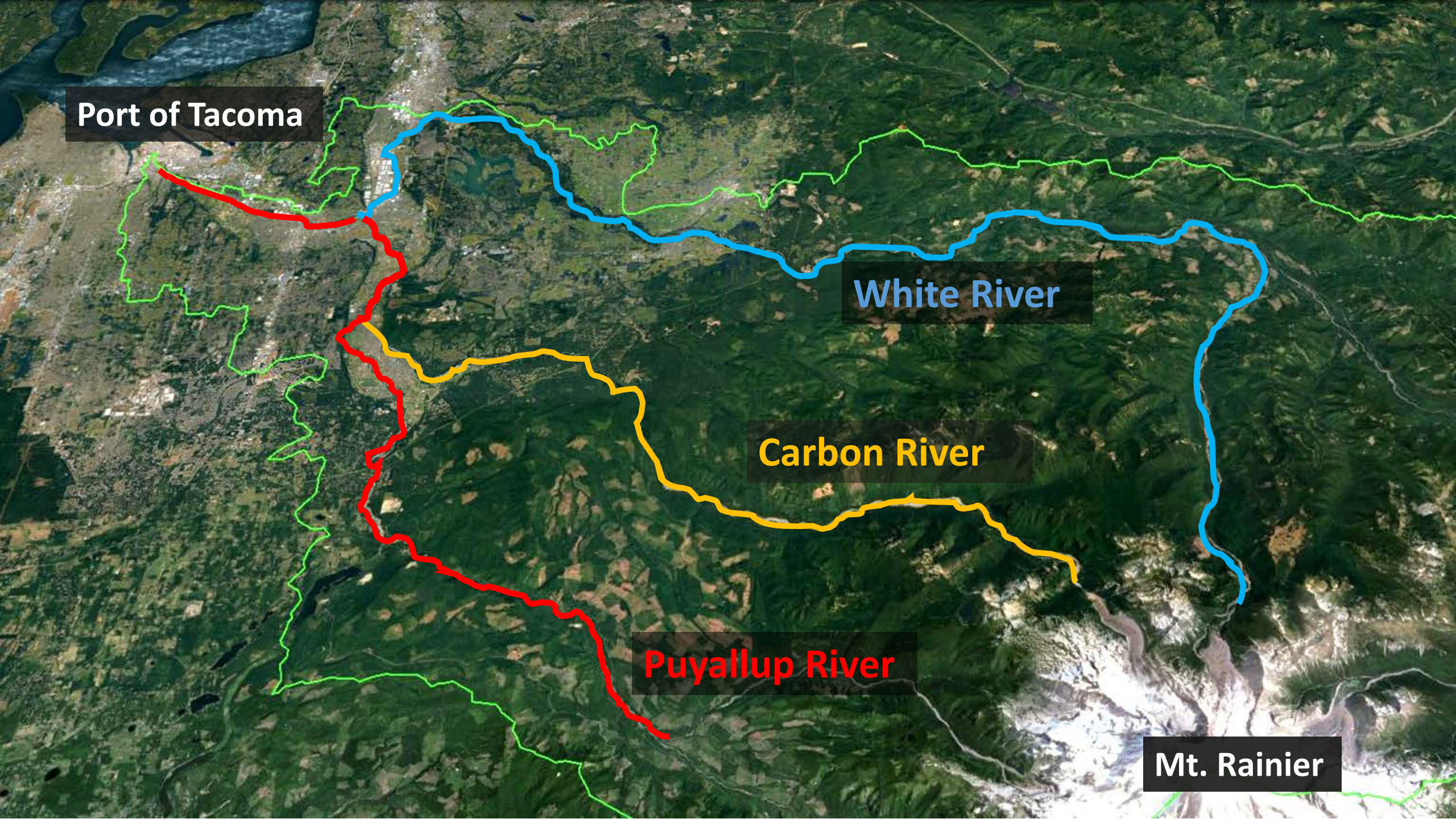

SUSTAINABILITY 2020
Pierce County is a beautiful place to live, work and play and it is all of our jobs to make sure that it stays that way for future generations.

Climate Change is Here Now

Q) What impact has climate change already had on Pierce County?
Q) What changes can we expect in the future?
Q) What does that mean for Pierce County Government?
Q) What is Pierce County already doing that is working?


