CHAPTER TEN: CONDITION SUMMARY

This section summarizes the findings of the lower Molalla River & Milk Creek assessment, including major findings, data gaps, and recommendations.

CHANNEL HABITAT TYPES

Summary: The upper reaches of drainage networks within the watershed consist primarily of constrained channels of moderate-to-steep gradient classes, including Very Steep Headwater channels (VH), Steep Narrow Valley channels (SV), and Moderately Steep Narrow Valley channels (MV). Proceeding downstream through the mid reaches of tributary networks in the watershed, channels become less constrained and gradients are low to moderate (LM, MM). The lower reaches of many tributary drainages, as well as most of the mainstems of the Molalla River and Milk Creek, consist of unconstrained, low gradient systems on floodplains (FP1, FP2, FP3).

A total of 257.5 miles of streams were assigned CHTs throughout the watershed. Among all stream reaches within the watershed, 41% (105.6 miles) are CHTs considered to be highly sensitive to disturbance. More than half of the total watershed channel length classified as highly sensitive to disturbance was classified as FP1 or FP2, indicating that large floodplain channels occurring in the lowland areas of the watershed represent a large proportion of the most sensitive channels occurring in the watershed.

Moderately sensitive channels represented 49% (126.0 miles) of the total watershed channel length. These channels typically occurred midway through tributary drainage networks, where gradients begin to flatten from steeper headwater areas and channels become less (moderately) constrained. Finally, channels with low sensitivity to disturbance represented only 10.0% (25.9 miles) of the total stream length in the watershed. These channels occurred exclusively in steep, confined headwater areas and are generally less responsive to restoration efforts than are highly or moderately sensitive channels.

DATA GAPS

- Further field verification of channel habitat types.
- Field-based surveys of channel morphology and conditions.

RECOMMENDATIONS

Although channel habitat typing provides one source of information used in identifying restoration opportunities, we suggest that more intensive field-based surveys be performed to examine stream channel conditions to both produce baseline information and to better quantify channel conditions in various areas of the watershed for restoration prioritization.

HYDROLOGY & WATER USE

Summary: Annual peak flows typically occur between November and March in the Lower Molalla River watershed. Ninety-seven percent of the LMR&MC watershed occurs below 2,300 feet above sea level placing it within the rain dominated peak-flow-generating zone. Land Use in the lower Molalla River & Milk Creek watershed includes rural residential (45%), agriculture (25%), and commercial forestry (19%) with only a small area(1%) zoned as urban. Much of the watershed (48%) consists of rural residential property including small family farms. Lands devoted to agriculture occur primarily along the mainstem Molalla river subwatershed and adjacent areas with some croplands occurring in the lower reaches of tributaries, particularly in the Lower Milk creek subwatershed. Forestry activities appear to pose little risk to enhancing peak flows within the LMR&MC watershed because a very small proportion of the watershed occurs within the rain-on-snow elevation zone. Canyon creek and the Headwaters of Milk creek are the only subwatersheds containing areas at these elevations and far less than 75% of the area in each of these two subwatersheds occurred in this zone.

Agricultural land comprises over 25% of the total Lower Molalla River and Milk Creek watershed area, with most of the acreage occurring in the Molalla River subwatershed. Therefore, the screening-level assessment for agricultural impacts on hydrology was first performed in this subwatershed using GIS land use coverages and examination of aerial photos. Across the three hydrologic soil types occurring in the Molalla River subwatershed, agriculture currently poses a low risk of increasing peak flows. Because agriculture is far more prevalent in this subwatershed than in others, no further analyses of potential impacts of agricultural lands on hydrology was performed.

A total of 765.3 miles of roads occur in the watershed, averaging 4.8 miles of road per square mile. Forest roads account for 208.5 miles of roads while rural roads account for 556.8 road miles within the watershed. Among subwatersheds, Cedar Creek poses the highest potential risk to peak-flow enhancement with a rural roaded area equaling 9.4% of the total rural land use area of the subwatershed and 58.8% of forested areas within the subwatershed (a large number because the forested area is so small). Watershed wide, roads occupy 3.3% of the total forested land, while rural roads occupy 2.9% of the total rural land use area. At these densities, the watershed-wide risk for peak flow enhancement from road runoff is low. However, sediment-laden runoff likely occurs from these roads, and waterways that are near these road systems are more likely to be detrimentally affected by runoff. In the basin, 142.3 miles of roadways are within 200 feet of the Lower Molalla and its tributaries. Watershed wide, total road densities are 4.41 mi/mi^2, resulting in assignment of moderate potential of impervious surfaces altering watershed hydrology. Among subwatersheds, the headwaters of Milk Creek and lower Milk Creek pose the highest risk of potential impacts with road densities of 6.6 and 4.3 mi/mi^2 respectively.

