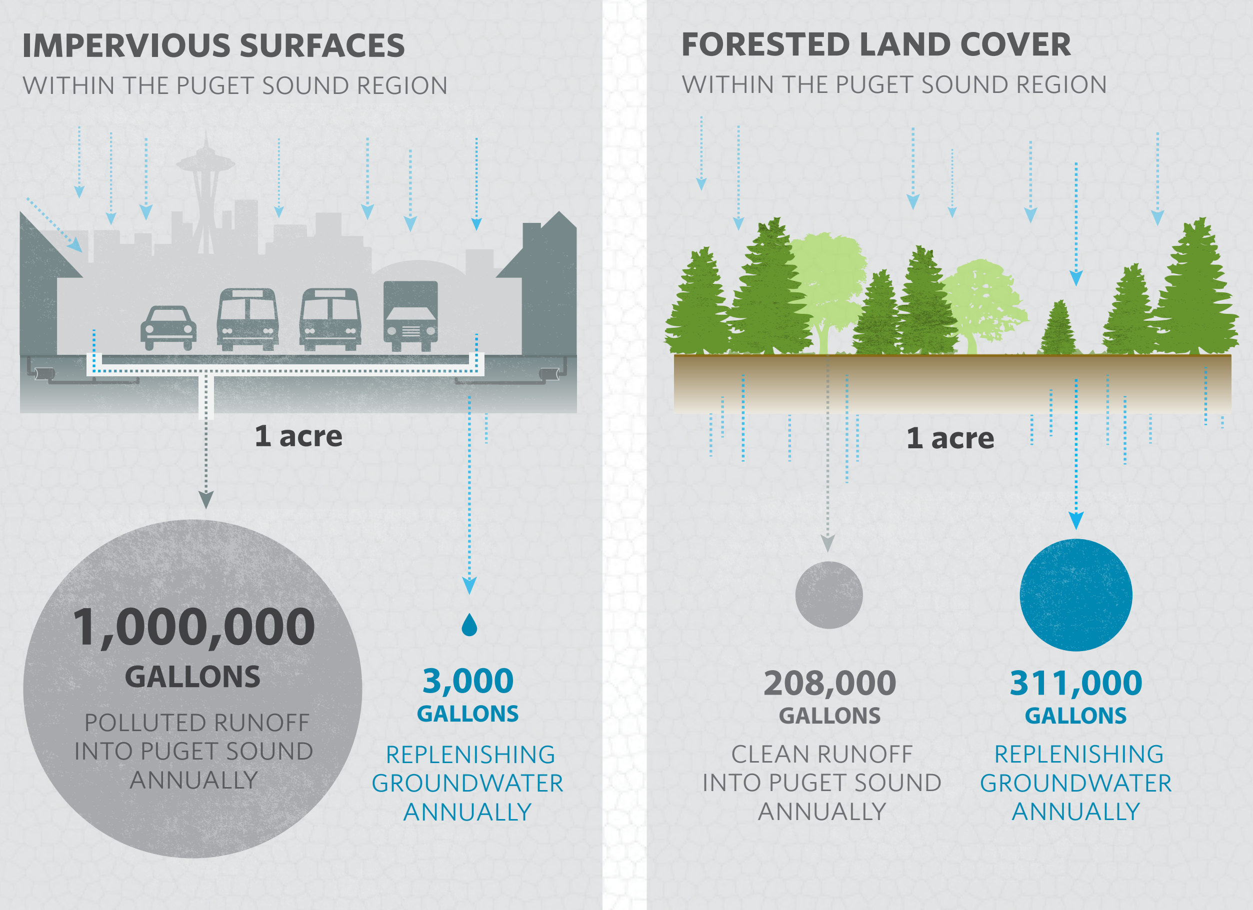
SOLVING STORMWATER:

ACCELERATING SOLUTIONS TO PUGET SOUND'S #1 POLLUTION PROBLEM

WHAT IS THE ISSUE?

As stormwater hits the ground and washes over impervious surfaces in urban areas, it picks up pollution and rushes to creeks, lakes, and Puget Sound. In a natural setting, clean stormwater soaks into the ground and helps replenish vital groundwater. Stormwater pollution is considered the biggest water pollution problem in the urban areas of Washington State.



