especially along transportation routes.
- Consider applying the following tools to Climate Change-vulnerable areas: zoning, setbacks/buffers, buyback programs, transferable development credits, buyer disclosures, building codes.
- Continue to invest in and incentivize the use of green infrastructure (e.g., tree canopy, rain gardens, green rooftops), which can reduce heat, improve water quality, reduce flooding, beautify neighborhoods and sequester carbon.
- Ensure that all land use decisions are made through a Climate Change lens that considers future consequences and potential opportunities to increase resilience.

Public & Alternative Transportation:

- Decrease vehicle miles traveled in Wilmington by at least 10% in the next 20 years.
- Increase the percent of residents who walk by 15% in the next 20 years.
- Advocate routinely and doggedly to ensure that federal and state investments go toward improving the connectivity of Wilmington neighborhoods and providing access to public transportation and safe multi-modal facilities.
- Attend bi-annual meetings at WILMAPCO to recommend such projects, and encourage community leaders to get residents to attend these meetings.
- Ensure that Wilmington is getting its fair share of investment in multi-use paths (which are currently being built at higher rates in less densely populated areas of the state).
- Implement plans to promote car shares and safe biking.
- Install electric vehicle infrastructure and offer reduced price parking for electric vehicle cars.

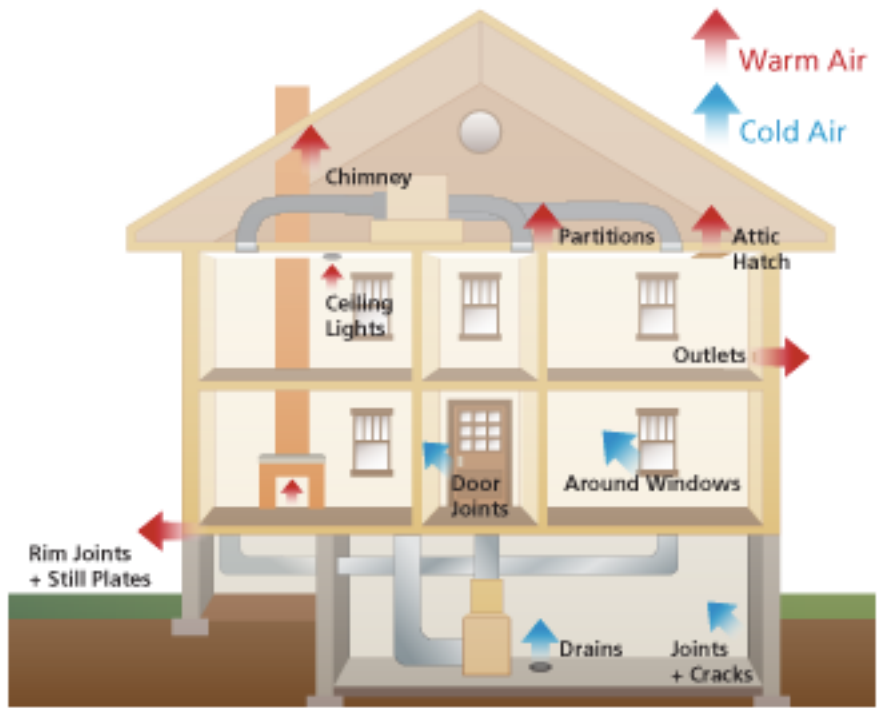
Public Transit

- Saves commuters $10,000 per year in gas and parking expenses
- Saves 4,627 pounds of carbon dioxide emissions per driver per year

Energy Efficiency & Weatherization:

- Perform training on state-wide energy code to ensure the city's workforce is informed.
- Offer incentives and training to residents and businesses to show them how they can implement energy upgrades and weatherization improvements.
- Target institutional landlords with incentives to weatherize and upgrade the energy efficiency of rental units.

- Set a performance goal for obtaining a certain percent of the city's electricity from alternative energy sources.
- Enact PACE legislation to allow innovative funding for energy efficiency projects.
- Bolster efforts by Interfaith Power & Light and Energy Coordinating Agency to implement weatherization programs for residents.



Common Air Leaks
Air infiltrates into and out of a home through every hole and crack. About one-third of this air infiltrates through openings in ceilings, walls, and floors.

