working for clean rivers

# Climate Resiliency for BES

**Nishant Parulekar**

City of Portland Environmental Services

December 10, 2024

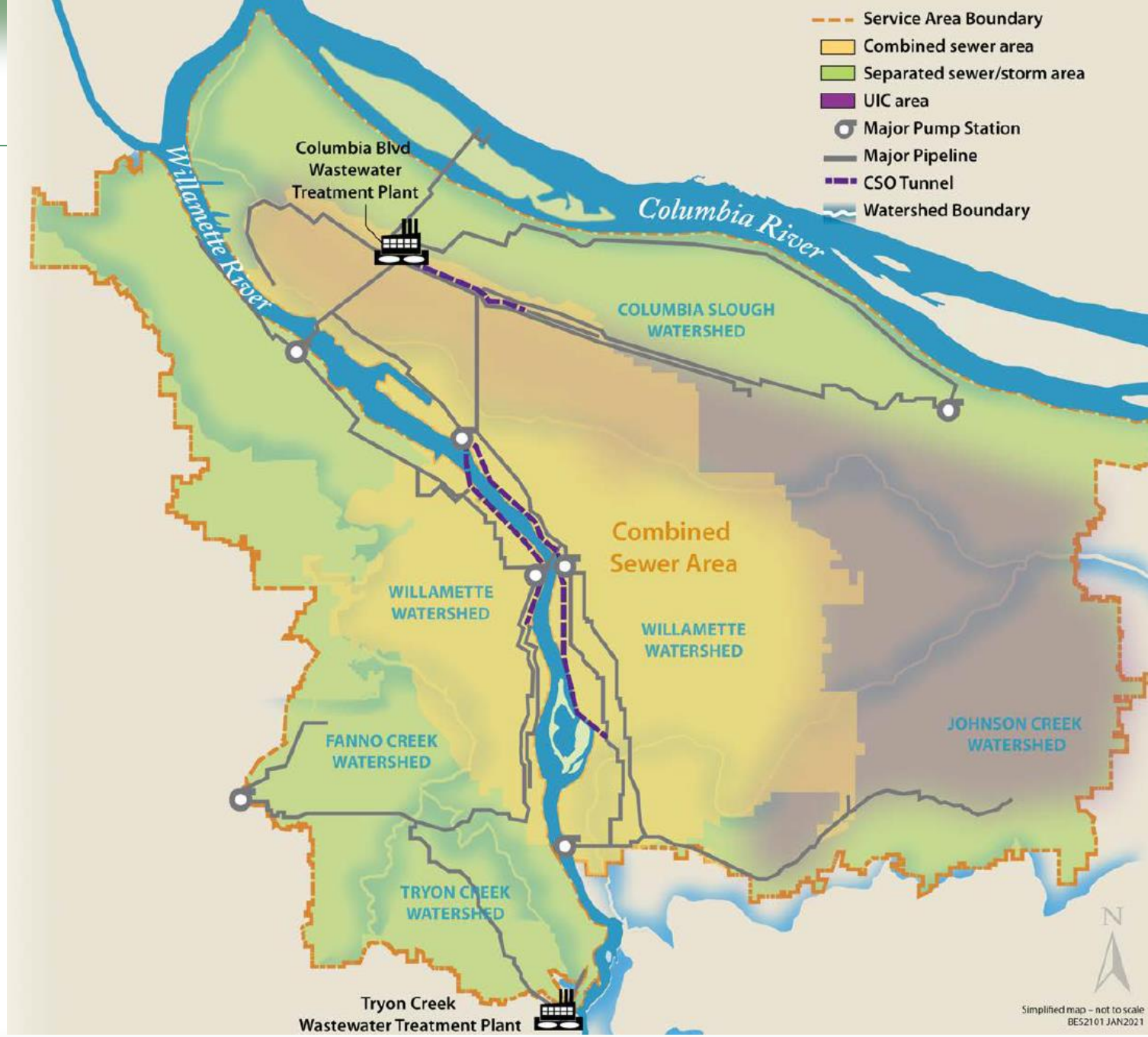
ENVIRONMENTAL SERVICES
CITY OF PORTLAND

working for clean rivers

Dawn Uchiyama, Director

# Portland's Sewer & Stormwater Systems

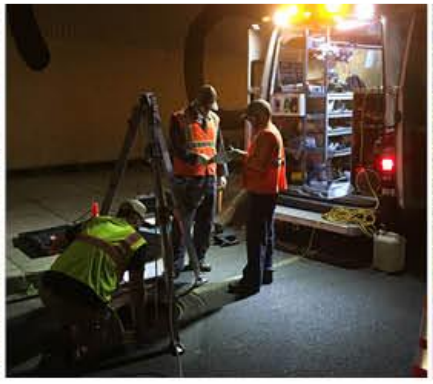
BES uses grey infrastructure and green infrastructure to manage the city's sewer and stormwater needs to protect public health, water quality, and the environment.



# BES manages many assets that will be or are already being impacted by climate change, including:

- 2,500+ miles of pipe
- 2 treatment plants
- 3 “Big Pipes”
- Nearly 100 pump stations
- Almost 50,000 maintenance holes

- 2,400 bioswales