IMPERVIOUS SURFACES
WITHIN THE PUGET SOUND REGION

1,000,000 GALLONS POLLUTED RUNOFF INTO PUGET SOUND ANNUALLY

3,000 GALLONS REPLENISHING GROUNDWATER ANNUALLY

FORESTED LAND COVER
WITHIN THE PUGET SOUND REGION

208,000 GALLONS CLEAN RUNOFF INTO PUGET SOUND ANNUALLY

311,000 GALLONS REPLENISHING GROUNDWATER ANNUALLY

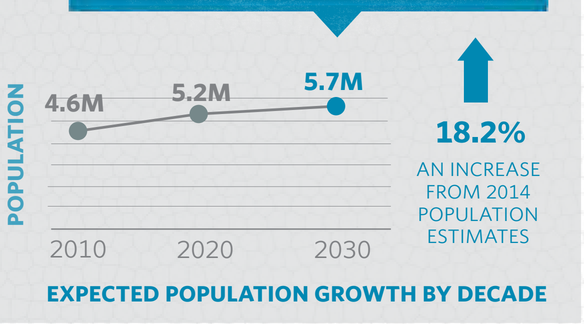
Data Sources: Puget Sound Fact Book - Parametrix (2010) Puget Sound Stormwater Retrofit Cost Estimate Appendix A, USGS Summary of Land Cover Trends Puget Lowland Ecoregion, WSDOT Hydraulics Manual - Runoff Coefficients for the Rational Method 10-year Frequency. All stormwater runoff volumes shown are estimates.

WHAT ARE THE IMPACTS TO OUR REGION?

Stormwater is affecting our environment, economy and human health.

POPULATION GROWTH

The Puget Sound region is **one of the most rapidly urbanizing** in the nation and is estimated to reach over **5.7 million** by 2030.

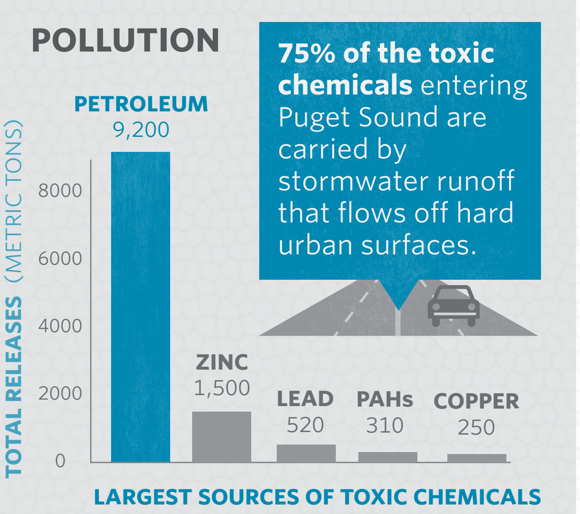


EXPECTED POPULATION GROWTH BY DECADE

IMPERVIOUS SURFACES

As population grows, natural land covers are converted to impervious surfaces such as roofs, roads, and sidewalks.

POLLUTION



75% of the toxic chemicals entering Puget Sound are carried by stormwater runoff that flows off hard urban surfaces.