Port of Tacoma
White River
Carbon River
Puyallup River
Mt. Rainier

Glaciers Changes to Date: From 1913 to 1994, Mt. Rainier glaciers decreased by approximately 25 percent. Preliminary data from Mount Rainier National Park indicates that the glacier has lost another 18 percent since 2003. In all years between 2003 and 2009, there has been a net melting of the Emmons and Nisqually Glaciers between 0.5 and 2.0 meters water equivalent.

Expected Future: Current trends indicate that Mt. Rainer's glaciers—and others contributing to summertime stream flows and sedimentation in Puget Sound watersheds—will continue to melt as temperatures warm.

Sedimentation Changes to Date: Historically, large volumes of sediment were removed from local rivers to increase channel capacity. However, this practice did not prevent flood losses in the valley and was ceased due to concerns about impacts to salmon habitat and natural river channel processes. From 1984 to 2009, the channel elevations of the Puyallup, White and Carbon Rivers rose by several feet in some locations.

Expected Future: For rivers originating on Mount Rainier, including the Puyallup, White, and Carbon Rivers, sediment loads are expected to increase, further contributing to flood risk, as declining snowpack and glacial recession expose more unconsolidated soils to rain, flood flows, and disturbance events.

Extreme Precipitation Changes to Date: Locally, an increase in extreme precipitation has been observed in Tacoma since 2010. Since records started in the 1890`s in Seattle there have only been two years with at least 10 days with an inch or more of precipitation, 2015 with 14 days and now 2017 with 10 days.

Expected Future: Total annual precipitation in the Pacific Northwest is not projected to change substantially, but heavy rainfall may be more frequent and intense, and summer precipitation may decrease. More rain and less snow will fall in the winter.

Flooding Changes to Date: The stream gauge on the Puyallup River near Orting has been in operation since 1932. Eight of the top ten peak floods have been recorded since 2006. The timing of peak spring streamflow shifted earlier by 0-20 days in many snowmelt-influenced rivers in the Pacific Northwest between 1948 and 2002.

Expected Future: Flood risk is projected to increase during the fall and winter seasons as warmer temperatures cause more precipitation to fall as rain over a larger portion of the basin. Less snowmelt will cause the lowest flows to become lower in the summer months.

Landslides ***Expected Future:*** Landslides are expected to become more common in winter and spring due to projected increases in extreme precipitation events and increasing winter precipitation, particularly in areas most prone to present-day landslides. Changes in landslide frequency and sediment transport can affect water quality, aquatic and coastal habitat, flooding, and relative sea level rise.

East Pioneer Way in Puyallup

Sea Level Rise Changes to Date: Sea level has risen. The closest tide gauge is in Seattle. According to NOAA, sea level has risen 7.8 inches over the last century.

Expected Future: Additional sea level rise is expected of 4 inches (range of 1-6 inches) by 2030, 7 inches (range of 1-14 inches) by 2050 and 23 inches by 2100 (range of 6 to 55 inches), depending on future global trends in greenhouse gas emissions and glacial melt rates.

Extreme Heat and Wild Fire Changes to Date: Average annual temperatures for the Pacific Northwest have risen 1.3°F since 1895. Pierce County has experienced an increase in forest fires during the droughts of 2015 and 2017.

Expected Future: More extreme heat is likely, although the increase may be moderated by changes in weather patterns. There is strong agreement among climate models that extreme heat events will become more frequent while extreme cold events will become less frequent. Wildfires are expected to become more common as temperatures rise and less rain falls during summer months.

***Water Temperature* Changes to Date:** Stream temperatures in the Pacific Northwest are projected to increase 1°F over 1980 averages by 2020.

Expected Future: Stream temperatures in the Pacific Northwest are projected to increase by 3°F by 2080. Warmer water temperatures will result in more lake closures and could be lethal to salmonids and other aquatic species.

Ocean Acidity Changes to Date: Ocean pH has already dropped by about 30% as the oceans absorb increasing amounts of carbon dioxide.

Expected Future: Ocean acidity is projected to increase by between 38 and 109 percent by 2100 relative to 2005 levels[c]. Corrosive conditions are particularly of concern to the shellfish industry in Puget Sound, which depends on good water quality to grow oysters, clams, and mussels.

