

# Seattle Public Utilities and Sea Level Rise

April 2012

## Introduction

Seattle Public Utilities (SPU) has performed a preliminary assessment of the magnitude of inundation to the City's marine shoreline and SPU's infrastructure. The project identified the best available science and applied it to specific assets using geographic information systems (GIS). Initial results include a partial inventory of vulnerable assets and maps indicating future coastal inundation. The work is presently being incorporated into SPU decision-making, and data is being shared citywide to assist in planning processes. A summary of the assessment, of subsequent project planning outcomes, and of future assessment goals and objectives is detailed below.

## Background

Perhaps the most certain of all climate change impacts, SLR is driven by global and local factors. The Intergovernmental Panel on Climate Change's (IPCC) fourth assessment report provided global SLR estimates based primarily on oceanic thermal expansion and polar ice melt. These estimates were modified by the University of Washington's Climate Impacts Group (CIG) in light of local SLR drivers such as vertical land movement and atmospheric effects and were published in a 2008 report. From the report, SPU used the "low," "medium," and "high" scenarios/estimates for the common standard time horizons of 2050 and 2100 (below). Additionally, due to the likely episodic nature of future SLR impacts, i.e., storm and tidal surges, historic tide information was also analyzed by SPU. The impacts from the chronic and episodic signals of sea level rise should be considered in combination as well as separately.

Scenario	Estimate by Year	
	2050	2100
Low	3"	6"
Medium	6"	13"
High	22"	50"

*"Sea Level Rise in the Coastal Waters of Washington State" (Mote et al, 2008)*

<b>Highest Observed Tide Level</b>	<b>38"</b>
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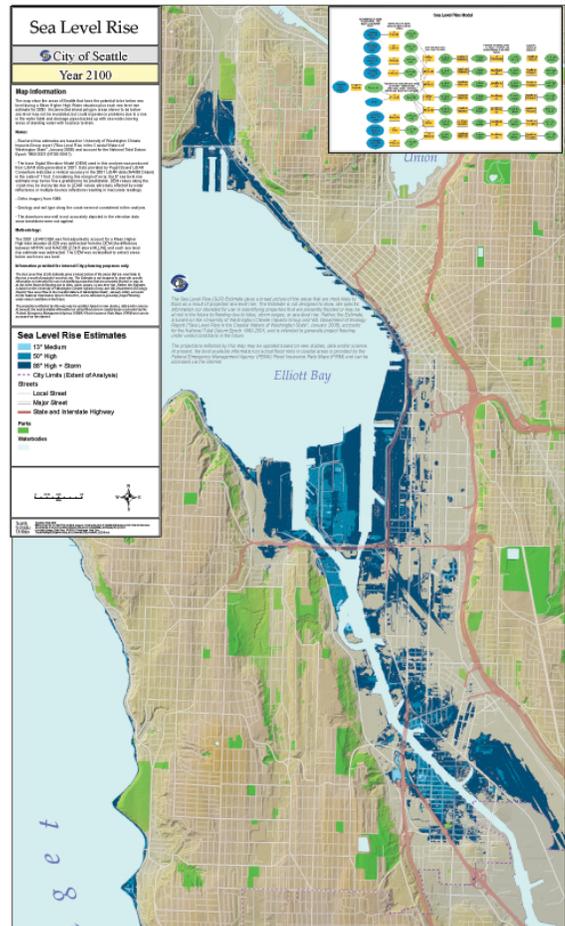
*"Response of Extreme Storm Tide Levels to Long-Term Sea Level Change" (Zervas, 2005)*

The SLR estimates have been applied to GIS to produce presentation and analysis materials, including maps (right) and inventories of SPU assets inundated under the different scenarios and time steps. SPU is currently attempting to integrate risk framing with asset management principles to inform the development of adaptation options

## Asset Management, Risk Framing and Adaptation

SPU's initial assessment evaluated when and where SLR impacts may occur. Results include detailed maps (below) and inventories of assets across all lines-of-business. Impacted assets are currently being prioritized and inspected manually for vulnerability and adaptability, with a near-term goal of establishing a basic understanding of risk to factors such as inundation, increased

flooding frequency and saltwater intrusion. Examples of infrastructure being analyzed include maintenance holes, critical water mains, and drainage outfalls and pump stations. With the risk profiling completed, SPU will evaluate adaptation options to ensure the delivery of services, using a framework of protection, accommodation and retreat. SPU also intends to develop its adaptation options within its asset management approach, taking into account the life cycle and status of the asset when determining the nature and timing of an adaptation action.



Additional guidance on risk assessment and adaptation planning is also being reviewed from sources such as the Army Corps of Engineers, and other domestic and international municipalities. Finally, information on the impacts of sea level rise including revised scenarios and estimates are expected to continue to improve on a periodic basis, notably with respect a to National Academy of Sciences report expected in early 2012.

*For more information, please contact: Paul Fleming, Manager, SPU Climate and Sustainability Group (paul.fleming@seattle.gov), or James Rufo Hill, Climate Adaptation Specialist (james.rufohill@seattle.gov), Seattle Public Utilities, 700 5<sup>th</sup> Ave. Ste. 4900, Seattle, WA 98124-4018*