memorandum

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to Isabel Ragland, Pierce Conservation District

from Ilon Logan and Christina Hersum

subject Puyallup River FbD Monitoring Plan: Watershed and Reach Descriptions

This memo is a summary of features, issues, and identified goals for the Puyallup Watershed and the five river reaches relevant to the Floodplains for the Future (FPFF) monitoring plan. The document brings together information gathered at the November 14, 2016 FPFF workshop and two previous documents: the Vision, Strategies and Actions for Puget Sound Major River Floodplains (Floodplains by Design, 2016) and the summary of the Puyallup Floodplains Reconnections Project Workshop (August 24 and 25, 2015).

Puyallup Watershed

Features and Issues

The Puyallup Basin, Water Resource Inventory Area 10, (Figure 1) drains an area of approximately 1,065 square miles, has over 728 miles of rivers and streams which flow over 1,287 linear miles. Included in the watershed are more than a dozen cities and towns, including the state’s third largest city, Tacoma. The watershed has been substantially altered from its historic condition due to extensive urban growth, heavy industry, a marine port, and agriculture use and an extended revetment and levee system along the river.

The Puyallup River watershed ranks among the highest in the state for frequency and magnitude of flood damage with major events occurring in the winter months. Despite widespread habitat degradation, the watershed and its estuary and nearshore of Commencement Bay is used by two distinct and ESA-listed stocks of Chinook salmon: the Puyallup River Fall Chinook and the White River Spring Chinook. Several other salmon and trout species are present including coho, pink, chum, sockeye, steelhead salmon, and cutthroat and bull trout.

Stakeholders in the basin have identified a proactive plan to significantly modify existing flood control infrastructure throughout all reaches of the river and its two primary tributaries (the Carbon and White rivers), primarily through setback levees. Short-term objectives are to pursue high priority land acquisition to protect those areas that have not yet been developed. As part of this effort, Puyallup stakeholders are also purchasing conservation easements on agricultural lands and exploring the possibility of integrating agriculture with setback levee projects on the landscape scale.
**Identified Watershed Goals**

- **Flood Goals**
  - Reduce flood risk to Pierce County infrastructure (roads, sewer system, fire protection)
  - Reduce flood risk to private homes by removing them or lowering flood levels
  - Provide protection from channel migration and erosion
  - Manage sediment
  - Reduce risk of flooding in cities
  - Improve stormwater infrastructure

- **Fish Goals**
  - Re-establish a commercial Tribal fishery
  - Establish sustainable salmon runs
  - Reconnect floodplains to the river
  - Establish a functional riparian corridor
  - Improve fish passage at culverts and dams
  - Implement protection and restoration priorities in WRIA 10&12 Strategy (2012)
  - Increase woody debris and recruitment potential in the watershed
  - Improve water quality to meet Department of Ecology standards and to promote hyporheic flows
  - Prioritize the channel migration zone (CMZ) for fish restoration

- **Ag Goals**
  - Reach a goal of 85% of ag lands conserved and in production
  - Maintain a viable farming economy
  - Maintain critical mass of farmland and farm businesses
  - Improve farmers’ implementation of better BMPs
  - Utilize the areas of Pierce County Surface Water Management properties that have available agricultural leasing programs
  - Prevent the development of agricultural land
  - Identify areas for preservation through acquisition; preserve forest land and prevent conversion

- **Other Goals**
  - Lower water temperature; look for areas of cold water in mainstream
  - Increase riparian cover/shade
  - Control invasive vegetation
  - Identify and improve water quantity issues (high flow/low flow) to promote a normative flow regime for the river and tributary streams
  - Identify water quality goals based on TMDLs for various reaches
  - Implement SCP acreage goals: long-term goal of 50,000 acres or more in farmland, 10-year voluntary conservation goal of 6,000 acres
  - Improve forest cover above Kapowsin
  - Keep open space around rivers
Lower Puyallup

Features and Issues

The Lower Puyallup reach (RM 0.0-10.3) extends from its mouth at Commencement Bay to the confluence with the White River. The Lower Puyallup flows through the cities of Sumner, Puyallup, Fife, and Tacoma, portions of unincorporated Pierce County, agriculture in the Clear Creek area, and Tribal lands. Major infrastructure in this reach includes Highway 167, Highway 5 and the Port of Tacoma. Surrounding land uses are mostly urban in the cities and a mixture of agricultural, rural, and urban in unincorporated Pierce County. The reach includes extensive areas mapped as 100-year floodplain and the river has primarily been straightened with levees on both banks. The Clear Creek area has been the focus of significant flooding in recent decades and several projects have been identified to modify existing infrastructure and reduce flood risk on residential and agricultural lands. A portion of the reach is tidally influenced, but much of the historic intertidal habitat critical to fish survival has been lost. All local species of salmon are found in the reach and many are present in tributaries discharging to the Lower Puyallup River. The reach has 14 bridge crossings.