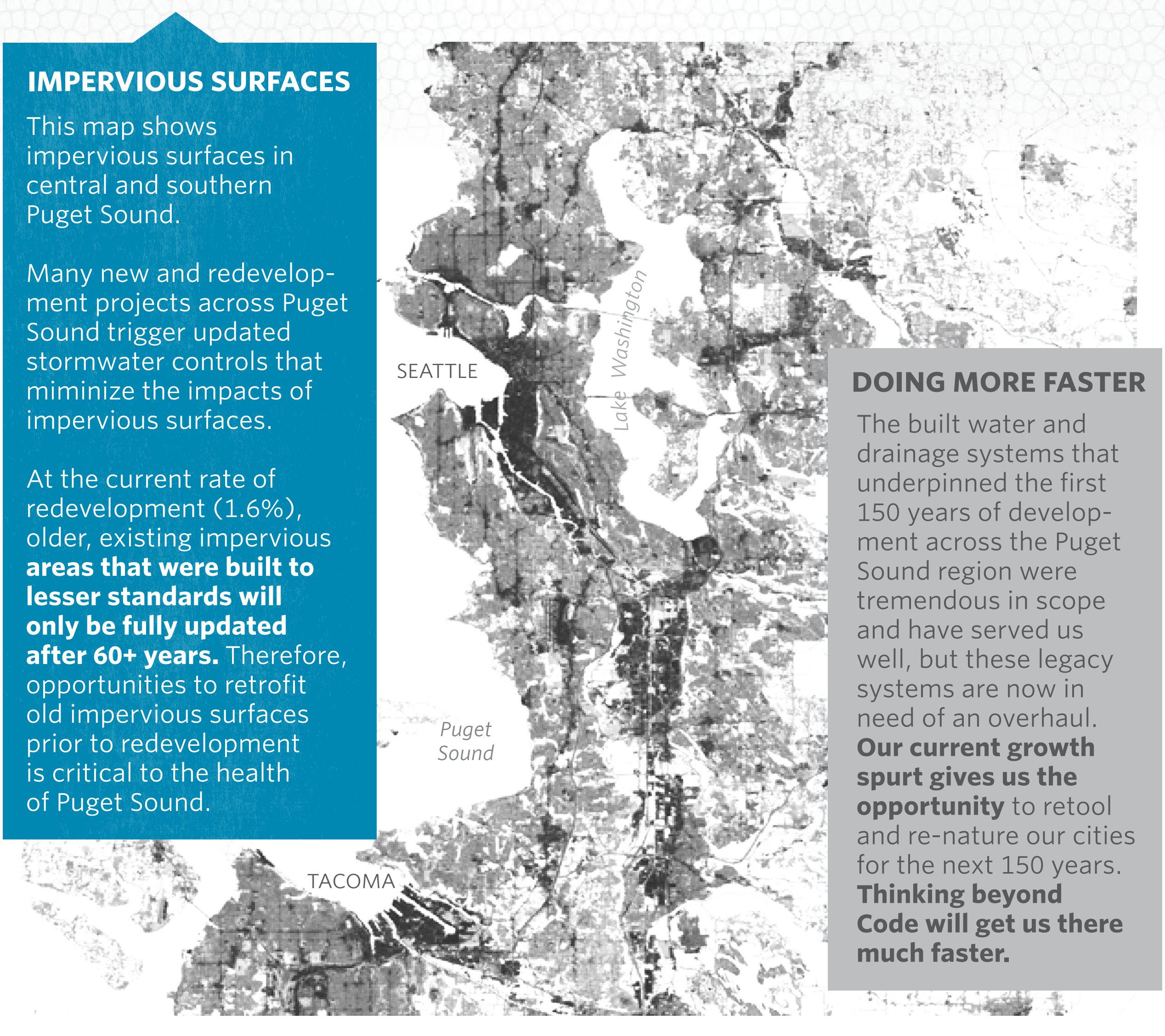
LARGEST SOURCES OF TOXIC CHEMICALS IN PUGET SOUND ANNUALLY

TOXIC CHEMICALS	MAJOR SOURCES
PETROLEUM	OIL & GAS LEAKS FROM VEHICLES
ZINC	ROOF MATERIAL LEACHING, VEHICLE TIRE ABRASION
LEAD	ROOF MATERIAL LEACHING
TOTAL PAHs *polycyclic aromatic hydrocarbons*	WOODSTOVE & FIREPLACE COMBUSTION, VEHICLE EXHAUST
COPPER	PESTICIDES, COPPER FROM BRAKE PADS

Data Sources: Office of Financial Management 2007 Population Projections, WA DOE- Control of Toxic Chemicals in Puget Sound Phase 3 Primary Sources of Selected Toxic Chemicals and Quantities Released in the Puget Sound Basin

WHAT IS THE SCOPE OF THE PROBLEM?

The large footprint of impervious surfaces in Puget Sound was developed prior to stormwater quality controls created by the Clean Water Act.



IMPERVIOUS SURFACES

This map shows impervious surfaces in central and southern Puget Sound.

Many new and redevelopment projects across Puget Sound trigger updated stormwater controls that miminize the impacts of impervious surfaces.

At the current rate of redevelopment (1.6%), older, existing impervious **areas that were built to lesser standards will only be fully updated after 60+ years.** Therefore, opportunities to retrofit old impervious surfaces prior to redevelopment is critical to the health of Puget Sound.

