



# **Preparing for climate change impacts on storms and hydrology in King County:**

## **Moving from Concept to Action**

**Jim Simmonds**

King County Dept. of Natural Resources and Parks

2017 Northwest Climate Science Conference

October 11, 2017



**King County**

# **Why Co-produce Research to Support Adaptation?**

# **Local jurisdictions have extensive responsibilities**

- Stormwater
- Wastewater
- Flooding and emergencies
- Building permits and critical areas protection
- Roads and other infrastructure
- Public health





“Climate change is one of the paramount challenges for our generation and generations to come.”



- Health
- Safety
- Economy
- Environment







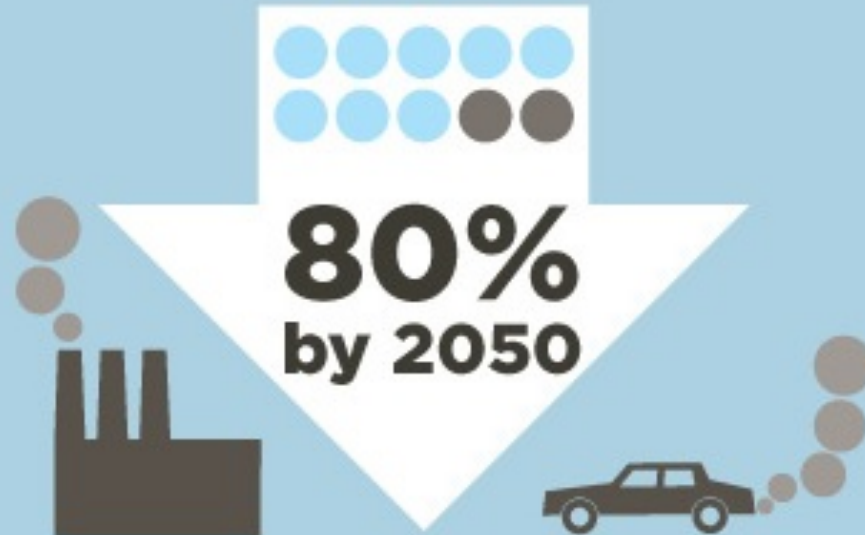
# CLIMATE ACTION PLAN



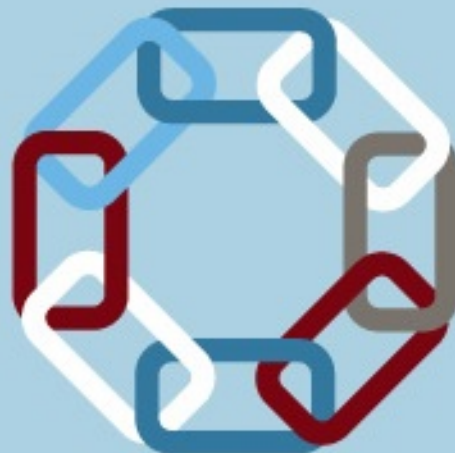
## King County's 2015 Strategic Climate Action Plan

A 5-year  
blueprint for  
climate action

1. Reduce countywide carbon pollution by



2. Prepare our region for the impacts of a changing climate by



**strengthening  
community  
resiliency**

# Preparing for Climate Change Impacts

## RESILIENT COUNTY OPERATIONS, FACILITIES

King County Is planning for climate change impacts on wastewater, stormwater, emergency management, public health, flood risk reduction, and salmon recovery.



## STRENGTHENING REGIONAL RESILIENCE

King County Is working with local cities, organizations, and other partners to improve regional coordination on climate change preparedness.



## ENHANCING REGIONAL UNDERSTANDING

King County Is partnering with researchers, local communities, state agencies, and others to address key information gaps related to climate preparedness goals.



# Do Excellent Work!



# Priority actions #1-4

1. Assess climate impacts on storm intensity
2. Update stormwater design requirements
3. Assess impacts on wastewater conveyance and treatment
4. Assess climate impacts on flood sizes and frequencies

