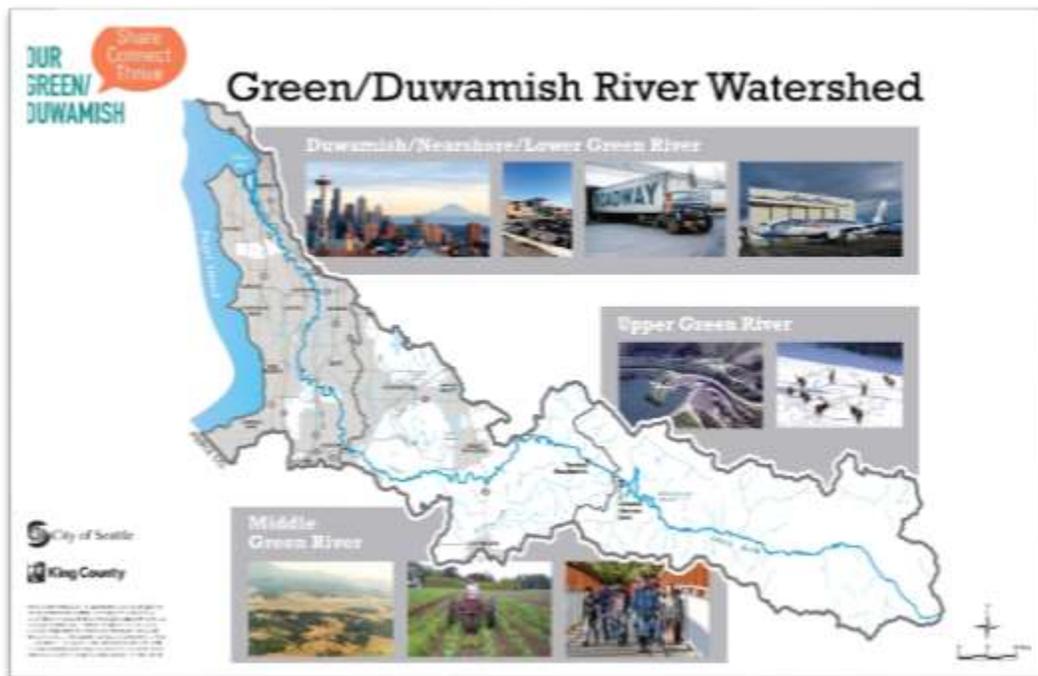


Advancing Climate Change Resilience & Preparedness in the Green/Duwamish Watershed

Introduction

In September 2014, King County, in partnership with the City of Seattle, launched the *Our Green/Duwamish* initiative to develop strategies to strengthen communities and improve air, land, and water conditions in Green/Duwamish Watershed. This initiative is intended to increase coordination of current work in the watershed at the local, state, and federal levels to manage habitat restoration, salmon recovery, flood control, stormwater management, public health, social equity, environmental cleanups, economic development, open space preservation, water quality and more.

Figure 1 - Our Green/Duwamish Geography



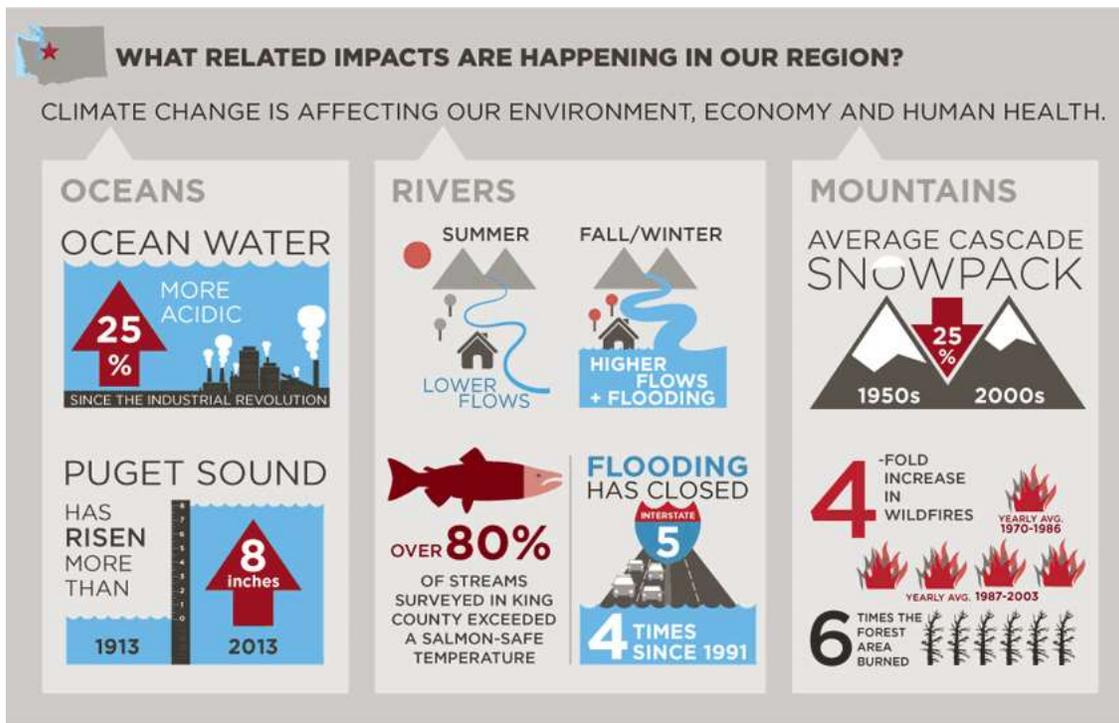
Over a year of initial background research and community meetings culminated in a [Preliminary Background Report \(PBR\)](#), which provides a summary of current conditions and existing plans and programs active in the Green/Duwamish Watershed. The report documents the need to better coordinate climate change resilience and preparedness activities. More specifically, the PBR recommended the following:

Integrate climate change resilience and preparedness activities to provide a stronger response to current and future conditions and build a more resilient landscape within the watershed.

Background

Across the globe, there is overwhelming evidence that increases in carbon dioxide and other greenhouse gases (GHGs) in the atmosphere are causing the climate to change. The year 2016 was the warmest on record since 1880, and the ten warmest years on record have occurred since 2000. In the Green/Duwamish Watershed, climate change is one of the most important and uncertain drivers of change causing increasing temperatures, heat events, acidifying marine waters, rising seas, larger and more frequent storms, increasing flooding risk, decreasing mountain snowpack, and less water in the summer, greatly influencing the health of the watershed as a whole. The impacts of a changing climate will be experienced differently by residents, influenced by factors such as income, age, health, and location.

Figure 2 - Climate Change Impacts in the Region¹



Climate change has long-term consequences for the economy, the environment, and public health and safety in Green/Duwamish Watershed. It can be difficult to meet the challenges of extreme weather and

climate conditionsⁱⁱ but many communities are already taking actions on their own to respond and adapt to climate change.

Figure 3 - Future Consequences of Climate Changeⁱⁱⁱ



The PBR found that, currently, in the watershed, there are numerous climate change plans, programs and initiatives underway. The Green/Duwamish Watershed has an opportunity to work, collaboratively, to develop and implement strategies to prepare for, respond and adapt to climate change. Climate change resilience and adaption could benefit from enhanced coordination of the plans and programs with other efforts in the watershed, and in the broader region. Such coordination would help agencies work together to share best practices, troubleshoot jurisdictional conflicts, collaborate on funding opportunities, optimize existing resources for maximum benefit and ensure at risk communities are not overlooked. This could provide greater opportunities to make a broad impact and alleviate environmental and social inequities in the watershed if climate change activities can be integrated across the watershed.

During Phase I of Our Green/Duwamish stakeholders identified specific gaps and opportunities to better coordinate and integrate climate change activities in the watershed. They are:



1. Incorporate priority climate change resilience and adaptation actions for the watershed into local plans;
2. Integrate open space and climate change planning;
3. Create a citizens' climate change tool kit to inform discussions and facilitate behavior change;
4. Map areas vulnerable to climate change impacts risk;
5. Maintain an inventory of greenhouse gas emissions and carbon sequestration assets;
6. Public health agencies play a significant role in responding to impacts from climate change (i.e. heat, power outages, emergencies, etc.). Consider funding options so that public health agencies can better reach vulnerable populations.

There are already efforts underway in the region that address the gaps and opportunities identified in the Green/Duwamish Watershed. Table 1 highlights efforts, specifically, by King County and the City of Seattle that address the gaps and opportunities identified.