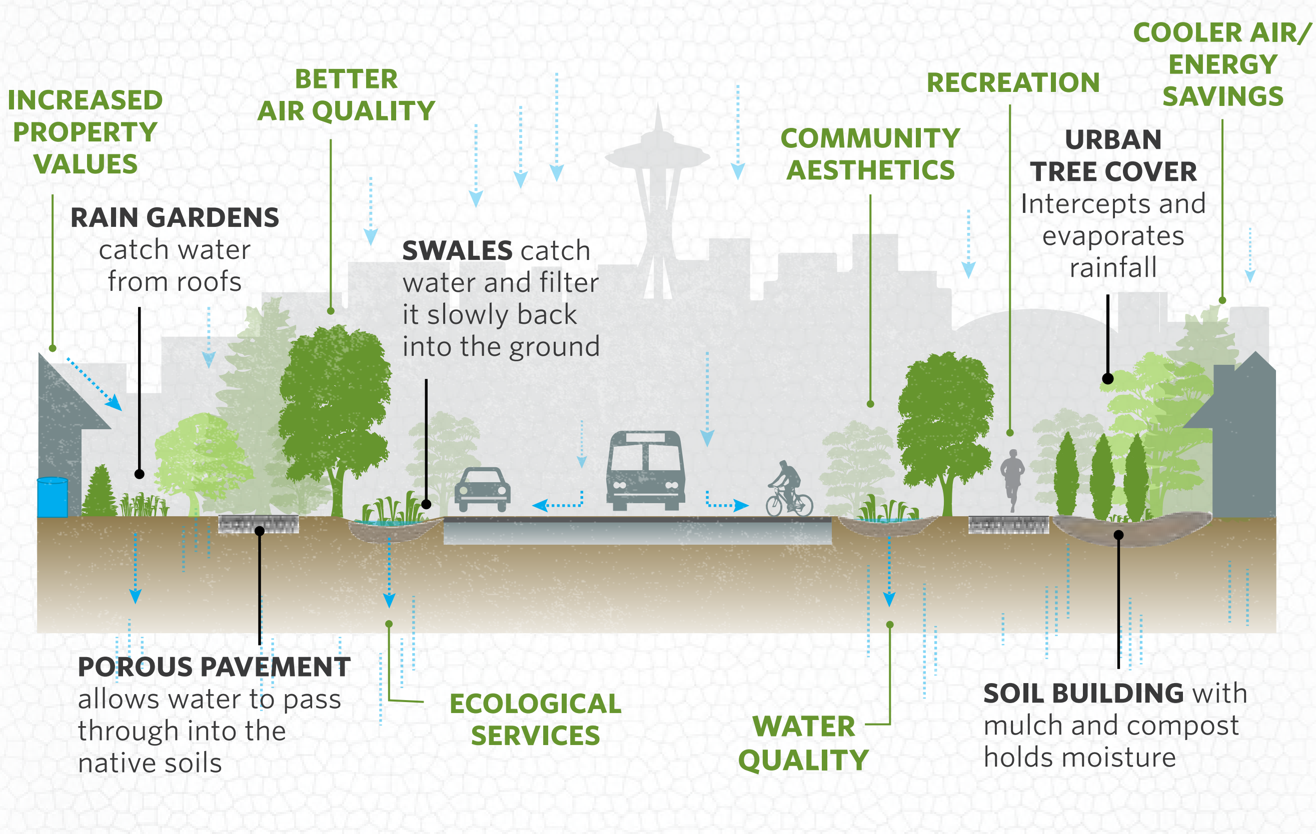
DOING MORE FASTER

The built water and drainage systems that underpinned the first 150 years of development across the Puget Sound region were tremendous in scope and have served us well, but these legacy systems are now in need of an overhaul. **Our current growth spurt gives us the opportunity** to retool and re-nature our cities for the next 150 years. **Thinking beyond Code will get us there much faster.**

Data Source: 2006 NOAA impervious surface data

HOW ARE WE RETHINKING THE PROBLEM?

Re-envisioning and re-designing cities to function more like forests so water is absorbed back into the ground, in addition to treating stormwater through traditional means, will solve our region-wide stormwater problem.