Climate Change Litigation & Advocacy

- Analyze whether the city should pursue Climate Change-related litigation to seek financial assistance for adaptation measures.

Health Assessment:

- Perform a vulnerability assessment to determine Climate Change's impact on vulnerable populations and neighborhoods.
- Identify solutions that would make vulnerable residents more resilient to climate change and then operationalize those solutions.

Partnerships:

- Convene an annual coalition of diverse stakeholders to brainstorm ways to improve coordination to work on climate response measures (e.g., Mayor/city

council, state, federal, city departments, environmental advocates, industry, academia).

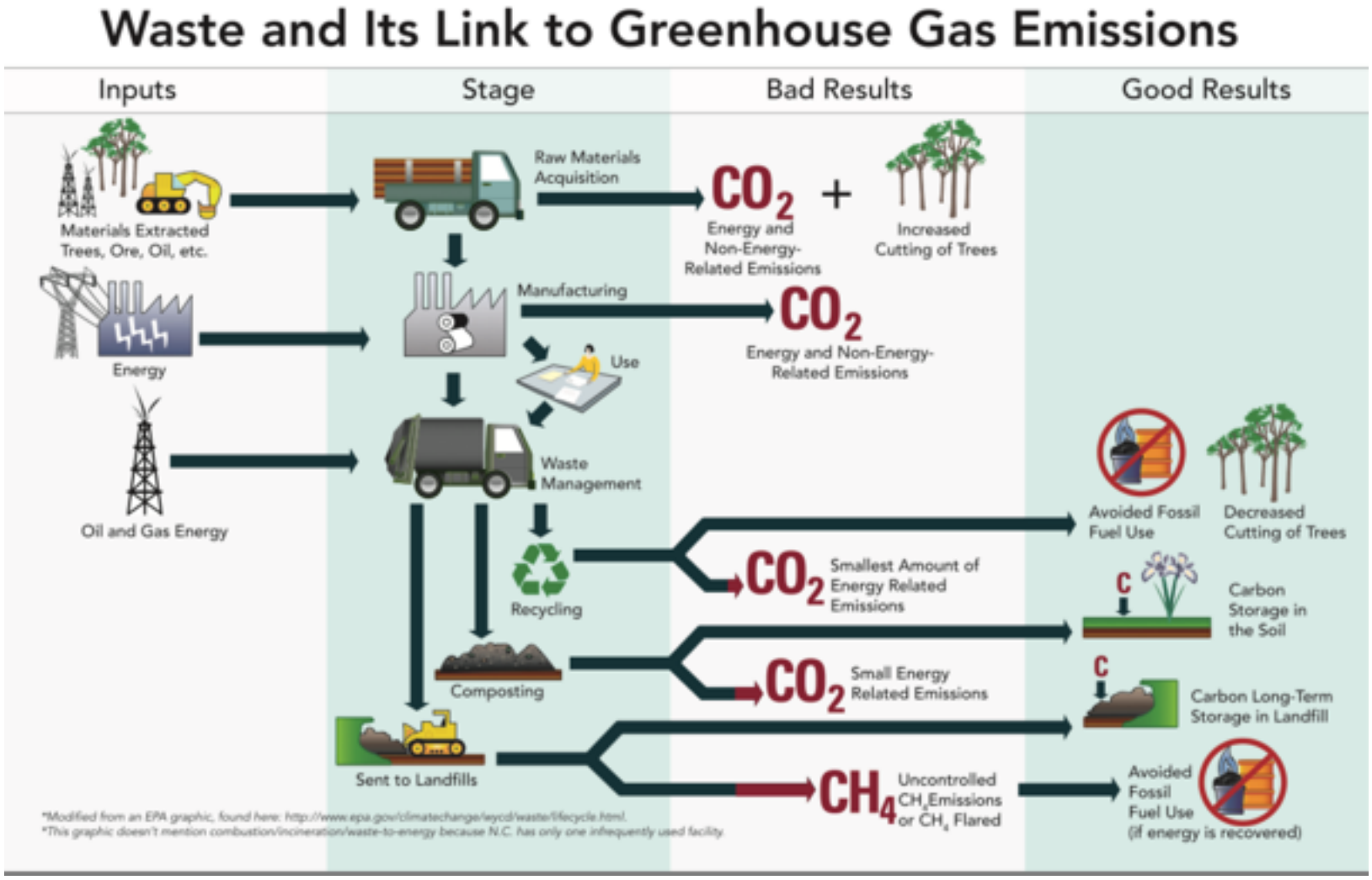
- Form more targeted groups to work on specific issues (e.g., green business, energy efficiency, renewable energy, green infrastructure).
- Partner with local colleges, universities and trade schools to develop greenhouse gas reduction and resilience strategies.
- Form a steering committee to analyze the city's response and to set priorities.