# **Four management issues for King County**

- Stormwater
- Wastewater
- Streams
- Rivers

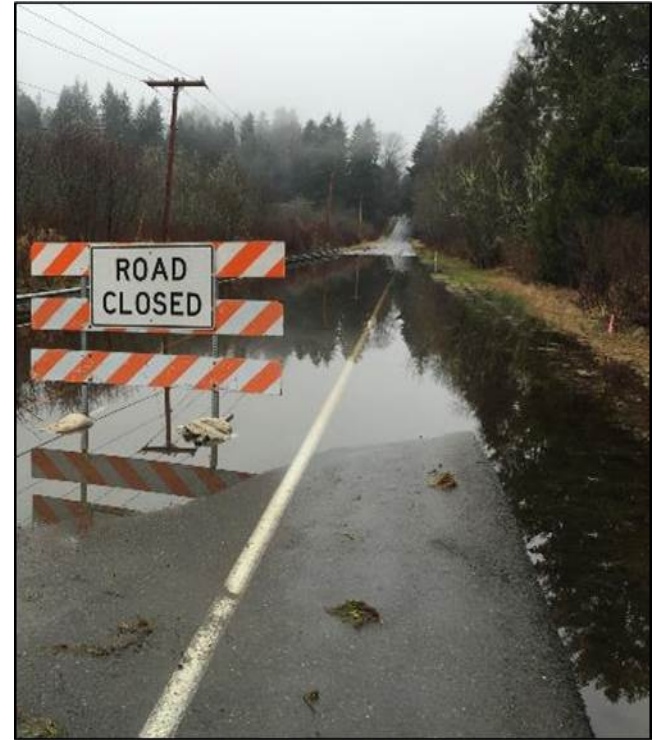
**STORMWATER**



# **Local jurisdictions manage large stormwater systems**

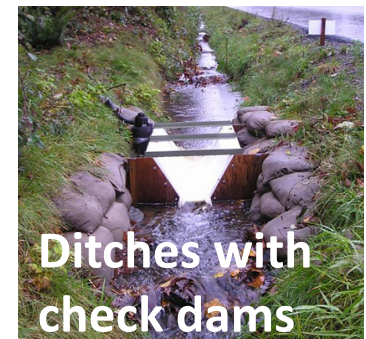
- Implement NPDES permits
- Stormwater Design Manuals for new construction
- Maintenance and operations
- Increase numbers of facilities

**Urban  
stormwater can  
be dangerous and  
expensive!**





# Developers are required to build stormwater infrastructure using design standards based on historic rainfall



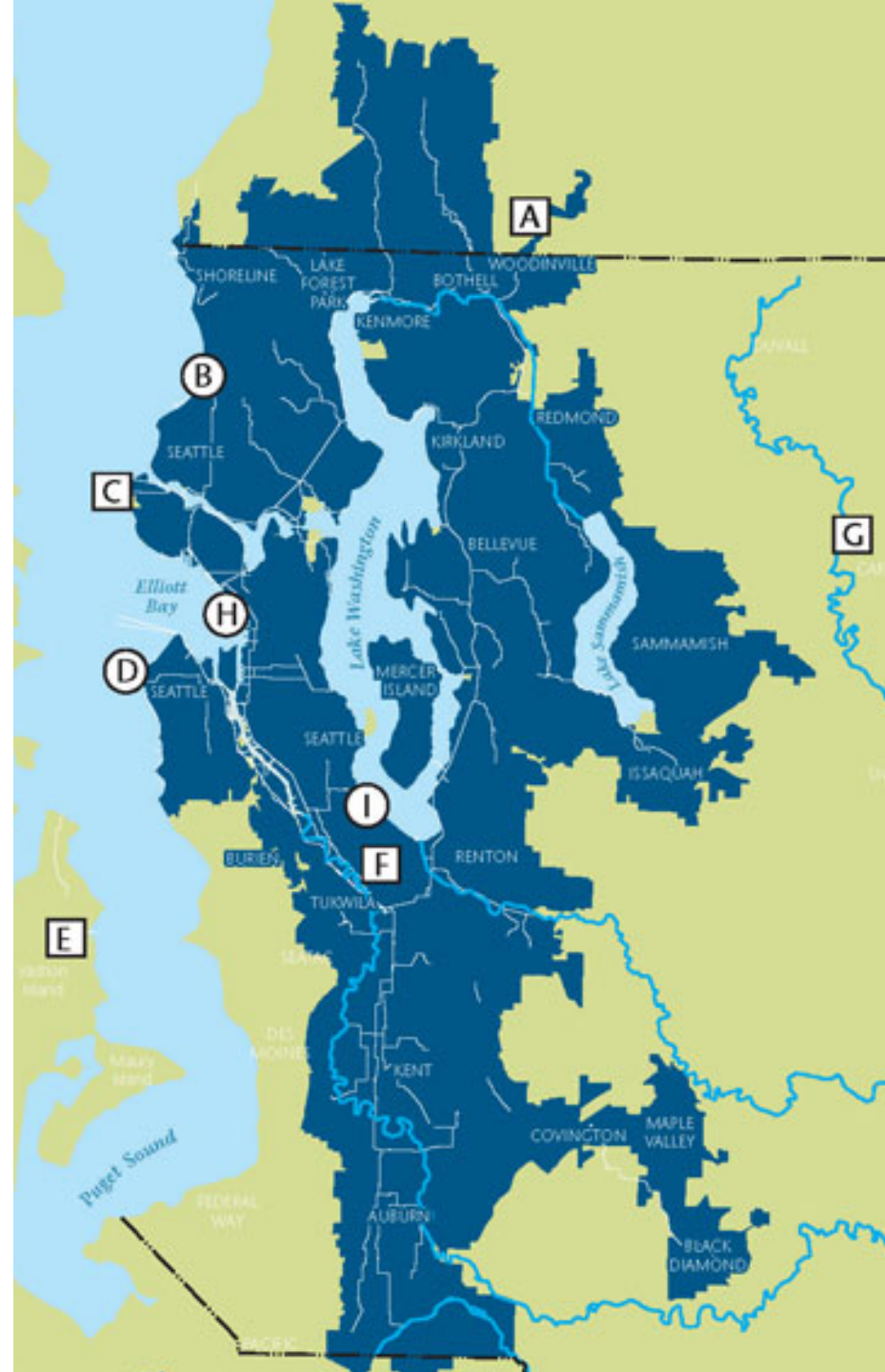


# **Stormwater design modeling will assess impacts of climate change on facility sizes and designs**

- Western Washington Hydrology Model
- Design multiple hypothetical facilities
- Compare facility designs for historic vs climate-impacted rainfall data
- Assess how to incorporate into design requirements by 2018