Short Term Findings

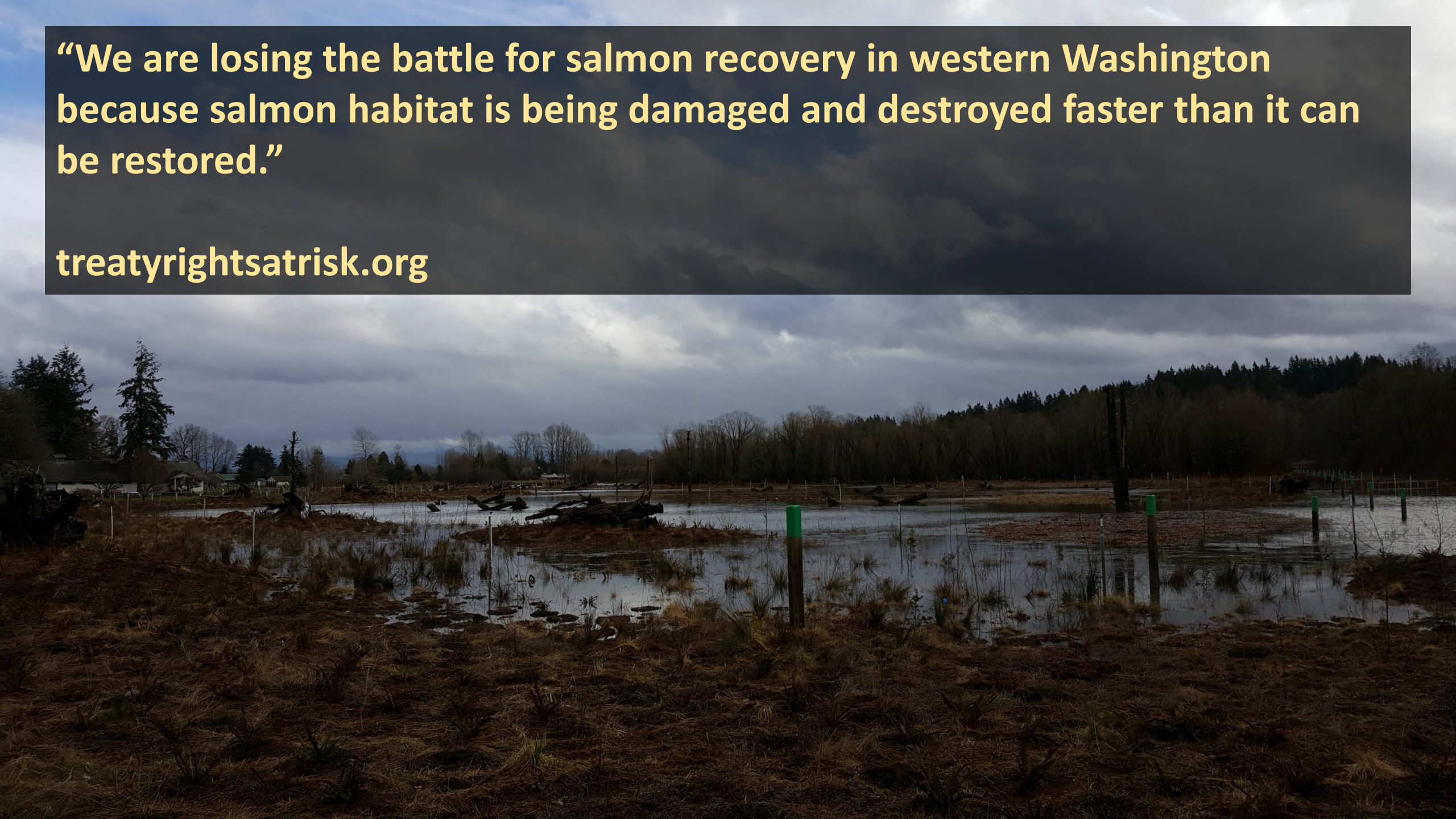
- Make sure new stormwater infrastructure and roads projects are built to handle larger storms with more precipitation. Rebuilding outdated infrastructure is incredibly expensive so we need to make sure we get these systems sized right the first time.
- Work with local tribes and other partners to increase tree canopy around streams and increase low impact development. Consider code changes to increase tree planting.
- Develop a plan for how Pierce County can help residents deal with increased heat with cooling centers, spray parks and other cooling mechanisms.
- Develop an extreme heat plan for County workers that work outside in the summer time.
- Develop a plan to limit wildfires at County owned properties.

Long Term Findings

- Funding for DEM, SWM, Roads, Parks and Facilities will need to be increased over time as they deal with a higher frequency of climate change related service interruptions.
- Develop a long-range plan for low lying roads and infrastructure (areas within 2 feet of current high tides).
- Reach out to our Fishing and Aquaculture interests to support their efforts to better understand Ocean Acidification and potential improvements we can make at the County level.
- Develop a map of residential areas that could be damaged by increased wildfires.
- Study the viability of an electric ferry, construct new ferry docks and boat ramps as sea level rises.

