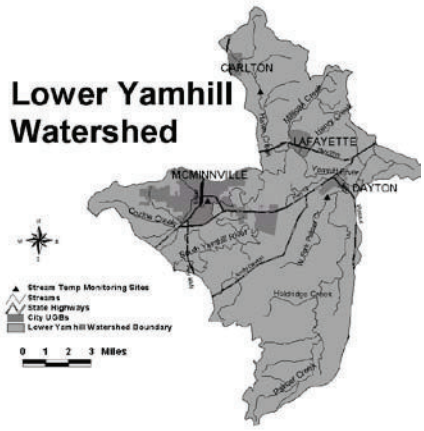
Lower Yamhill Watershed Assessment Summary

Yamhill Basin Council

Yamhill & Polk Counties, Oregon

Background



- Nearly the entire 63,747-acre watershed is in Yamhill Co.
- Major streams include Cozine Creek, S. Yamhill River, Hawn Creek, Millican Creek, Henry Creek, and Palmer Creek.
- Residents are concentrated in McMinnville, Dayton, Lafayette and Carlton.
- Climate is marine-influenced, rainfall amounts vary and snow & ice do not accumulate often. Soils have volcanic and sedimentary parent material and vegetation correlates well with geology.

Native Peoples and Fire History

- Indigenous Che-ahm-ill people were a sub-group of the Kalapuyan culture. Plants such as camas, tarweed and berries accounted for more of their nutritional intake than meat.
- For at least 4,000 years their regular burning maintained the oak savanna and prairies while preventing Douglas-fir forests from developing.
- Since the 1930s fire suppression crews have become better trained and organized.

Land Use

- Approximately 70% of the land is used for agriculture. Varied topography allows water to be channeled into streams for cultivation during the wetter part of the year, but also alters hydrology. 45% of the watershed is cultivated for perennial grass seed.
- Forests are the 2nd highest land use, about 22%.
- Five quarry permits are held in the watershed.

Wetlands and Forests

- Wetlands have abundant water, hydric soils, and specially adapted wetland plants.
- Wetlands connect ecosystems and bodies of water, capture sediment, consume nitrogen from agricultural runoff, slow peak flows, and provide habitat.
- Approximately 1/3 of the prairie that used to dominate the Willamette Valley was "wet prairie" and home to species such as tufted hairgrass. Today, most wetlands are drained and cultivated. About 22 acres of tufted hairgrass remain in the watershed today.
- Current fire suppression has resulted in much less oak savanna & prairie, more Douglas-fir, and contributes to a fire hazard in the forested areas of the watershed.
- Historically, open oak savanna covered a large portion of the watershed. Small mammals and 28 cavity-seeking birds are common in oaks. Today, it remains

primarily in isolated remnants on wildlife refuges or in thin bands where woodlands transition into agricultural and residential areas.

- Historically, there was relatively little pure conifer stands in the watershed. Today, approximately 10% of the watershed is conifer forest.

Exotic and Rare Species

- Non-native species introduced from other regions or continents occasionally do extremely well and become invasive. The OR Department of Agriculture identifies noxious weeds as plants having the potential to cause economic losses. Costs are high to eliminate weeds once they are established.
- The federal or state government lists 9 species native to the watershed as rare, threatened or endangered. The BLM lists 16 additional species as special status and 7 species as sensitive.

Riparian Zones

- Riparian zones have higher moisture levels that support a more diverse and productive ecosystem. Vegetation provides shade, balanced water chemistry, and nutrient assimilation. Riparian vegetation also stabilizes stream banks and provides habitat for insects and macro-invertebrates.
- Large woody debris retains gravel and sediment, helping to create flood terraces, meanders, larger riparian zones, a pool and waterfall pattern and less powerful floods. Additionally, large woody debris provides fish cover, reduce erosion, and add in-channel habitat diversity.
- Today, 28% of streams and in-stream reservoirs have only brush or grass and 47% have only hardwoods. Ideally, all of these areas should have some mature conifers.
- Landowners grazed riparian areas so they could grow crops on the more level tillable land, used them as a source of lumber and used creeks for power and transportation. In the past, the area would re-seed itself, but in 1940s foresters introduced the idea of actively replanting trees.

Channel Habitat & Modification

- Many streams are incised, greatly impacting natural meandering and seasonal flooding. Stream incision results from: dredging, dike building, straightening, damming, draining, removing large woody debris, hardening banks with rip-rap (rocks) or concrete. Constraining streams results in high velocities during heavy flows that erode channels and lead to incision.
- Many of the bottomland areas would naturally be in the flood plain category but are now low gradient moderately confined streams due to downcutting of stream banks.
- Natural meandering finds the stream's natural curvature to best dissipate energy.
- Agriculture has had the greatest impact on stream modification in the Salt Creek watershed. Building roads by streams and stabilizing the banks with rip-rap prevents natural channel movement.
- Fish barriers such as culverts, dams, waterfalls, logjams, and beaver ponds prevent fish from moving upstream and downstream to adjust to changing habitat conditions such as temperature. Barriers separate fish populations and prevent escape or repopulation from catastrophic events. There are 6 barriers on public roads and 10 dams in the watershed.