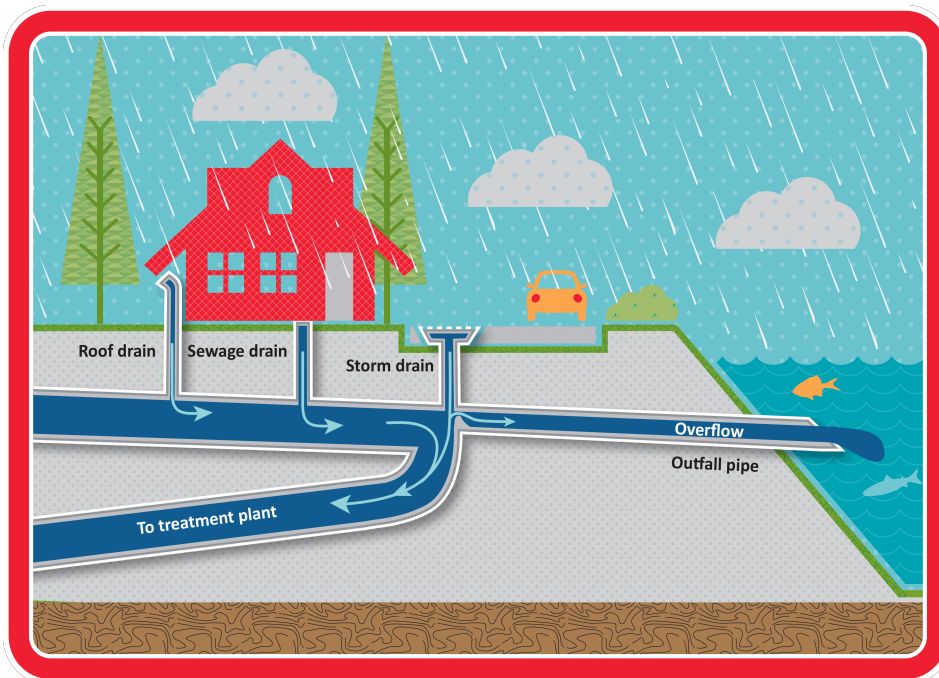
# **WASTEWATER CONVEYANCE AND TREATMENT**

**King County  
provides  
wastewater  
conveyance  
and treatment  
for the greater  
Seattle metro  
area**





# There are over 100 locations in Seattle where combined sewers can overflow during large storms



# **Wastewater conveyance system modeling will assess impacts of climate change**

- Compare system flows in combined sewer area for historic vs climate-impacted rainfall data
- Review exceedance frequency of different peak flows at different future time periods
- Incorporate into system planning in 2018

**STREAMS**

# King County works to protect streams

- Salmon recovery
- Temperatures and other water quality issues
- Stormwater requirements
- Critical Areas Ordinance requirements for buffers
- Building codes for flood elevation



# **Stream watershed hydrology and water quality modeling in Bear Creek will assess climate impacts**

- Watershed-scale stormwater management plan
- About 25 square mile watershed flows into Sammamish River
- Model impacts on hydrology and water quality using HSPF
- Implications on stormwater and habitat management will be assessed
- Results in 2018



**RIVERS**

# **King County has several major rivers that flood**

- Snohomish Basin
  - S Fork Skykomish, Snoqualmie, Tolt, Raging
- Cedar/Sammamish
- Green/Duwamish
- White
- 12 federally declared disasters since 1990

# **Wide range of land use and flood risks**

- Agriculture
- Rural residential
- Urban residential
- Commercial
- Industrial
- With and without levees

# **Over 6,000 structures are in the 100-year floodplain in King County**





# **More research needed before code requirements changed**

- Study Tolt, Cedar, Sammamish, and White rivers
- Model impacts on flood elevations and extent
- Base elevation requirements for new and substantial remodel construction
  - 3 ft above 100-year flood elevation
- Capital facility designs

# Can we get an ensemble of output?

- Only modeling two scenarios
- Prefer using ensemble of multiple scenarios and models
- Need to figure out how to use 10 more scenarios that will be available in 2019

# Planning considerations

- Life of facility vs timing of change
- Criticality of infrastructure
- Cost of addressing now vs later
- Confidence in projections
- Legal risk of not addressing
- Data are not perfect but best available
- Community support

# Questions?

Jim Simmonds

Water Quality and Quantity Unit Supervisor

[Jim.Simmonds@KingCounty.gov](mailto:Jim.Simmonds@KingCounty.gov)

206-477-4825