Table 1 - Current Climate Change Reduction Efforts

Identified Gaps/Opportunities	King County Initiatives Addressing Gap/Opportunity in the Green/Duwamish Watershed	City of Seattle Initiatives Addressing Gap/Opportunity in the Green/Duwamish Watershed
<p>1. Incorporate priority climate change resilience and adaptation actions for the watershed into local plans.</p>	<ul style="list-style-type: none"> • King County’s Strategic Climate Action Plan (SCAP) Section 2: Preparing for Climate Change Impacts - lists preparedness priority actions for the entire county. Specific actions underway of importance for the Green/Duwamish watershed include to: <ul style="list-style-type: none"> • Investigate the impacts of changing rainfall patterns to county infrastructure and operations. • Manage increased stormwater runoff from large rain events. • Coordinate regionally to evaluate potential population growth increases from climate disruptions. • Conduct stakeholder engagement to inform policy changes regarding climate change impacts to public health. • Assess changes to flooding frequencies and sizes. • Incorporate climate change data into King County Water Resources Inventory Areas (WRIA) salmon recovery plans. • King County recently received grant funding for a pilot project to test the effectiveness of floating wetlands in the lower Duwamish. Floating wetlands will be studied for their ability to improve water quality and provide habitat for Chinook and other salmon. Floating wetlands also act as a dynamic restoration project; they are able to move with rising seas and can be moved to different locations as needed. 	<ul style="list-style-type: none"> • The City of Seattle has a draft report “Preparing for Climate Change” that is anticipated to be finalized in the first quarter of 2017. The draft plan addresses the city’s priority climate change preparedness actions for the City of Seattle.
<p>2. Integrate open space and climate change planning</p>	<ul style="list-style-type: none"> • King County’s 2016 Update to the Open Space Plan includes open space guiding principles that are specific to the Green/Duwamish Watershed (Chapter 2, page 19). The Open Space Plan Update incorporates policy direction provided by the 2015 SCAP. 	

	<ul style="list-style-type: none"> King County’s Land Conservation and Preservation Work Plan is an effort to conserve land in order to reduce climate change impacts, improve biodiversity, social equity, human health, economic development, and competitive advantage. 	
3. Create a resident climate change tool kit to inform discussions and facilitate behavior change	<ul style="list-style-type: none"> The Seattle King County Public Health Department (Public Health) has held workshops for Community Based Organizations (CBOs) to assist these groups with incorporating climate change responses into their programs, especially for emergency event response. Public Health plans to expand these workshops and possibly develop training kits for CBOs to use within the communities. 	
4. Map areas vulnerable to climate change impacts risk	<ul style="list-style-type: none"> King County is developing a Climate Resiliency GIS mapping tool to map areas vulnerable to climate change impacts. The final product may not be available until 2018. King County conducted coastal hazard and sea level rise mapping for Vashon-Maury Island as well as landslide hazard mapping along river corridors in King County. 	<ul style="list-style-type: none"> The City of Seattle developed a Regional Equity Atlas. Seattle Public Utilities conducted Sea Level Rise Mapping.
5. Maintain an inventory of greenhouse gas (GHG) emissions and carbon sequestration assets	<ul style="list-style-type: none"> King County in partnership with the City of Seattle and the Puget Sound Clean Air Agency, have completed several inventories of King County’s community GHG emissions in order to track reduction goals. The tracked emissions are from all activities attributed to King County residents, businesses and other entities. A 2015 inventory update is now in development. 	<ul style="list-style-type: none"> The Seattle Office of Sustainability and Environment tracks and measures Seattle’s greenhouse gas emissions.
6. Public health agencies play a significant role in responding to impacts from climate change (i.e. heat, power outages, emergencies, etc.); Consider funding options so that public health	<p>King County’s Strategic Climate Action Plan (SCAP) Section 2: Preparing for Climate Change Impacts – This plan states that by 2020, Public Health will:</p> <ul style="list-style-type: none"> Develop and implement a stakeholder engagement strategy to gauge perceptions of climate impacts on human health and to inform policy changes to prepare for climate change. First, Public Health will partner with the Office of Emergency Management to implement a survey of local emergency managers. Other potential stakeholders include Public Health employees and community partner organizations. Use engagement and survey results to develop strategy and potential policy changes to address and prepare for climate change. Develop a funding strategy for a comprehensive public health and climate change program to include: 	

<p>agencies can better reach vulnerable populations.</p>	<ul style="list-style-type: none"> • Implementing a data surveillance system to monitor and report human effects of climate change, particularly for vulnerable populations. • Conducting community and stakeholder engagement, education, and outreach, with an emphasis on historically marginalized and overburdened communities. • Establishing systems to detect and respond to current and emerging health threats. • Preventing and adapting to current and anticipated human health impacts. • Secure the assistance of an intern or practicum student to help identify key components, develop a program framework, and pursue a strategy to secure funding required for implementation. 	
<p>Additional Climate Change and Resilience Efforts Relevant for the Green/Duwamish Watershed</p>		
<p>Salmon recovery efforts</p>	<ul style="list-style-type: none"> • The Watershed Resource Inventory Area (WRIA) 9 Technical Committee is in the process of writing a draft climate change issues paper in order to incorporate future climate change projections into salmon habitat recovery plans in the Green/Duwamish watershed. The draft issues paper is anticipated to be complete in 2017. 	<ul style="list-style-type: none"> • The City of Seattle is part of the WRIA 9 technical committee and will be included in the development of the draft climate change issues paper.
<p>Assessment of climate impacts on changing rainfall patterns</p>	<ul style="list-style-type: none"> • King County is working with the University of Washington Climate Impacts Group to assess climate change impacts on local rainfall patterns. With this research, the county will update stormwater design requirements and assess impacts on wastewater treatment and conveyance. 	<ul style="list-style-type: none"> • Seattle Public Utilities conducted a preliminary rainfall study in 2016.
<p>Comprehensive Sea Level Rise Strategy</p>	<ul style="list-style-type: none"> • King County is developing a Comprehensive Sea Level Rise Strategy. The strategy is a commitment in the SCAP. The project goals of the strategy include: <ul style="list-style-type: none"> • Develop a scientific basis for addressing sea level rise. • Review and update permit requirements. • Develop adaptation approaches along King County’s Puget Sound shoreline. • Plan for adaptation along the Elliot Bay, Harbor Island and Duwamish River. • Understand impacts and adaptation options at the locks. 	<ul style="list-style-type: none"> • Seattle Public Utilities has conducted mapping for future sea level rise and impacts to the city.