- 9,000 underground injection control structures
- 50,000+ storm drains
- About 2,400 acres of wetland (public and private)



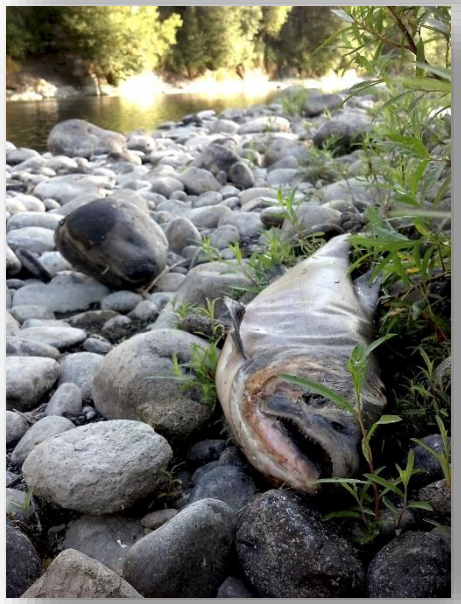
# Our work is highly regulated

- Clean Water Act
- Safe Drinking Water Act
- Endangered Species Act
- National Pollutant Discharge Elimination System Permits (NPDES)
- NPDES Municipal Separate Storm Sewer System Discharge Permit (MS4 Permit)
- Superfund – Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980 and amendments
- Underground Injection Control System Permit
- And many more

# BES Climate Risk Concerns

- Rainfall changes
- Flooding risks
- Other impacts
  - Vegetation impacts
  - Urban heat
  - Landslides and erosion
  - Water quality and discharge standards

