

# Mill Watershed Assessment Summary

## Yamhill Basin Council

### Yamhill & Polk Counties, Oregon

#### Background

- Most of 33,920-acre watershed is in Polk Co. Streams include Mill, Gooseneck, Panther, Tillaston, South Branch Mill, Bear, Wind, Cedar, Coffee, Pine, Shumway, Camp, Coldwater, Rowell, and Glenbrook.
- The four sub-watersheds are Upper Mill, Middle Mill, Lower Mill, and Gooseneck. Residents are concentrated in Lower Mill.
- 165.3 of the 336.7 miles in the watershed are intermittent and not included in the assessment.
- Climate is marine-influenced, rainfall amounts vary, and snow & ice accumulate at higher elevations. The five primary soil associations for the watershed are Salkum-Briedwell, Bellpine-Suver-Hazelair, Peavine-Honeygrove-McDuff, Kilchis-Klickitat, and Valsetz-Luckiamute.
- 49.1% of the watershed is early vegetation seral stage, 0-39 years, which include mostly agricultural and recently replanted forest. 40.1% is middle, or 40-79 years.
- Small landowners own the majority of land in Lower Mill and Gooseneck sub-watersheds. Lower Mill is zoned mostly agricultural and rural residential. Trees in Gooseneck are harvested for timber. BLM and Willamette Industries own nearly all of the Upper and Middle Mill where forestry is the dominant land use.
- There are a total of 15 quarry permits with only 6 considered open or active. Shenk's quarry is the only quarry known to be currently in operation.
- Current dominant crops in the Lower Mill, Gooseneck and Middle Mill sub-watersheds are grass seed, wheat, flower seeds, hay, and nursery stock. Additionally there are Christmas tree and vineyards in the area.



#### Historical Conditions

- 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 1855.
- Settlers first moved to and homesteaded in the watershed during the 1840s. European settlers used fire for trail building, amusement, agriculture, camping, hunting, logging slash, and incendiary.
- There have been two catastrophic fires since 1840 that have significantly affected the watershed. Current fire policy is to control and extinguish all fires that occur.
- Since the 1840s wetlands and low-lying areas have been tilled and drained for rural residential and agricultural uses.
- In the 1890s Gooseneck Creek was diverted from its natural channel into a man and horse dug diversion to allow easier access to fields.

## Channel Habitat Types

- The watershed consists of 7 different channel habitat types. 75% of the Gooseneck and 64% of Upper Mill sub-watershed is very steep headwater. Middle Mill sub-watershed is 46% moderately steep narrow valley and 32% very steep headwater. Lower Mill sub-watershed is 31% moderate gradient constrained, 28% low gradient constrained and 31% low gradient moderately confined.
- Moderately steep narrow valley channels have potential for anadromous steelhead and resident fish spawning and rearing. Moderate gradient constrained, low gradient moderately confined, and low gradient constrained channels have potential for anadromous coho and steelhead spawning and rearing and resident fish spawning, rearing and overwintering.

## Fish

- Fish present in the waters of the watershed include steelhead trout, coho salmon, pacific lamprey, western brook lamprey, cutthroat trout, longnose dace, rainbow trout, prickly sculpin, reticulate sculpin, riffle sculpin, torrent sculpin, redbelt shiner, and sucker.
- Steelhead prefer cold, fast moving streams with channel gradients of 0.5% or greater.
- Cutthroats are the only native trout species to the watershed. They prefer to spawn in the gradient tributaries and streams of the upper watershed.
- Warm water game fish and non-native bullfrogs are found in the lower reaches of the Yamhill river watershed. They live and breed in the lower reaches of the watershed preferring warmer slower moving water.
- ODFW considers the Yamhill Basin to be one of the most productive areas in the Coast Range Sub-watershed that makes up the western part of the Upper Willamette Valley with regards to native winter Steelhead. Historically the Yamhill Basin probably never supported large populations of winter Steelhead prior to stocking efforts in the 1950s.
- Coho salmon and rainbow trout are non-native to the watershed. Resident populations are considered introduced from hatchery stocking efforts.
- Three native species of crayfish are thought to be present. They are important to Oregon's fisheries due to their hypersensitivity to pesticides and water pollution. Anecdotal evidence indicates populations have decreased dramatically this century.
- Overall fish habitat condition for the watershed is considered poor partially due to the lack of deep pools and low numbers of coarse woody debris.
- Fish barriers are natural or human created obstacles that impede the passage of fish. Barriers include culverts, dams, waterfalls, log jams, and beaver ponds. As habitat conditions change fish need to move to locations with more favorable conditions.

## Riparian Conditions

- Riparian areas are regions adjacent to streams, rivers, and wetlands with characteristic plant and animal species unique to the habitat. They have higher levels of soil moisture and support a more abundant and diverse ecosystem.
- Riparian vegetation provides shade, stream bank stabilization, insect and macro-invertebrate habitat, organic litter for vital nutrients, and large woody debris (LWD) vital for fish habitat.

