

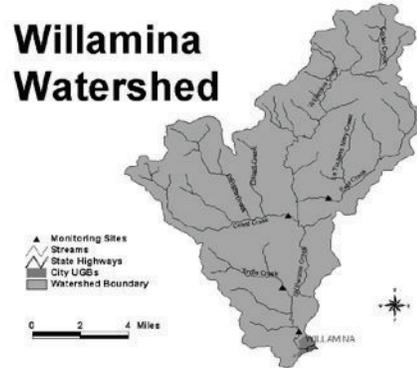
Willamina Watershed Assessment Summary

Yamhill Basin Council

Yamhill & Polk Counties, Oregon

Background

- Most of 52,224-acre watershed is in Yamhill Co. Named creeks include: Willamina, East, Coast, Indian, Tindle, Burton, Canada, Gilbert, Baltimore, La Toutena Mary, and Cedar Creek.
- The four sub-basins are Upper Willamina, East Creek, Coast Creek, and Lower Willamina.
- Residents are concentrated in Willamina.
- Climate is marine-influenced, rainfall amounts vary, and snow & ice accumulate often. Soils have volcanic and sedimentary parent material. The three primary soil associations for the watershed are Wapato Cove, Peavine, and Hembre-Astoria-Klickitat silty clay loams.



Land Use

- Approximately 91% of the land is heavily forested, 67% of which is conifer and 33% of which is hardwood.
- The Bureau of Land Management owns approximately 30% of the watershed and most of the remaining land is privately owned.
- In the early 1960s, there were 205 farms in the watershed, 3,190 acres of cropland, 480 acres of rangeland, and 2,000 acres of grazed forestland.

Exotic and Rare Species

- Nelson's sidalcea, Weak bluegrass, Loose-flowered bluegrass, Meadow checker, Northern spotted owl, Northern red-legged frog, Mountain quail and Winter steelhead are either protected by the Federal ESA or are of concern because of low population. There are several other species that may live in the watershed that have not been field verified.

Fire History

- Kalapuyan natives used fire for increasing yields of agriculture, hunting, communication, warfare, visibility, safety, and sanitation. They were moved to the Grand Ronde Reservation near present-day Willamina in 1856.
- European settlers used fire for trail building, amusement, agriculture, camping, hunting, logging slash, and incendiary. The town of Willamina was founded in 1879 with an initial population of 70.
- There have been three catastrophic fires since 1840 that have significantly affected the Willamina watershed. Current fire policy is to control and extinguish any fires that occur.

Channel Habitat & Modification

- Willamina watershed consists of nine different channel habitat types. A majority of the surveyed stream segments in the Lower Willamina sub-basin are classified as

flood plains, contrasting with the other sub-basins that are mostly classified as steep valleys or very steep headwaters.

- Generally the surveyed sections of the watershed were in good condition.
- Fish barriers such as culverts, dams, waterfalls, logjams, and beaver ponds prevent fish from moving upstream and downstream to adjust to changing habitat conditions. There are 58 barriers and fish passage culverts in the watershed.
- Willamina Creek is thought to have sustained the most splash damming and log runs of the South Yamhill watershed.
- There are innumerable modifications associated with small landowners including rip-rap, driveway culverts, ditch diversions, and riparian zone vegetation clearing.
- There are an estimated couple of hundred channel modifications, of which only 26 have been physically or verbally verified.

Fish

- Coho salmon, Steelhead and cutthroat trout as well as other fish species use a significant portion of the watershed's streams and tributaries as habitat.
- Big Creek hatchery stocked of Steelhead in the watershed from 1964 to 1989. More than 500,000 winter Steelhead fry, fingerlings, yearling smolts, and adults were released into the watershed over that time period.
- From 1964 until 1983 most Steelhead were released into Willamina Creek. In 1983 local residents and private landowners were encouraged to release fry stock into the smaller streams and tributaries of the watershed.
- Willamina Creek is considered to have the best return for winter Steelhead in the coast range sub-basin of the upper Willamette.
- The Oregon Fish Commission released more than 110,000 Coho salmon into the Willamina watershed between 1953 and 1958.

Riparian Zones

- Riparian areas adjacent to streams, rivers and wetlands have higher levels of moisture than adjacent upland areas. The watershed averages a riparian buffer of over 30 feet.
- Riparian vegetation influences fish habitat and water quality by decreasing daily water temperature fluctuations and providing fish with cover from predation. It also stabilizes stream banks, provides habitat for insects and macro-invertebrates, and provides nutrients to the ecosystem. Trees in the area provide large woody debris that diverts channels and obstructs flow, thus increasing habitat complexity.
- The Lower Willamina sub-basin has the most impacted riparian areas in the watershed. Rural residential and urban land use create a low to moderate potential for large woody debris contributions.
- The upper Willamina sub-basin has some sections of low and medium grade riparian coverage, however a large portion has high grade conditions and good conditions for large woody debris contributions.
- The Coast Creek sub-basin has mostly been designated as moderate grade conditions.
- The East Creek sub-basin has one section of grasses and wetlands that do not provide shade and large woody debris and a small section of moderately graded riparian conditions. Most of the riparian zone vegetation is continuous. East Creek has the highest majority of forested riparian zones.