Source: Arco Plumbing

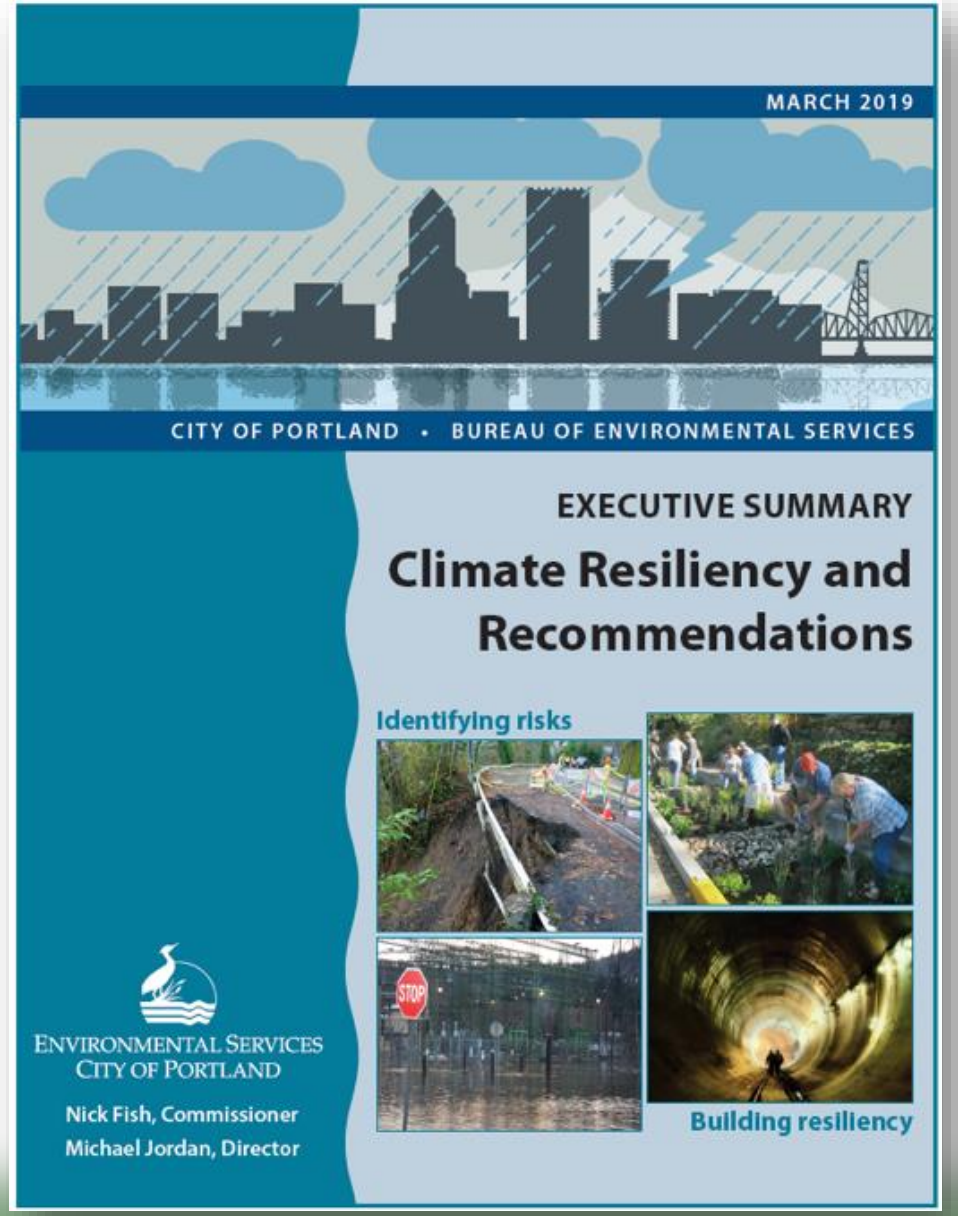


Top Left: https://www.oregonlive.com/history/2016/02/oregon_flood_of_1996_20_years.html
Bottom Left: http://www.tulalipnews.com/wp/tag/drought/

# 100-Year Floodplain at Holiday Inn

# BES Resiliency Plan (RMP) – Climate & Seismic

- Impacts of climate risks to our services
- Mitigation and adaptation opportunities
- Pilot studies for decision-making under future uncertainty
- Short-term and long-term actions



# How We Think About Climate Change

- As a risk multiplier
- Risk to be managed, not eliminated
- Concerned with extreme, cascading, and back-to-back events
- View climate resilience with an equity lens
- Hope to invest where other risks can also be addressed

Aerial view of 1948 Vanport Flood
Oregon Historical Society OrgLot131_010

# Integrated Planning and Climate Adaptation

- What are the climate risks in the area?
- What are the critical assets?
- Where are the critical community facilities?
- What other critical infrastructure is in the area?
  - Interdependency analysis
  - Cascading failure concerns
- What should be prioritized?
- General recommendations for adaptation, mitigation, and data gathering