The lower Molalla River and Milk Creek watershed has been divided into four water availability basins (WABs). In the Molalla River WAB, water availability is negative during July through October at 50% exceedence flows and during June through October at 80% exceedence flows. Water availability is negative in August and September at 80% exceedence flows in the Molalla above Gribble Creek WAB (Figure 4.5). In the Molalla above Milk Creek WAB, water availability is negative from August until October at 50% exceedence flows and from June through November at 80% exceedence flows. Milk Creek water availability is negative from June through October at 50% exceedence flows and is negative from May through November at 80% exceedence flows. August consumptive use in the Milk Creek watershed is 86% of the natural stream flow at 50% exceedence flows and is 118% of natural flow and 80% exceedence, indicating that significant potential for flow restoration through conservation measures, increased efficiency of use, and/or best management practices exists in this WAB.

DATA GAPS

- Streamflow measurements in tributaries to the lower Molalla River during various flow conditions and seasons to further identify areas within the watershed with altered hydrology.

RECOMMENDATIONS

- Best management practices on forest and agricultural lands should include management techniques known to restore and maintain desirable hydrologic functions, including abatement of peak flows, increasing low flows, and increasing groundwater recharge. Management of upland and riparian zones that promotes regeneration and maintenance of natural vegetative communities will enhance groundwater recharge and stabilize discharge.

RIPARIAN AND WETLANDS

Summary: Riparian conditions varied widely throughout the watershed. Riparian zones occurring in lower elevation, nonforested ecoregions in the watershed were represented by a number of vegetation communities in the RA1 zone. Small, sparse hardwood forest was the most common single riparian condition class, occurring along 21.5 of 87.5 stream bank miles. Brush and grass vegetation classes, combined, occurred along 19.2 of 87.5 stream bank miles. Historically, riparian zones within these non-forested ecoregions would have supported dense stands of large hardwoods, including cottonwood, Oregon ash, and bigleaf maple. Currently, vegetation within most of these riparian zones is composed of grasses and shrubs or young-aged and thinner tree stands. These riparian areas largely occur on the lower elevation valley floors, where riparian vegetation has historically been cleared and channels have been modified for agricultural purposes.

Within the forested ecoregion portions of the watershed, riparian conditions also varied widely, but are represented by a large proportion of partially intact riparian zones composed of hardwoods and conifers. Almost 10% of these riparian areas were dominated by brush and grasses, and almost half of these areas supported only small trees. Historically, riparian zones occurring in all of these ecoregions supported medium to large-sized, mixed stands of hardwoods and conifers in the riparian zone; upland areas supported large dense stands of either conifers or had a mixed composition (WPN 1999). Clearing for agricultural development and timber harvest operations are largely responsible for the alteration in riparian condition classes in these portions of the watershed occurring within forested ecoregions.

Across the watershed, riparian recruitment potential was adequate in only 11% of the total riparian area assessed, indicating that most of the watershed riparian zones do not support sufficient quantities of trees to provide adequate supplies of woody materials to stream channels. Furthermore, the watersheds where most of the adequate conditions occur (Middle Milk Creek, Molalla River/Willamette, and Woodcock Creek) are dominated by the non-forested ecoregions, where riparian wood recruitment is naturally not as significant a factor as in forested ecoregions.

Forestry, a high-value land use in the watershed, is the largest factor affecting riparian recruitment potential by limiting tree sizes. Sixty-seven percent of the stream area throughout the watershed was limited by small stand size. Stands of smaller trees result either from recent forestry activities (harvest, replanting) or succession of fallow or replanted agricultural land. If allowed to attain larger tree sizes, these situations will eventually produce adequate amounts of LWD; however, if current management practices continue, large proportions of small tree sizes will persist and continue to deplete streams of important woody structural components.