	<ul style="list-style-type: none"> • Understand impacts on shoreline railroad tracks. • Reduce risks to King County infrastructure. • Public outreach and engagement. 	
<p>King County Strategic Climate Action Plan</p>	<ul style="list-style-type: none"> • In addition to addressing resilience and preparedness, Section 1 of the SCAP addresses actions to reduce GHG emissions at the community-wide scale and from government operations. GHG emission reduction goal areas include: <ul style="list-style-type: none"> • Transportation and Land Use • Buildings and Facilities Energy • Green Building • Consumption and Materials Management • Forests and Agriculture • Under the Transportation and Land Use goal area, the King County Department of Transportation (DOT) is increasing transit for low-income populations, piloting alternative services, continuing to lead the region in supporting and demonstrating new transportation technologies, promoting equitable transit-oriented development policies, and reducing air pollution through offering a wide range of public transportation services. 	



The King County – Cities Climate Collaboration

In addition to the efforts highlighted in Table 1 to reduce climate change impacts, King County, in conjunction with King County cities, recently created the King County-Cities Climate Collaboration (K4C). The K4C was created to coordinate and enhance the effectiveness of local government climate and sustainability action. The K4C works together on the following items:

- **Outreach** – to develop, refine, and utilize messaging and tools for climate change outreach to engage decision makers, other cities, and the general public
- **Coordination** – to adopt consistent standards, benchmarks, strategies, and overall goals related to responding to climate change
- **Solutions** – to share local success stories, challenges, data and products that support and enhance climate mitigation efforts by all partners
- **Funding and resources** – to secure grant funding and other shared resource opportunities to support climate related projects and programs.

Some of the focus areas in which the K4C is supporting and enhancing projects and programs are green building, using and producing renewable energy, sustainability outreach and education, and alternative transportation.

The K4C developed a set of *Joint County-City Climate Commitments*, which can be found here: [Commitments](#). All King County cities are encouraged to join into this effort and presently the following fourteen of the 41 jurisdictions in King County are participating in the K4C:

- | | | |
|-----------------------|-------------------------|-----------------------|
| • Bellevue, | • Mercer Island, | • Seattle, |
| • Burien, | • Normandy Park, | • Shoreline, |
| • Issaquah, | • Redmond, | • Snoqualmie, |
| • King County, | • Renton, | • and Tukwila. |
| • Kirkland, | • Sammamish, | |

In the Green/Duwamish Watershed, six of its sixteen jurisdictions (bolded above) are participating in the K4C. Since inception in 2014, the K4C has accomplished the following:

- helped to develop ambitious, shared, countywide climate targets^{iv};
- expanded Sustainable Cities Roundtable Series;
- developed, shared, and promoted sustainability related trainings, workshops, and education opportunities;
- developed a database for K4C partners to access information on various sustainability related projects and programs being led by King County and its cities;



- developed municipal revolving energy funds: created locally focused guidance, case studies, recommendations, and resources to support county and city efforts;
- pursued financial support of local climate action.

Next Steps and Recommendation

Our Green/Duwamish has been a starting point for greater collaboration on climate preparedness and resilience action in the Green/Duwamish Watershed. The K4C provides an opportunity for jurisdictions within the watershed to become a part of a lasting effort to reduce impacts from climate change and take leadership regionally. **It is recommended that all of the Green/Duwamish cities consider participating in the K4C to team up with this larger collaborative effort on climate change.** This is a practical, near-term opportunity to begin to reduce carbon pollution, invest in long-term solutions and ensure that the watershed is resilient to climate change impacts.

ⁱ <http://www.kingcounty.gov/services/environment/climate/why-act/infographic.aspx>

ⁱⁱ King County Strategic Climate Action Plan

ⁱⁱⁱ <http://www.kingcounty.gov/services/environment/climate/why-act/infographic.aspx>

^{iv} http://www.kingcounty.gov/elected/executive/constantine/news/release/2014/July/23_greenhouse-gas-targets.aspx