Source: Arco Plumbing

# Adaptation Strategies

- Green infrastructure
- Wet and dry floodproofing
- Capacity projects
- Buyouts and floodplain restoration
- Resilient materials
- Higher performance standards
- Operational response plans
- Monitoring / adaptive management
- More

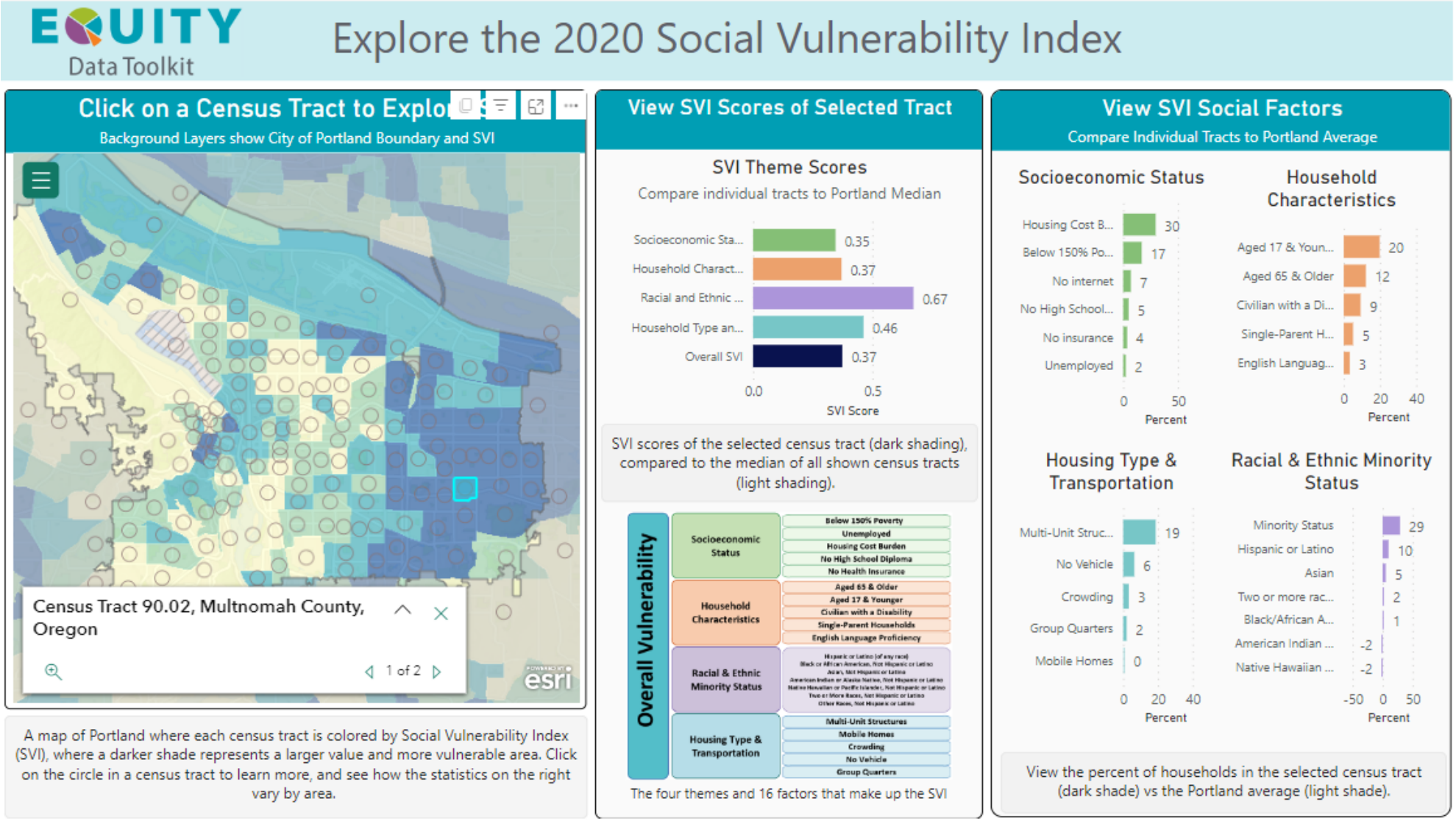
Foster Floodplain Natural Area
Photo by Naim Hasan Photography for City of Portland Bureau of Environmental Services

