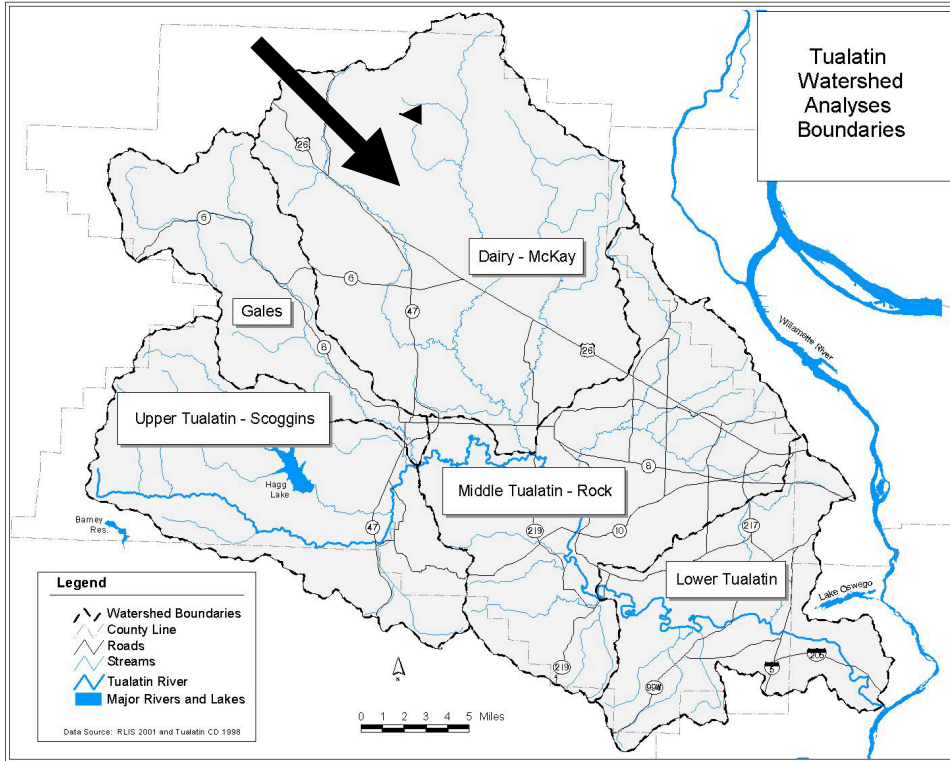




Dairy - McKay



Watershed Analysis Summary

What is a Watershed Analysis?

A watershed analysis is a process for evaluating how well a watershed is working. This process includes steps for identifying issues, examining the history of the watershed, describing its features, and evaluating various resources within the watershed.

This summary contains:

- a watershed characterization
- a description of major issues
- key recommendations

The full report can be downloaded from our website.

WATERSHED CHARACTERIZATION

Physical

The Dairy-McKay watershed drains 231 square miles in the northern part of the Tualatin River subbasin. Elevation ranges from 2,265 feet at Long Peak to 115 feet at the confluence with the Tualatin. The northern part of the watershed is mountainous, with zones of sedimentary and igneous rock. The southern portion of the watershed lies within the Tualatin Plain, and is a flat to rolling region of terraces built on Pleistocene alluvium and bottomlands underlain by recent floodplain deposits.

The climate is Mediterranean, with mild rainy winters and relatively dry summers. About 72% of precipitation falls between November and March. Since little snowfall occurs in the watershed, stream flow also is highest during the winter

months. The November-March period accounts for about 80% of discharge.

The watershed is drained by three major tributaries: West Fork Dairy Creek, East Fork Dairy Creek, and McKay Creek. The West Fork and East Fork join north of Hillsboro to form Dairy Creek. McKay Creek joins Dairy Creek near its mouth in Hillsboro.