- Lower Mill has riparian widths averaging 43 feet with major vegetation small to medium-sized hardwoods (68%). 14% is exposed soil. Vegetation is sparse, overall shade quality and LWD recruitment potential is estimated to be low.
- Middle Mill has riparian widths averaging 49 feet with major vegetation hardwoods (60%). 12% is exposed soil. Vegetation was better along steeper tributaries and headwaters than along the main channel and roads, overall shade quality is low and LWD recruitment potential is low to medium.
- Upper Mill has riparian widths averaging 61 feet with major vegetation conifers (65%). 17% is exposed soil. Higher order stream segments are densely forested. Shade quality was higher in older stand areas and low near timber harvest and roads. Very little LWD was observed. Few mature or old growth stands, nearly all forest vegetation in early to mid seral age stages.
- Gooseneck Creek has riparian widths averaging at 79.5 feet with major vegetation small stands of hardwoods and conifers (both 34%). 9% is exposed soil. Riparian zones were narrowest along rural residential and agricultural land uses and wider along steeper gradient tributaries to Gooseneck Creek. Headwaters had zones over 100 feet consisting of a mix of hardwoods and conifers. Shade quality ranged from low to high. LWD recruitment potential was relatively better, however larger trees were not commonly observed.

### Wetland Conditions

- Wetlands are areas saturated or annually inundated with water for periods long enough to support particular types of “water loving” vegetation and hydric soil types. Wetlands absorb floodwaters, filter pollutants, recharge groundwater and provide habitat for wildlife.
- The watershed has approximately 42 separate palustrine wetlands totaling 111 acres. Most are in the Lower Mill sub-watershed. 63% of the wetlands are forested, 18% are emergent, 12% are unconsolidated, 2% are aquatic bed and 1% are scrub-shrub. 71% of the wetlands are unmodified, 15% are diked or impounded and 14% are excavated.

### Channel Modifications

- Historically Mill and Gooseneck Creeks were more sinuous and braided or had multiple stream channels. Damming, dredging, diversions, dikes, splash dams, and rip-rap alter the physical and biological characteristics of streams.
- Many channels have been downcut to the underlying bedrock.
- There is a relative absence of dikes, levees, dams, or channel dredging in the watershed. The most common modifications are culverts at road crossings and the effects from land management activities in the uplands such as road construction and rip-rap. Small landowners use rip-rap, driveway culverts, ditch diversions, and clear riparian vegetation.

### Hydrology and Water Use

- Precipitation, infiltration, and evapotranspiration primarily dictate both the quantity and the time of year that water is available in the watershed. Human land use activities, primarily urbanization, rangeland, forestry, and agriculture, can alter the hydrologic cycle and influence the water budget.

- Stream flows can be influenced by human land use activities such as irrigation withdraws and/or stream channel modifications that can affect the time and amount of water that is present in the stream.
- The watershed has an overall road density of roughly 3.1 miles per square mile.
- Under Oregon law all water is publicly owned. There are 135 surface water rights permits in the watershed. Irrigation rights are authorized to withdraw a total of 15.25 cfs during the irrigation season to provide water for 1328 acres of farmland in the watershed. The lowest annual stream flows also occur during this period.
- ODFW and DEQ determine instream water rights for fish habitat and pollution.
- The upper section of Gooseneck Creek has the only major reservoir in the watershed. It is recharged with winter flows and supplies domestic and agricultural water for nearly 300 homes and farms.
- Total surface water rights exceed flows from April through mid-December.
- Low flows make stream temperature and water quality problems worse.

## **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 & industrial water supply, irrigation, livestock watering, fish passage, fish rearing, resident fish & aquatic life, wildlife, 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. Mill Creek, mouth to headwaters, is listed for bacterial pollution and temperature in the summer. It is also a water body of concern for sediments, flow modification and habitat modification. Gooseneck Creek, mouth to headwaters, is a water body of concern for sediments and flow modification.
- Fecal coliforms warn of associated pathogenic health hazards. The DEQ limit for a single fecal coliform sample is 400-cfu/100 mL.
- DEQ maximum temperature standard for streams is 64°F. Growth and reproduction of native species are adversely affected when water temperatures range outside the optimum. During the winter spawning period for Steelhead the stream temperatures are not to exceed 55°F.
- Elevated levels of nutrients such as phosphorus and nitrates can cause increase algae growth and low concentrations of dissolved oxygen both of which can be detrimental to watershed habitats. Sources include farm and home fertilizers.
- Dissolved oxygen is essential to support aquatic life, especially salmonid species. The evaluation criterion is set at a minimum of 6.5 mg/l. Data recorded by the DEQ and EPA between 1987-88 showed DO values ranging from 8.1-13.7 mg/l.
- Water pH indicates the availability of nutrients and the presence of toxic chemicals. 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 7.0-8.5.
- Turbidity is a measurement of water clarity. High values indicate excessive amounts of suspended solids in the system that can damage fish gills and/or reduce their ability to see prey. DEQ data between 1987-88 showed turbidity levels ranging from 1.0 to 29.0 FTU.

- Pesticides, herbicides and other organic chemicals move from land to streams through drainage, runoff, and erosion. Rain and irrigation water helps transport these chemicals to ground water. Synthetic chemicals can damage water quality and the health and reproduction of aquatic animal species.

## **Sediment Sources**

- 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.
- Road instability, slope instability, rural road runoff, and erosion from cropland were estimated to be the primary sources of sediment for the watershed.
- One of the most important factors in determining cropland contributions of fine sediments is to know where, when and how often cover crops are used to protect the topsoil from heavy winter rains and wind.
- The watershed is reported to have one of the highest slide risk areas in the region with rates predicted at one slide per 494 acres. Many slopes in upper elevations of the watershed exceed 90% gradients, classifying them as severe risks for landslides.
- Ratio of road-related landslides vs. forested area landslides was predicted at 7.7:1. Ratio of landslides in clearcut vs. forested areas was estimated at 7.2:1.
- Amount of sediment contributed by road runoff is variable and difficult to measure. Mill Creek road is above and near the creek, which indicates a high probability of fine sediment contribution.