Identified Goals

- **Flood Goals**
  - Establish 200-year level of protection
  - Reduce flood risk to private property
  - Protect infrastructure in the floodplain (Fife pump station, Puyallup treatment plant, Sumner sewage treatment plant)
  - Remove tide gates at the confluence with Clear Creek without increasing flooding

- **Fish Goals**
  - Re-establish intertidal habitat and productive nursery habitat
  - Provide more space for the river
  - Reconnect off-channel habitat
  - Protect and improve Tribal fishing at the confluence with the White River
  - Increase connectivity by removing fish passage barriers between tributaries, creeks and mainstream and within creeks upstream
  - Increase riparian cover on tributaries
  - Implement protection and restoration priorities in WRIA 10&12 Strategy (2012)
  - Preserve and restore important tributaries in the floodplain such as Fennel Creek that provide habitat to salmon

- **Ag Goals**
  - Protect agricultural land in the Clear Creek area
  - Provide a net increase of agricultural land in the Clear Creek area
  - Integrate agriculture goals with the capital project in the Clear Creek area and use it as a model for work in other areas
  - Prohibit further development of ag lands in Fife
  - Prioritize supporting and retaining viability of agricultural lands and current ag communities over increase of agricultural land area (both function and production)
  - Improve drainage in a way that also improves habitat

- **Other goals**
  - Improve water quality (including temperature)
Middle Puyallup

Features and Issues

The Middle Puyallup reach (RM 10.3-17.4) extends from the confluence with the White River up to the confluence with the Carbon River. Throughout the Middle Puyallup reach the river channel is a combination of large meander bends with segments that are straightened and confined by a combination of levees, revetments, and valley walls. This reach is considered more stable from a flood risk perspective than other reaches in the watershed, though flood risk is still a major concern. The surrounding watershed and land use are mostly urban near the White River confluence in the cities of Sumner and Puyallup, while predominantly agricultural and rural residential are located in the Alderton-McMillan communities, and upstream to the Carbon River confluence. This reach has a significant portion of the overall agricultural lands in the Puyallup watershed. Salmon and trout, including Chinook, Coho, pink, chum, sockeye, steelhead salmon, and cutthroat and bull trout use the entire reach of the Middle Puyallup River. Several setback projects have been identified for the reach that would promote channel migration and channel complexity in addition to improving connectivity.

Identified Goals

- **Flood Goals**
  - Remove at-risk RV parks
  - Allow river to migrate through old oxbows
  - Increase the amount of wood
  - Re-establish connections to side channels
  - Implement levee setbacks

- **Fish Goals**
  - Allow river to migrate through old oxbows
  - Increase riparian cover along river
  - Connect off-channel habitats
  - Implement protection and restoration priorities in WRIA 10&12 Strategy (2012)

- **Ag Goals**
  - Protect existing agricultural lands and see a net increase in active farming
  - Integrate ag interests into proposed large levee setback projects
  - Prevent conversion/development of floodplain agricultural land
  - Retain viability of agricultural lands (both function and production)

- **Other goals**
  - Identify TMDL issues and improve water quality (including temperature)
  - Identify and improve water quantity issues (high flow/low flow) to promote a normative flow regime for the river and tributary streams
Upper Puyallup

Features and Issues

The Upper Puyallup reach (RM 17.4-28.6) extends from the confluence with the Carbon River upstream. The Upper Puyallup reach is diverse in terms of confinement and flood risk. Close to the confluence with the Carbon River, the Upper Puyallup is characterized by a combination of levees and revetments but also a large floodplain reconnection project (South Fork reconnection). Between RM 19.0 and 25.0, there are three setback levees (Calistoga, Soldiers Home, and Frew) and the channel is less confined. Above RM 25.0, few levees and revetments remain on the right bank due to past flood damages and changes in flood management strategies. The surrounding watershed and land use is mostly urban on the right bank of the Puyallup near the City of Orting, but is predominantly agricultural, rural residential and forested upstream of RM 21.8. This reach has more flood issues than other reaches in the watershed, and the City of Orting and the Needham Road and Orville Road areas require many resources for flood response. Like the middle Puyallup River, by the 1930s much of the valley and surrounding hills in the upper Puyallup River were harvested for timber and the valley cleared for agriculture. Salmon and trout, including Chinook, Coho, pink, chum, and steelhead use the entire reach of the upper Puyallup River.