Land Use

Forestry is the dominant land use in the northern half of the watershed. Agriculture is concentrated in the center of the

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watershed and accounts for 40% of watershed area. The southern 5% of the watershed is dominated by urban uses.

DESCRIPTION OF MAJOR ISSUES

Erosion

The hill slopes in mountainous portions of the watershed are susceptible to landslides (including slumps and similar processes). Numerous landslides occur on these hills, especially under saturated conditions. The highest rate of landslides can be expected on steep slopes. Steep slope conditions are especially common along canyons bordering streams in this watershed. Although these conditions could be found throughout the mountains, they were particularly prevalent in several subwatersheds contributing to McKay Creek, as well as the Williams Fork subwatershed, which contributes to West Fork Dairy Creek. Ground-based examinations found several examples of large landslides in these subwatersheds. Although these landslides were largely caused by natural factors, there was evidence that management activities (such as road cuts or timber harvest) could have contributed to slope failure.

Sheet, rill, and gully erosion are a potentially significant problem in the lower foothills of the watershed and along streams. These processes typically occur where activities such as agriculture expose bare earth to the force of precipitation. Although no specific areas of sheet, rill, and gully erosion were identified, it was noted that areas classified as "Highly Erodible Land" by the Natural Resources Conservation Service (NRCS) were particularly susceptible to these erosion processes.

Accelerated stream bank erosion was noted in stream reaches within the Tualatin Plain. The West Fork of Dairy Creek, in particular, appeared to be particularly susceptible to stream bank erosion problems. It was also noted that vegetated riparian buffers were quite poor along this stream.

Hydrology

No long-term discharge measurements exist for this watershed. A stream gage is seasonally operated on Dairy Creek at Highway 8. In 1992, a gage was installed on McKay Creek at Hornecker Road. In the past, other gages were also maintained.

Historically, watershed hydrology was altered through wetland drainage and stream canalization. These activities were most extensive along West Fork Dairy Creek near Kansas City, East Fork Dairy Creek near Mountaindale, and Jackson Bottom south of Hillsboro. Additionally, stream banks were built up

to facilitate log driving. These activities contributed to hydrologic disconnection of streams from their floodplain.

Currently, diversion of stream water for agricultural purposes reduces the natural discharge within the Tualatin Plain. Although the effects of land use upon peak flows was not specifically examined, studies elsewhere in the Tualatin subbasin indicate that forestry and agriculture have had a low to moderate effect upon these flows. Urban uses cover only five percent of the watershed, thus are not likely a major contributor to hydrologic alteration.

Water rights in the watershed are over-allocated during much of the year. Over 90% of water rights within the watershed are allocated for irrigation. Based on OWRD water rights records, the greatest demand upon surface water resources occurs within the East Fork Dairy Creek, Cedar Canyon, and Dairy Creek subwatersheds. Many of these water rights are senior to existing instream rights.

Stream Channels

Although streams in the mountains are deeply incised, they do not tend to be as steep as those in western portions of the Tualatin subbasin. Headwater streams often have a high content of fine sediment because of direct deposits from canyon slopes. Most mountain streams, however, are dominated by coarse (gravel or larger) substrates, which grade into finer substrates as streams enter the Tualatin Plain. Streams with gravel-dominated substrate persist into the narrow valleys that provide the transition between the mountains and the Tualatin Plain. Human activities are also generally more prevalent here than in the mountains, and so have a potentially greater effect upon channel morphology and substrate characteristics. The result is that these areas are as important because they directly affect the amount and quality of habitat suitable for salmonid spawning and rearing. These areas include East Fork Dairy Creek between Mountaindale and Little Bend, as well as West Fork Dairy Creek near Buxton.