# Compounding “New” and “Old” Risks

- Culvert in Gresham was reported as “collapsed under the weight of Monday’s downpour”
- Pre-failure structural condition of culvert was not noted
- Climate events can be a tipping point for infrastructure in poor condition

Source: Pamplin Media 12/8/15 (Gresham blown culvert)

# Equity Lens


EQUITY Data Toolkit
Explore the 2020 Social Vulnerability Index
Click on a Census Tract to Explo
Background Layers show City of Portland Boundary and SVI
Census Tract 90.02, Multnomah County, Oregon
1 of 2
esri
A map of Portland where each census tract is colored by Social Vulnerability Index (SVI), where a darker shade represents a larger value and more vulnerable area. Click on the circle in a census tract to learn more, and see how the statistics on the right vary by area.
View SVI Scores of Selected Tract
SVI Theme Scores
Compare individual tracts to Portland Median
Socioeconomic Sta... 0.35
Household Charact... 0.37
Racial and Ethnic ... 0.67
Household Type an... 0.46
Overall SVI 0.37
0.0
0.5
SVI Score
SVI scores of the selected census tract (dark shading), compared to the median of all shown census tracts (light shading).
Overall Vulnerability
Socioeconomic Status
Below 150% Poverty
Unemployed
Housing Cost Burden
No High School Diploma
No Health Insurance
Household Characteristics
Aged 65 & Older
Aged 17 & Younger
Civilian with a Disability
Single-Parent Households
English Language Proficiency
Racial & Ethnic Minority Status
Housing Type & Transportation
Multi-Unit Structures
Mobile Homes
Crowding
No Vehicle
Group Quarters
The four themes and 16 factors that make up the SVI
View SVI Social Factors
Compare Individual Tracts to Portland Average
Socioeconomic Status
Housing Cost B... 30
Below 150% Po... 17
No internet 7
No High School... 5
No insurance 4
Unemployed 2
0
50
Percent
Household Characteristics
Aged 17 & Youn... 20
Aged 65 & Older 12
Civilian with a Di... 9
Single-Parent H... 5
English Languag... 3
0
20
40
Percent
Housing Type & Transportation
Multi-Unit Struc... 19
No Vehicle 6
Crowding 3
Group Quarters 2
Mobile Homes 0
0
20
40
Percent
Racial & Ethnic Minority Status
Minority Status 29
Hispanic or Latino 10
Asian 5
Two or more rac... 2
Black/African A... 1
American Indian ... -2
Native Hawaiian ... -2
-50
0
50
Percent
View the percent of households in the selected census tract (dark shade) vs the Portland average (light shade).

# Continue Research and Collaboration

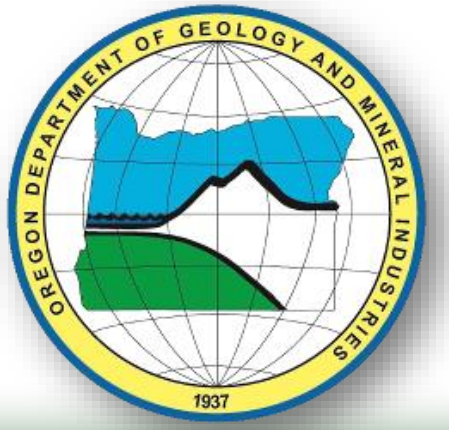
Institute for Sustainable Solutions
PORTLAND STATE UNIVERSITY

NOAA

Water Utility Climate Alliance

CLiP
CASCADIA LIFELINES PROGRAM

the green infrastructure leadership exchange



THE
Water
Research
FOUNDATION

working for clean rivers

ENVIRONMENTAL SERVICES
CITY OF PORTLAND
working for clean rivers

# Thank You!

Nishant.Parulekar@PortlandOregon.Gov