RAIN GARDENS catch water from roofs

SWALES catch water and filter it slowly back into the ground

URBAN TREE COVER Intercepts and evaporates rainfall

POROUS PAVEMENT allows water to pass through into the native soils

SOIL BUILDING with mulch and compost holds moisture

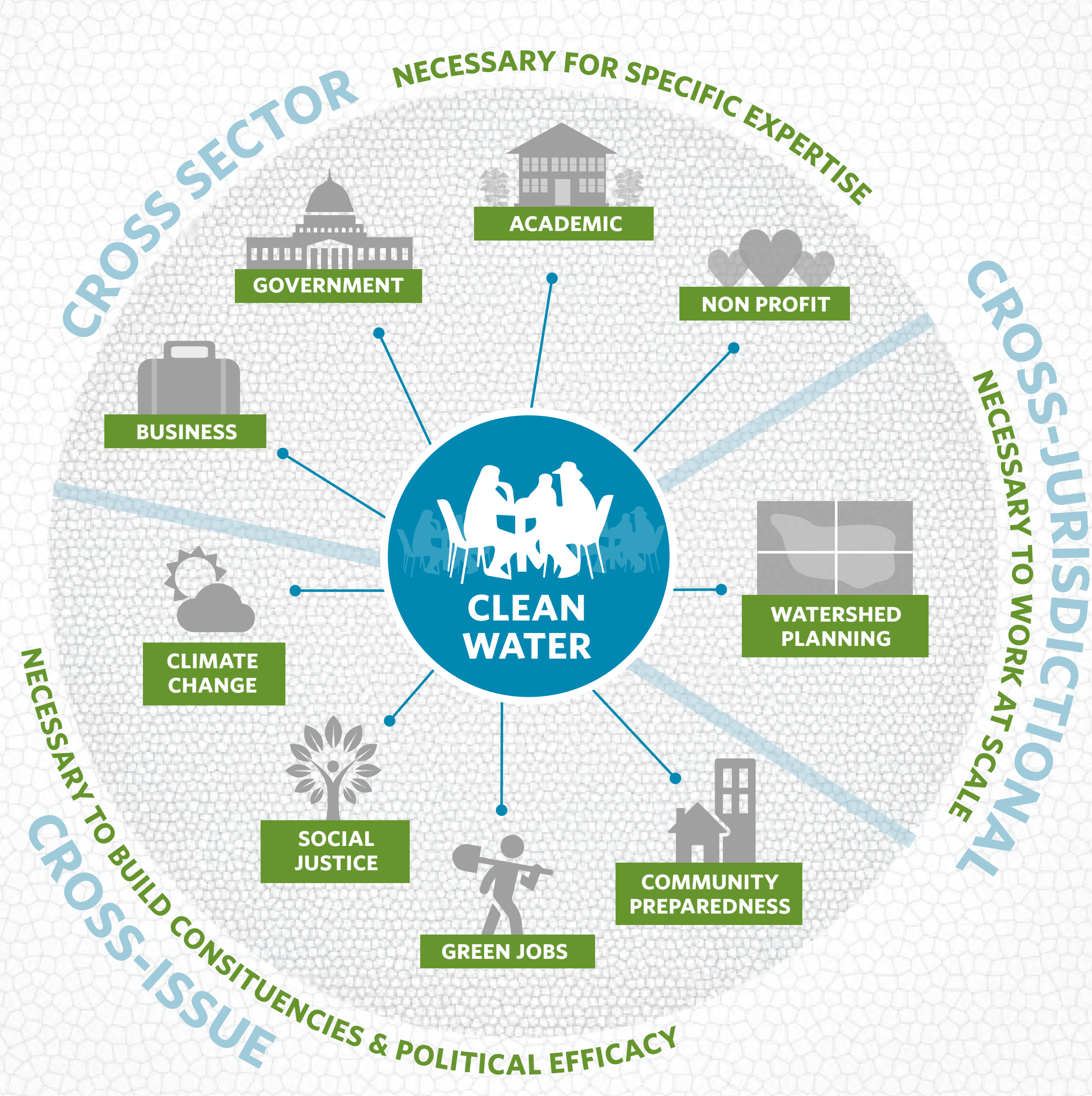
GREEN & GRAY STORMWATER INFRASTRUCTURE

A study by the city of Philadelphia has shown a hybrid approach of green and gray infrastructure can get the same freshwater solutions as gray infrastructure, plus additional benefits to the community.

Data Source: City of Philadelphia Water Department

WHO CAN HELP?

To build a robust coalition for collaboration, all are needed at the table.

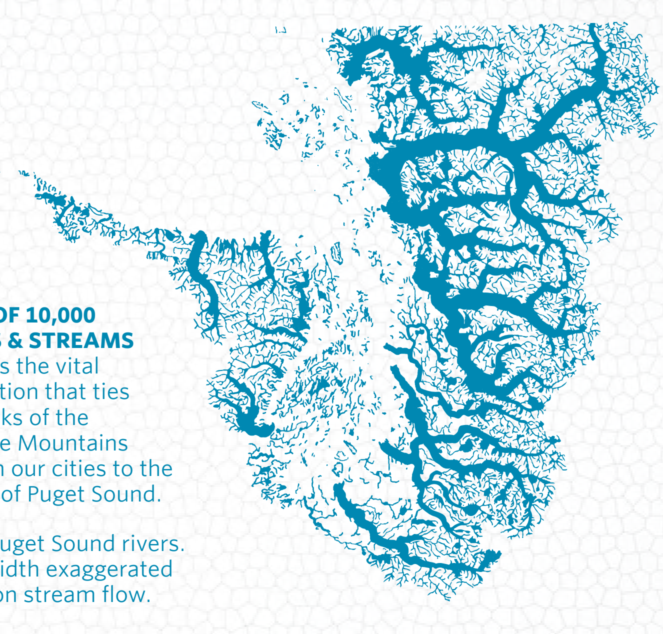


HOW WILL WE MEASURE PROGRESS?