Water Quality

Surveys indicate that water quality in mountainous portions of the watershed is generally good. Although some of these streams have high phosphorus levels, this appears to be a result of naturally high phosphorus content in sedimentary rock. Water quality quickly degrades once streams enter the valleys adjoining the Tualatin Plain. These areas generally have high temperature and phosphorus concentrations. Additionally, West Fork Dairy Creek and Council Creek have summertime dissolved oxygen levels limiting to aquatic life. West Fork Dairy Creek, lower Dairy Creek, and McKay Creek (below its confluence with East Fork McKay Creek) have high bacteria levels. In total, 69 miles of stream are on the Oregon 303(d) water quality limited list. Conditions appear to be most

degraded on the West Fork of Dairy Creek near Buxton. However, studies by Clean Water Services indicate that water quality is improving, with the notable exception of temperature.

Aquatic species and habitat

Dairy Creek and its tributaries provide habitat for several salmonid species, including steelhead trout, which are listed as threatened under the Endangered Species Act. Other salmonid species include cutthroat trout and the (non-native) coho salmon. Steelhead trout and Coho salmon spawn in upper reaches of East Fork Dairy Creek, West Fork Dairy Creek, East Fork Dairy Creek and a couple of their tributaries. The lower extent of these streams is primarily used for salmonid migration. The East and West forks of Dairy Creek are the main cutthroat trout spawning and rearing areas within the Tualatin subbasin. Although water quality on East Fork Dairy Creek above Meacham Corner was good, and fish populations were high relative to more urbanized streams, surveys indicate that there are fewer pools than are desirable along this reach. Examination of stream reaches below this point also indicates insufficient habitat diversity. Downstream, most streams are dominated by uniform glide habitat and sand/silt substrate, which provide poor habitat characteristics for salmonids. On upper portion of the valley plain, suitable rearing areas are potentially impacted by high water temperature and, on the West Fork of Dairy Creek, low dissolved oxygen levels.

During culvert surveys, Washington County identified 14 culverts that provided a barrier to fish. Of these, three were a high priority for replacement. These included culverts on Mendenhall Creek, Plentywater Creek, and Murtaugh Creek.

Although they get less attention, lamprey species also occupy the watershed. In some parts of their life history, they use lower stream reaches more extensively than do salmonids. In the scientific community, there have been concerns raised about diminishing populations of lamprey species.

Several amphibian species of concern were found within the watershed. These include red-legged frog, tailed frog, and Columbia torrent salamander. All three of these amphibians were found on East Fork Dairy Creek at Little Bend. Additionally, a large number of red-legged frogs were observed on McKay Creek above the confluence with East Fork of McKay Creek. These frogs are also present in numerous other places in the Tualatin subbasin.

Terrestrial species and habitat

Although they were not specifically mentioned in the report, Nelson's checkermallow and the Willamette Daisy are sensitive botanical species that may be present within the watershed. Additionally, BLM has found several botanical species that fall under their "Survey and Manage" directive.

These include the lichen *Lobaria pulmonaria*, the fungus *Helvella compressa*, and the western wahoo. These species were found at Wirtz Creek in the East Fork Dairy Creek subwatershed.

Prior to 1980, spotted owls were known to occupy sites in subwatersheds that drain to East Fork Dairy Creek. They have not been observed within the watershed since 1978. Although marbled murrelets theoretically could be present within the watershed, none have been found. The lack of forest stands with large trees and/or late successional characteristics has limited the amount of available habitat for these species.

Vegetation

This watershed naturally supported dense forest broken by occasional prairies. Pioneers settled in prairies near the current sites of Hillsboro and North Plains. Subsequent settlers cleared much of the forest growth within the watershed. Relatively young trees characterize the remaining stands. Almost all the trees are less than 20 inches diameter at breast height and less than 80 years of age. Thus, ability of these forests to support species dependent upon old-growth characteristics has been severely diminished. Numbers of snags, as well as downed wood has been severely decreased.

Riparian corridors in the Tualatin Plain have also been diminished. The remaining riparian corridors are generally narrow. This, to varying degrees, limits their ability to provide shade, wildlife habitat and instream woody debris. In many places, forest buffer is completely lacking. In particular, West Fork Dairy Creek has long reaches that lack riparian vegetation. Vegetation is absent along many smaller tributaries as well.