FLOODPLAINS FOR THE FUTURE

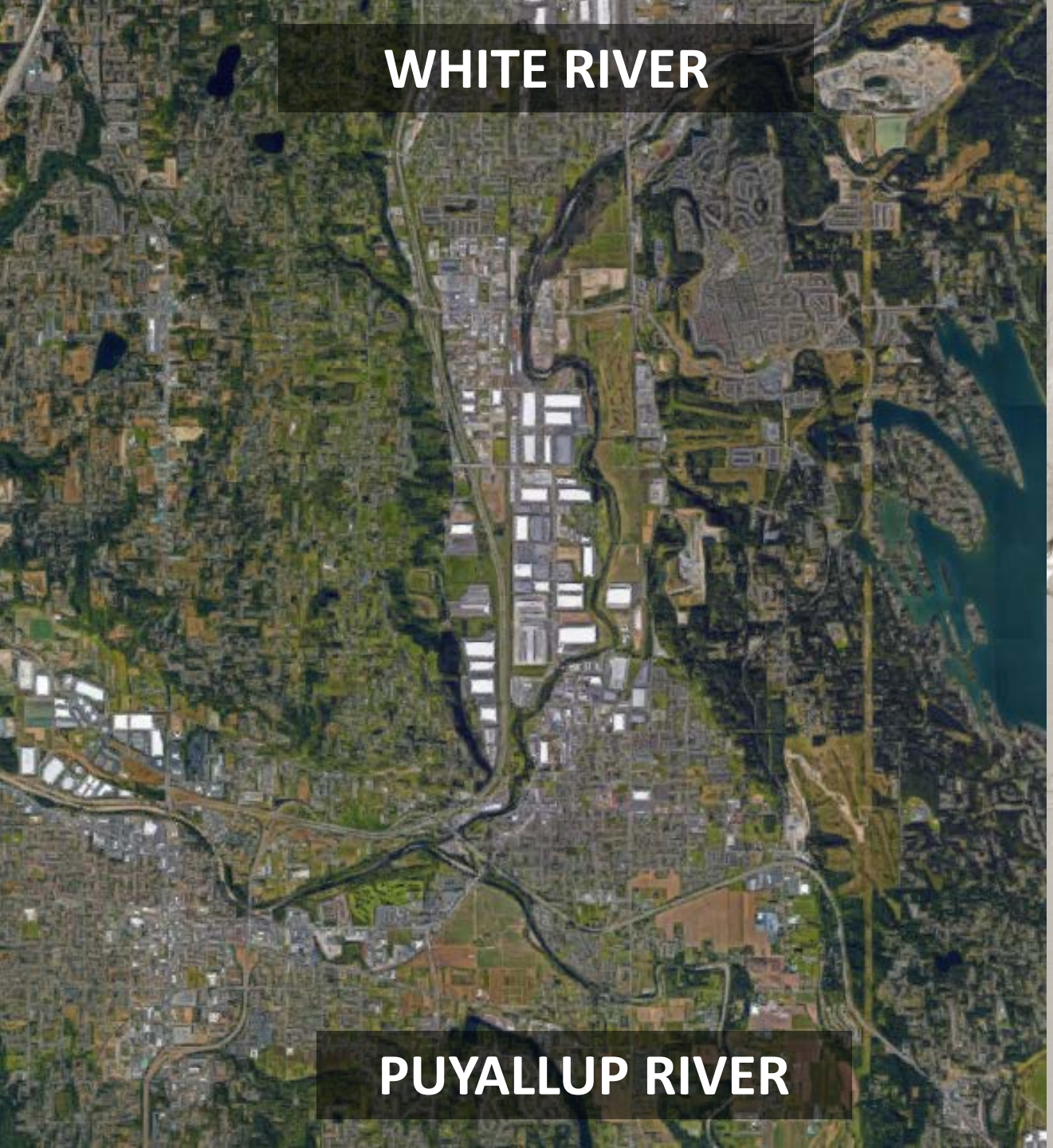
PUYALLUP, WHITE & CARBON RIVERS

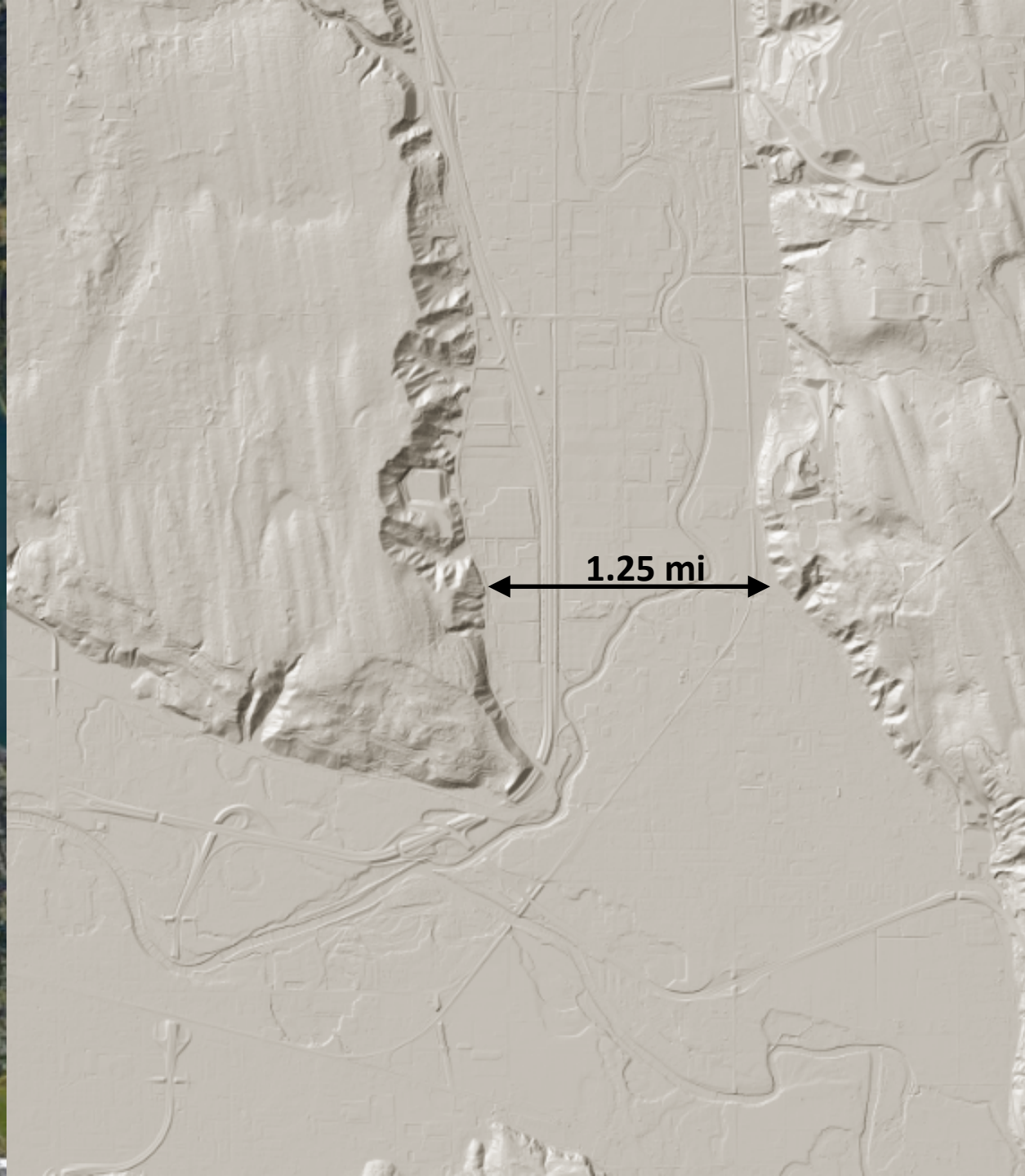

“We are losing the battle for salmon recovery in western Washington because salmon habitat is being damaged and destroyed faster than it can be restored.”
treatyrightsatrisk.org

Puyallup Watershed Floodplains:

- 9,000 homes and 21,000 individuals at risk of repetitive flooding in Puyallup Watershed
- Approximately 170 key facilities
- $2.7 billion of assessed value at risk


LOWER PUYALLUP
60% loss of Puget Sound farmland acreage since 1950


WHITE RIVER
PUYALLUP RIVER


1.25 mi

Projects:

- Some past projects:
  - South Fork Side Channel

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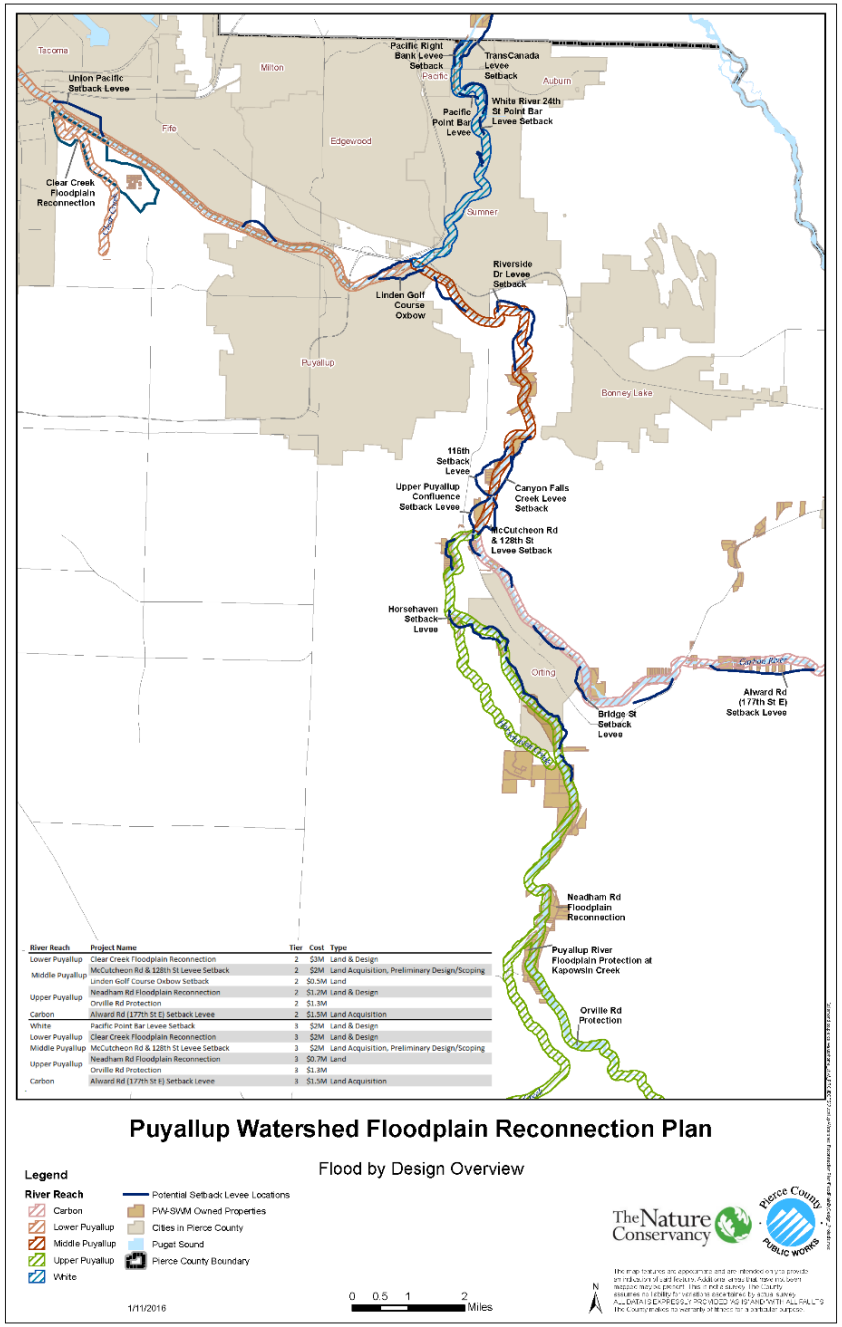
- Current and future Projects:
  - 17 floodplain reconnection projects (32 total identified in river plans)