Wetlands and Forests

- Wetlands have abundant water, hydric soils, and specially adapted wetland plants.
- Wetlands are important for absorbing floodwaters, filtering pollutants, recharging groundwater, and supporting a variety of wildlife. There are about 563 acres of wetland in the watershed. They are predominantly agricultural types (farmed wetlands or prior converted).

Hydrology & Water use

- Primary land use activities that impact hydrology are urbanization, rangeland, forestry, and agriculture.
- There are no known dams or reservoirs in the watershed with the exception of log ponds near Willamina that have been drained and are no longer in use.
- Average annual peak flow for the Willamina gaging station that measures flow for an estimated 63 square miles was determined to be 2715 cfs. Low flows range from 9-21 cfs with a mean flow of 13 cfs. Flows of 17 cfs or lower occur approximately 12% of the time. Lowest flows generally occur from late August to early October.
- Temperature and contaminant concentrations increase during low flow conditions. Dissolved oxygen in streams decreases with increased temperature, causing organisms to compete.
- Under Oregon law all water is publicly owned. Water rights are required prior to use or consumption. 45% of water rights are used for irrigation and another 45% are used municipally.
- Streams in the watershed are over appropriated and would run dry during the low flow time of year if everyone exercised their water rights simultaneously.

Water Quality

- The physical and chemical condition of the water in the watershed has important influences on habitats for maintaining aquatic life and for human uses of the water.
- Benefits of the watershed are domestic and industrial water supply, irrigation, livestock watering, fish passage, fish rearing, resident fish and aquatic life, wildlife and hunting, fishing, boating, water contact recreation, aesthetic quality, and hydro power.
- Streams that do not meet set standards of water quality are listed under section 303(d) rules. Willamina Creek, mouth to above East Creek, is listed for bacterial pollution in the fall, winter and spring.
- High temperatures affect the growth and reproduction of native fish. DEQ set the maximum seven-day average standard for streams at 64°F. Data recorded in Willamina Creek shows seven-day averages of 69.6°F.
- Elevated levels of nutrients such as phosphorus and nitrates can cause algae and aquatic plant growth to become a problem and even be lethal. Growth also lowers dissolved oxygen levels. Sources include fertilizers from agriculture and urban lawn maintenance. The DEQ established a Total Maximum Daily Load standard of 0.07 mg/L.
- Minimum concentrations of dissolved oxygen are essential to support aquatic life and particularly for salmonid species. The evaluation criterion is set at a minimum of 6.5 mg/l. Data recorded by the DEQ and EPA between 1970-88 showed DO values ranging from 8.5-12.7 mg/l.

- Water pH is an important indicator of the chemical forms and availability of nutrients, as well as the presence of toxic chemicals in the system. Oregon Water Quality standards specify the approved pH range as 6.5-8.5. Data collected by the EPA and DEQ between 1970-88 show values ranging from 6.9-7.8.
- Turbidity is a measurement of the clarity of water, with high values indicating excessive amounts of suspended solids in the system that can damage fish gills and/or reduce their ability to see prey.
- Synthetic chemicals such as pesticides, herbicides, and other organic chemicals can be transported from land to streams through a combination of drainage, runoff, and erosion. Infiltration of rain and irrigation water facilitate transport of these chemicals to ground water. Synthetic chemicals have the potential to damage water quality and the health and reproduction of aquatic animal species. Heavy metals can also move the same way from urbanized or mined areas.
- Willamina Lumber Company holds the only two active point source discharge permits in the watershed. They discharge storm water and heater cooling water discharge into surface water.

Sediments

- Erosion of sediments is natural and varies depending on season and weather. Aquatic life has evolved to compensate for natural levels of sediments. It is difficult to determine what sediment load the watershed is adapted to handle and what human-induced sediment loads are exceeding this level.
- During peak flow events, the potential for fine sediments and other road materials to migrate to active channels in these flow paths was estimated to be high.
- Road densities for the watershed averaged 5.0 miles per square mile. Roads within 200 feet of an active channel, 11% of the roads in the watershed, are a high risk potential for contributing sediments. Roads located on slopes greater than 50%, 5% of the roads in the watershed, are an even higher risk.
- Off road vehicle use is another potential source of fine sediments. A Cooperative Management Agreement between the BLM and a club has 25 miles of trails open to motorcycles and small all-terrain vehicles. The trails are in the upper reaches of the watershed and never pass directly through streams or wet areas and thus impacts are considered to be negligible.
- Landslides, slumps and debris flows that occur near streams can cause chronic turbidity, which inhibits the breathing and impairs the prey sighting ability of fish. 569 acres of the watershed were rated by the BLM as “unstable” and an additional 240 acres as “potentially unstable”. Most soil found in the watershed was rated as having a “low” to “moderate” erosion factor.

Restoration Efforts

- Bureau of Land Management restored a 5-mile stretch of Willamina Creek. They placed large woody debris in the streams, established multiple species of native trees & shrubs, and removed a culvert on an existing road.