Progress toward green infrastructure goals have been selected based on vital signs related to Puget Sound recovery by the Puget Sound Partnership.

FRESHWATER WATER QUALITY

Metrics will be tracked on the region's success in improving freshwater quality. Clean freshwater is vital to people and to fish and wildlife populations. When rivers and streams pick up pollutants, toxic contaminants, or excessive sediments and nutrients, the health of watersheds, marine waters, swimming beaches, and shellfish beds is adversely affected.



LAND OF 10,000 RIVERS & STREAMS
Water is the vital connection that ties the peaks of the Cascade Mountains through our cities to the depths of Puget Sound.

MAP: Puget Sound rivers. River width exaggerated based on stream flow.

LAND DEVELOPMENT & COVER

Indicators will provide a check on the region's success in maintaining forest cover throughout the Puget Sound region as well as tracking the fate of ecologically important lands under development pressure.

Data Sources: Puget Sound Partnership Vital Signs, National Hydrography (NHD) Stream Data

CALL TO ACTION

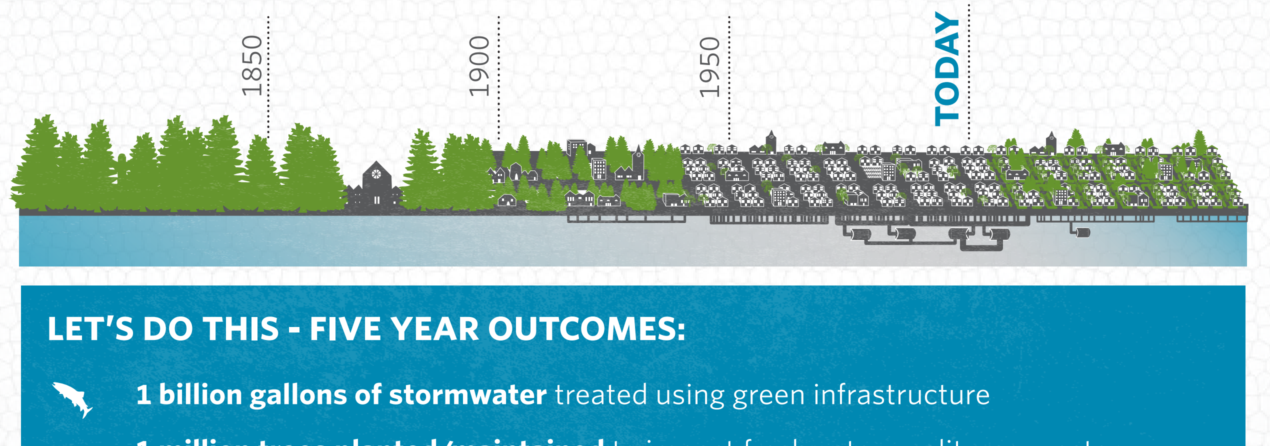
Our region is in the midst of a giant growth spurt. There is a huge opportunity to re-envision and re-design our urban areas to work better for people and the planet.

PUGET SOUND v1.0

The historical scale of investment, the built water systems and drainage systems, that went in to the shaping of Puget Sound was enormous. Our historical investments are well overdue for an overhaul. It's time to think at that scale, again.

PUGET SOUND v2.0

Today we are at an inflection point.
The re-naturing of cities is a promise to future generations for equitable prosperity, beauty, vitality and health.



LET'S DO THIS - FIVE YEAR OUTCOMES:

- **1 billion gallons of stormwater** treated using green infrastructure
- **1 million trees planted/maintained** to impact freshwater quality, sequester carbon and benefit underserved communities.
- **20,000 new raingardens** in private spaces
- Green spaces created and enhanced in ways that **better quality of life**
- Cross sector, issue, and jurisdictional leaders deploy **effective leadership** and focus investments in green stormwater infrastructure
- **Investment in sustainable stormwater** management increased by $200M annually, leveraged with private funding

The Nature Conservancy
washingtonnature.org/cities

Timeline: City of Seattle.
Infographic: TNC\Erica Simek Sloniker

March 2016

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