Identified Goals

- Flood Goals
  - Remove at-risk homes
  - Reduce levee maintenance costs
  - Prioritize setback levees to reduce flood risk and control sediment

- Fish Goals
  - Reconnect floodplains to the river
  - Require improvements to existing roads on forested lands post land sale/during development
  - Implement protection and restoration priorities in WRIA 10&12 Strategy (2012)

- Ag Goals
  - Integrate agriculture interests into proposed large levee setback projects throughout the Upper Puyallup (e.g., area of the Horse Haven Setback Levee Project)
  - Preserve agricultural land and protect its viability (function & production)

- Other goals
  - Protect forest lands
  - Establish new and protect existing forested buffers
  - Identify TMDL issues and improve water quality (including temperature)

Carbon River

Features and Issues

The Carbon River reach extends from the confluence with the Puyallup River up to RM 8.4. The right bank is largely forested with a small portion (below RM 0.8) of largely agricultural land. The left bank of the river from RM 0.75 to RM 3.54 is within the City of Orting and contains the Orting Wastewater Treatment Plant and single-family residential development. The Carbon River is a glacial fed tributary of the Puyallup River Basin that contributes approximately 30% of the Puyallup River flow.
Two major tributaries enter the Carbon River in this reach, Voight Creek at RM 4.0 and South Prairie Creek at RM 5.8. Voight Creek, a smaller tributary, collects runoff from the foothills to the south and west and flows across the valley floor before entering the Carbon River. South Prairie Creek provides the largest production refugia for salmonids in the Carbon River subbasin. Overall, the Carbon River reach contains the most productive mainstem spawning habitat remaining in the Puyallup River watershed for all species of salmon and trout. Chinook, steelhead, chum, coho, and pink salmon are found in relative abundance.

**Identified Goals**

- **Flood Goals**
  - Maintain critical road access
  - Protect or remove homes at risk
  - Install roughening structures
- **Fish Goals**
  - Improve spawning habitat
  - Reconnect floodplain to the river
  - Increase riparian cover
  - Implement protection and restoration priorities in WRIA 10&12 Strategy (2012)
  - Preserve and restore important tributaries in the floodplain such as South Prairie Creek (especially at the confluence with the mainstem) that provide habitat to salmon
- **Ag Goals**
  - Integrate agriculture interests into proposed large levee setback projects, and investigate the intersection of any levee setback projects with priority agricultural lands.
  - Preserve agricultural lands and protect their viability (function and production)
- **Other goals**
  - Maintain Rails to Trails area
  - Water quality (temp) and quality (high flow/low flow)
  - Identify TMDL issues and improve water quality (including temperature)
  - Increase public access since adjacent to trails

**White River**

**Features and Issues**

The White River reach is a long reach that extends from the confluence with the Puyallup River upstream to Mud Mountain Dam at RM 30. Land uses in the White River reach include commercial/industrial, residential, rural, agricultural, and forestland. Levees and revetments mostly confine the lower 11 miles of the White River. As these flood protection features have aged and the channel has aggraded with sediment, they have become less effective over time, increasing flood risks to neighboring communities. The constricted channel of the lower reaches has resulted in a marked reduction in habitat complexity and spawning gravel compared to upstream areas. The White River produces fall and spring Chinook salmon, winter steelhead trout and bull trout, as well as pink, chum, and coho salmon, rainbow, and cutthroat trout, and mountain whitefish. The river supports the only run of spring Chinook salmon in south Puget Sound; this population is identified by the National Marine Fisheries Service as needing to achieve low risk status for the entire Puget Sound Chinook Evolutionary Significant Unit to be viable (i.e., delisted).
Identified Goals

- **Flood Goals**
  - Maintain critical road access
  - Protect or remove homes at risk
  - Install roughening structures
  - Implement no development in floodplain

- **Fish Goals**
  - Improve habitat in the lower river
  - Implement protection and restoration priorities in WRIA 10&12 Strategy (2012)
  - Protect/restore riparian floodplain habitat from Lake Tapps upstream to diversion dam (King Co levee setback area)

- **Ag Goals**
  - Integrate ag interests into proposed large levee setback projects, and investigate the intersection of any levee setback projects with priority agricultural lands.
  - Protect ag land in Buckley Plateau area