FLOODPLAINS FOR THE FUTURE

PUYALLUP, WHITE & CARBON RIVERS

Floodplains by Design

• REDUCING RISK, RESTORING RIVERS •

Forterra

King-Pierce Farm Bureau

Muckleshoot Tribe

The Nature Conservancy

City of Orting

PCC Farmland Trust

Pierce County

Pierce County Agricultural Round Table

Pierce Conservation District

Port of Tacoma

Puget Sound Partnership

City of Puyallup

Puyallup Tribe

South Puget Sound Salmon Enhancement Group

City of Sumner

Washington State Department of Ecology

WRIA 10/12 Lead Entity

University of Washington Climate Impacts Group

University of Washington Wetland Ecosystem Team

FLOODPLAINS FOR THE FUTURE

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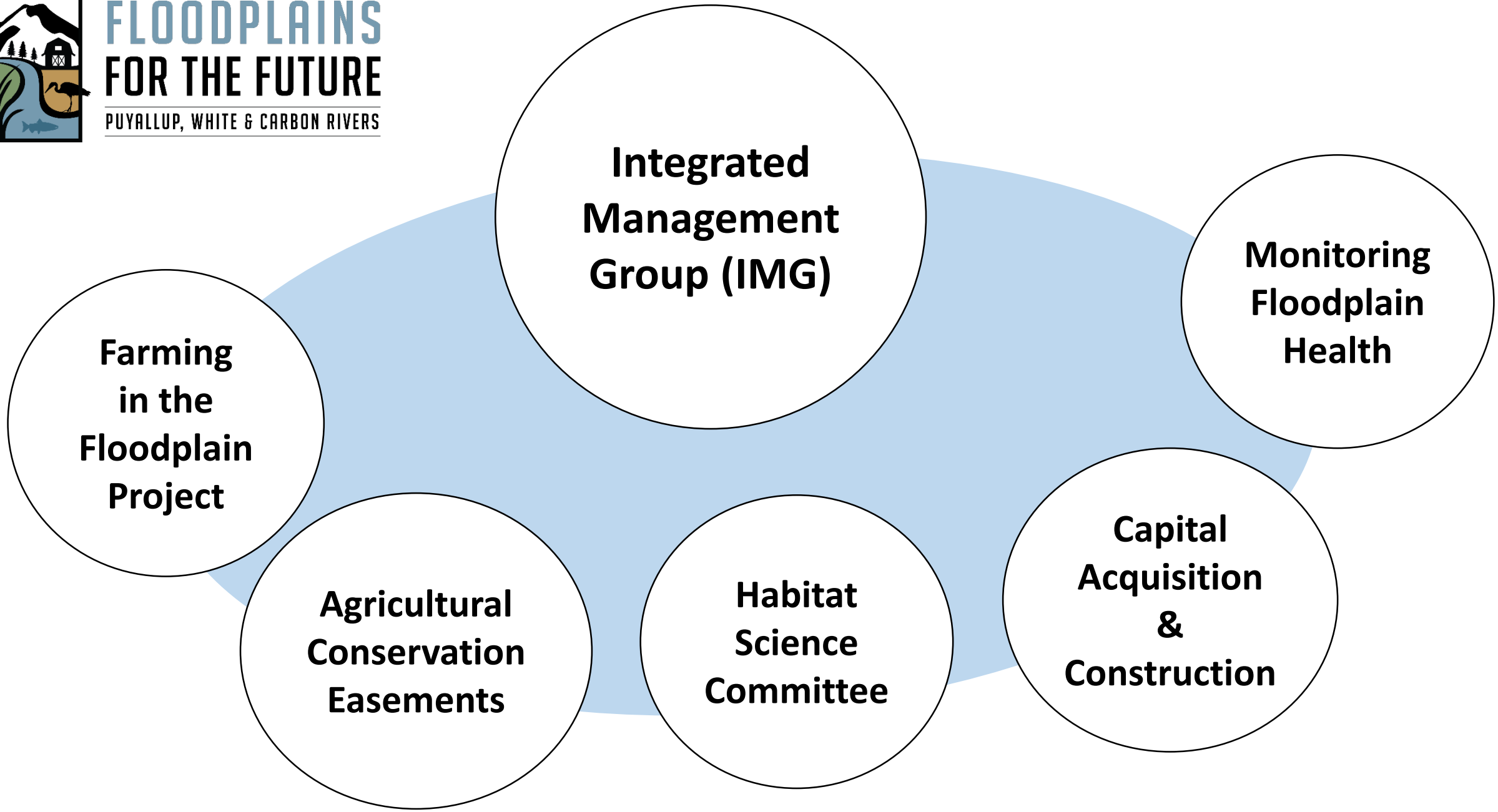
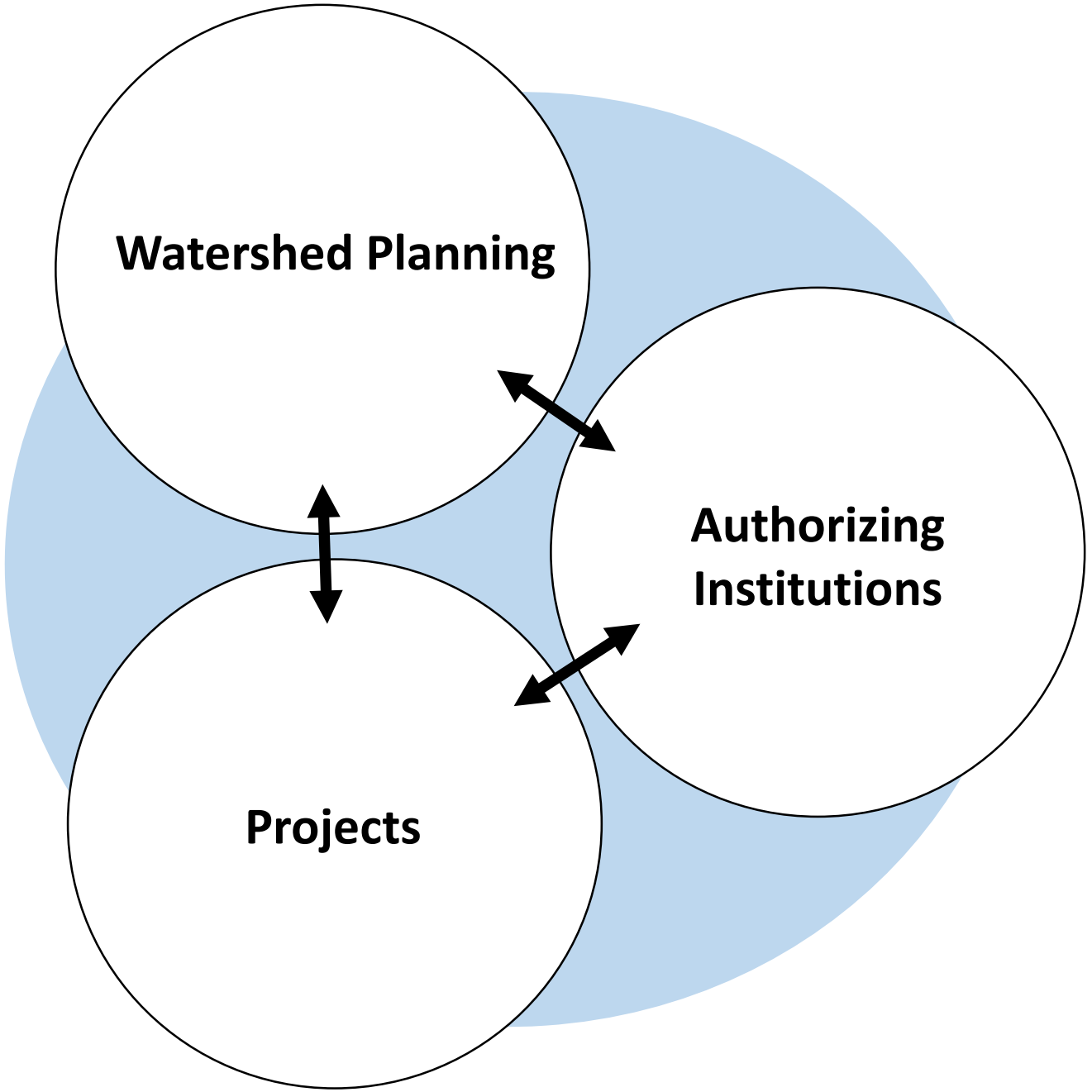


FLOODPLAINS FOR THE FUTURE
PUYALLUP, WHITE & CARBON RIVERS

- Build trust
- Align resources
- Define, fund, and implement a common vision driven by the scope and scale of the issues we face



FLOODPLAINS FOR THE FUTURE
PUYALLUP, WHITE & CARBON RIVERS

Our draft definition of Floodplain Health:

"The condition of multiple elements that when considered together contribute to a functioning floodplain, including the natural physical processes and biological factors that support salmon populations; the long-term viability of agricultural lands; and the reduction of the risk of flooding."

FLOODPLAINS FOR THE FUTURE
PUYALLUP, WHITE & CARBON RIVERS

What Have We Learned?

- This work takes a lot of time and commitment to start and get off the ground.
- People are doing great work already but they might not call it climate resilience or adaptation work.
- Climate Change in the NW is all about water.
- True collaboration can save us all money and time and provide better results.

FLOODPLAINS FOR THE FUTURE
PUYALLUP, WHITE & CARBON RIVERS

Major Takeaways

- True engagement is difficult but if you can stay together you usually come out stronger and with a better project.
- Climate Change forces us to plan and prepare for things that historically have not been problems.