Invasive weed species are present throughout disturbed and non-forested portions of the watershed. Himalayan blackberry, reed canary grass, and Scotch broom are particularly notable examples.

Social

Since 1960, Washington County has experienced rapid population growth. Recently, much of the urbanization pressure has been applied to the Dairy-McKay subwatershed. Yet, only 4.6% of the watershed lies within the Urban Growth Boundary (UGB). If the UGB remains fairly constant, the watershed will not be impacted as severely by urbanization as watershed to the east. Agriculture remains a major economic component of the watershed, as has forestry.

Roads remain an area of concern within the watershed because of their ability to contribute to enhance erosion, sediment delivery, altered hydrology, and impairment of fish passage. The highest concentration of roads is found in the urban North Hillsboro and McKay-Tualatin confluence subwatersheds.

However, the rural Murtaugh Creek and WF Dairy-Kuder Creek subwatershed also have very high road densities. These may be prime locations for decommissioning of unused logging roads.

Stream crossings in the watershed have the ability to expedite pollutant delivery to streams and to impair fish passage. The subwatersheds with the highest stream crossing densities were located along tributaries to West Fork Dairy Creek.

KEY RECOMMENDATIONS

Erosion Control

- Avoid building new roads on steep and unstable lands, decommission unnecessary roads, and maintain existing roads along with culvert cleaning and replacement.
- Restore riparian vegetation and implement Best Management Practices (BMP).
- Protect existing riparian vegetation and maintain a vegetated lining in road and drainage ditches.

Hydrology

- Protect existing floodplain and wetland resources, and prevent encroachment of industrial and residential development in the 100 year floodplain
- Increase water conservation efforts, especially in the area of irrigation through the use of technological solutions to minimize waste from agriculture.
- Maximize instream water use to help protect aquatic species and migration.

Stream Channel

Develop large woody debris recruitment potential by reintroducing conifers to hardwood stands and promoting development of tree mass in riparian zones. Preserve existing channel characteristics at relatively high quality sites, and restore channels at lower quality sites.

Water Quality

- Minimize sedimentation as described above in the erosion control section. Also, keep animal and human waste away from the waterway, as well as use effective fertilizer management to minimize chemical inputs.

- Reduce readily decomposable organic matter to reduce anaerobic streambed conditions that release phosphorus from sediments.

Riparian Management

- Manage currently mature stands of private forests to develop late-successional characteristics.
- Reduce the spread of noxious and invasive weeds, and replant native species in their place to prevent future growth.
- Determine the needs for species in the watershed and manage the areas in order to improve habitat.

Priorities

Table 6.1 in the watershed analysis report identifies priority subwatersheds and stream reaches for preservation and restoration activities. The priority among these options depends upon the objectives of the Tualatin River Watershed Council. Perhaps the highest priority should be the preservation of the best existing aquatic habitat. For the objective, East Fork Dairy Creek (above Greener Road) is the highest priority.

For restoration activities, priorities become a bit more subjective. In order to expand upon the best existing salmonid spawning and rearing habitat, it appears that East Fork Dairy Creek between Mountindale and Greener Road should be a restoration focus area. (In this context, restoration includes tree planting and instream habitat restoration activities, as well as farm planning.) However, if repair of the most severely degraded reaches is the highest priority, then the West Fork of Dairy Creek would be the clear choice.

STRATEGIES

Watershed needs and opportunities are most effectively addressed by a consistent, cooperative effort, between landowners and government agencies. Successful habitat management depends upon cooperation among landowners. Groups of individuals, grassroots organizations, and corporations can also play an important role. The Tualatin River Watershed Council acts as facilitator to promote implementation of these recommendations. In this role, the council acts to coordinate efforts between partners to achieve beneficial watershed objectives.