Community Outreach & Education:

- Solicit advice from the community to determine how to prioritize problems and identify possible solutions.
- Initiate a program for residents to voluntarily commit to reducing energy use and water consumption by a certain date and to protect themselves from extreme weather.
- Develop online and school programs to educate residents about household energy efficiency and the carbon intensity of different products.
- Ensure that outreach efforts are comprehensive, cross-cultural, and partner with existing community groups.

Solid Waste Reduction & Management:

- Set new and specific goals for diverting solid waste (e.g., other cities have set a goal of reaching zero waste disposal in the next twenty years).
- Educate businesses and residents about the link between consumption and Climate Change to encourage more waste reduction, reuse, recycling and composting.



- Advocate for state laws – for example:
    1. Incentives to reduce packaging,
    2. Incentives to reduce waste production (e.g., “pay as you throw”), or
    3. Mandated carbon footprint product labels.
- Encourage the development of collaborative consumption programs.

Heat Reduction & Management:

- Identify populations that are at particularly high risk of extreme heat and ensure that the City’s heat warning system protects them.
- Assess the adequacy of the existing heat management system (e.g., determine whether people without access to air conditioning can get to cooling centers).
- Encourage investment in green infrastructure that can reduce heat.

Water Management & Jobs:

- Develop a program to train Wilmington's residents to address the city's stormwater requirements by installing more green infrastructure.
- Work with the state and federal government to develop a long-term plan to manage flooding and protect the city from sea level rise.
- Work with other partners to assess the viability of sea walls, dikes and nature-based solutions to add resilience to sea level rise and extreme weather.

Green Jobs & Business Development:

- Develop a partnership to identify and implement strategies aimed at encouraging the development of green industry in Wilmington.
- Prepare residents for these jobs by working with local high schools, universities, industry and government partners to develop targeted curricula.
- Set a goal to increase green jobs by a certain amount by 2040.

Fact-finding, Assessments & Monitoring:

- Work with state and federal partners to perform a risk/vulnerability assessment to determine neighborhood-level vulnerabilities to Climate Change.
- Work with state and civic organizations to develop and implement solutions to neighborhood vulnerabilities.
- Develop plans to protect critical assets (e.g., port, Southbridge, the Riverfront).
- Monitor the city's climate response by collecting and analyzing data at prescribed intervals.

Funding Climate Response Measures

- Identify grant and other funding opportunities to maximize the city's ability to fund projects that prepare the city for Climate Change and related social issues.

CONCLUSION

Wilmington, Delaware is a city with vibrant communities and an impressive history of public and private investment -- but it is a city at an inflection point. Rising waters and extreme weather will soon compound the city's problems with poverty and violence. It will take real leadership, vision and civic engagement to steer the city through these difficult times.

As with most threats, these problems also bring opportunities for growth, cooperation, and innovation. Climate change and other socioeconomic problems often share common solutions. These include:

- Upgrading public and alternative transportation to provide more, cheaper and cleaner access to jobs;
- Making infrastructure and communities resilient to extreme weather and nuisance flooding;
- Improving energy efficiency to reduce costs and greenhouse gas emissions;
- Training residents to be competitive in expanding green industries.

Most recommended solutions, though ambitious, do not force choices between addressing two problems. Rather, they represent opportunities to address multiple problems at once.

Wilmington, and all of its communities, can and must bend their hearts and minds to find and accomplish these goals. The city's prosperity and sustainability for future generations depend on it.

3

ENDNOTES

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MEDIA ATTRIBUTION

Cover

View of Wilmington from Riverfront, Katie Tackman, KT Butterfield Photography (2017).

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Summary

View of boardwalk near DuPont Environmental Education Center (DEEC), Katie Tackman, KT Butterfield Photography (2017).

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Conclusion

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Endnotes

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