Sediments

- Erosional features actively contributing sediment to streams are fields, construction sites, landslides, roads, and stream banks. Transformation of agricultural lands to highly urbanized lands can increase the rates and volumes of storm runoff by a factor of two to four.
- 2/3 of McMinnville's 11,505 acres are drained by Cozine Creek. This results in 75% of the total storm water being drained by the South Yamhill River.
- Impervious surfaces and rural road ditches collect oil, gas, steering fluid, exhaust particulates, rubber from tires, and anti-freeze from cars. Agricultural land runoff contains nitrogen and phosphorus from fertilizers. Industry and consumer products also pollute runoff.
- Contaminants are most effectively removed by passing through an area where plant uptake of nutrients is significant and where heavy metals and toxins can either settle out or be consumed in a safe way before entering a stream.
- Sediment catch techniques include straw bales, silt fences, woven matting, detention ponds, and temporary swales. Gravel exit routes help remove mud from tires and keeps soil off of pavement and thus out of streams.

Hydrology & Water use

- Streams are influenced by precipitation, withdrawals for irrigation and drinking water, stream & wetland modifications, changes in land use, and water-related technology and removal or addition of vegetation.
- Streams left in natural state exhibit greater meandering, greater water exchange with wetlands and riparian areas, deeper flood plain soils for water storage and plant growth, increased number and depth of pools, less flows fluctuation, more minor localized flooding, and less major flooding.
- Area land yields 15 inches of runoff in an average year.
- Palmer Creek Irrigation District takes water out of the Willamette River and uses the Creek to distribute it to irrigation users.
- Under Oregon law all water is publicly owned. Water rights are required prior to use or consumption. 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. Low streamflow harms aquatic life and prevents sufficient dilution of pollutants.

Water Quality

- 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.
- Native cutthroat trout year-round presence and health indicates the overall health of the watershed streams.
- Streams that do not meet set standards of water quality are listed under section 303(d) rules. Palmer Creek, West Fork, from mouth to headwaters is listed for toxics. Yamhill River, mouth to confluence of N&S Yamhill Rivers is listed for bacterial pollution and warm summer temperature levels. South Yamhill River, from mouth to Salt Creek, is listed for bacterial pollution and warm summer temperature

levels. Other contaminants that are tested for include nutrients, sediment, organic compounds and solvents and metals.

- Elevated levels of nutrients such as phosphorus and nitrates can cause plant growth increases and can be a problem. Growth lowers dissolved oxygen levels and can be toxic.
- McMinnville's Water Reclamation Facility removes bacteria and most nutrients.
- High temperatures result in stress, increased metabolism, decreased competitiveness, decreased appetite and even death of native fish. DEQ's maximum seven day average temperature standard for streams is 64°F.
- Minimum concentrations of dissolved oxygen are essential to support aquatic life and particularly for salmonid species. The screening level of this assessment desired 8 mg/l. On the South Yamhill River, samples range from 8.5 to 13.5 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. The South Yamhill River pH ranged from 6.9-7.9 in ODEQ data from 1970 to 1988.
- Turbidity is a measurement of water clarity, with high values indicating high amounts of suspended sediments or particles in the system that can damage fish gills and/or reduce their ability to see prey. Sediments can clog spawning gravel. South Yamhill River turbidity levels in 1986-1988 were between 1.0-34.0 Hack FTU.
- Several pesticides are likely to exist in the streams and rivers of the watershed. There are likely to be a number of agricultural contaminants in the water. Residents likely contribute significant amounts of lawn or garden chemicals.

Fish

- Cutthroat trout are the most plentiful and widespread native salmonid in the Yamhill Basin.
- Stocking programs released fish in headwater streams as opposed to the Lower Yamhill for reasons of water quality and habitat.

Restoration & Enhancement

- Passive restoration can simply mean end disturbance and allow nature to recover on its own. Active restoration rebuilds natural functions but is more complicated.
- Gradual restoration is preferable to a quick, machinery-intensive makeover.
- James Stonebridge built 6 ponds on his field with the help of cost-share funding from the federal government.
- Doug Rasmussen planted native trees & shrubs along a stream and established a wet prairie plant community with the financial assistance of the Conservation Reserve Enhancement Program.
- Ted Gahr restored 30 acres of wetland on his land.
- Kareen Sturgeon diverts gutter runoff into her backyard where she planted water-loving natives.
- Jacqueline Groth gradually turned her small lot into an island of native vegetation.