Agricultural practices, including valley floor farms and rangelands along streams have prevented trees and shrubs from becoming reestablished. Nearly twenty percent of the watershed's riparian recruitment potential is limited by the presence of agriculture in the uplands. It is recognized that the bottomlands along streams can be the most valuable agricultural land in the basin; however, encouraging a larger buffer between land uses and streams will benefit water quality and stream health, which also have values for landowners in the basin.

Only a small portion of the RCUs assessed indicated wetland conditions as a secondary factor limiting riparian recruitment; no RCU had wetland conditions as the primary limiter of recruitment. These areas of saturated, anaerobic soils prevent the establishment of tall tree cover; instead wetland shrubs and grasses form a permanent cover. These areas are lacking in LWD, however the existence of functioning wetlands offsets the lack of LWD source trees, since they contribute to higher summer flows and help to buffer winter flooding.

Stream shading varied across the watershed. Generally, headwater stream reaches at higher elevations were more heavily shaded owing to the forested nature of these areas. Twenty-five percent of the riparian zone distance surveyed had stream shading of less than 40%; this primarily occurred in the lowlands where riparian vegetation has been cleared for agricultural purposes. Because water temperature is an important determinant of biological stream conditions and a number of stream segments in the watershed violate state standards, reestablishing desirable riparian conditions and shading should be a priority in the watershed.

According to information provided by the BLM, approximately 391 acres of wetlands occur in the LMR&MC watershed (Table 5.8). Most of these acres occur in the upper Milk Creek, Canyon Creek, and Molalla R./Cedar Creek subwatersheds. Most wetlands mapped in the watershed are immediately associated and contiguous with stream channels, which provide particularly important habitat during high flow events, allowing juvenile salmonds to take refuge from high velocity and turbulent waters occurring in river and stream channels.

Wetlands almost certainly were more extensive historically in the watershed than they are currently. An estimated 75% of wetlands have been lost from the Pacific Northwest due to human disturbance (US Fish and Wildlife Service and Canadian Wildlife Service 1990). Further losses of wetlands should be avoided in the watershed to avoid further loss of critical functions these areas provide.

DATA GAPS

- This watershed-wide, screening-level assessment provides a starting point for characterizing riparian zone conditions in the watershed. A more thorough field-based assessment would further improve understanding of current conditions and identify opportunities for restoration.

RECOMMENDATIONS

- Protection and restoration of riparian zones within the watershed would provide significant benefits to physical, chemical, and biological conditions. To this end, we recommend that landowners be encouraged to remove riparian areas from agricultural practices, including cropping and grazing. Riparian fencing can effectively exclude livestock from riparian areas and allow vegetation to regenerate. Planting of woody riparian vegetation will expedite and enhance recovery of the riparian zone.
- In forested areas of the watershed, a combination of decreased harvest rotation and increased protection of riparian-area tree cover would benefit water quality and quantity in the stand-size limited areas. Large areas of the watershed are within this classification, and would benefit from these actions.

SEDIMENT SOURCES

Summary: Watershed wide, 18.6% of rural and forest roads occur within 200 feet of stream, while 0.4% of rural and forest roads both occurred within 200 ft of streams and occurred on uphill hillslopes exceeding 50%. The results of this basic assessment suggest that the Canyon Creek subwatershed likely poses the greatest risk of elevated sediment delivery from road runoff with 0.08 mi/mi^2 of roads within 200 ft of streams and on >50% hillslopes. The Molalla River/Cedar Creek, Middle Milk Creek, and Headwaters Milk Creek watersheds are all likely at greater risk of elevated sediment loading from road runoff owing to their higher densities of high-risk road segments than occur in Lower Milk Creek, Upper Milk Creek, Woodcock Creek, or the Molalla River subwatersheds. The Molalla River subwatershed likely poses the lowest risk with no higher-risk road segments occurring in the subwatershed.

The Lower Molalla River and Milk Creek watershed contains 9.31 square miles of potential debris flow hazard areas, representing 6% of the total watershed area of 157.6 square miles. More than 36 miles of streams occur within these debris flow hazard zones. Most of the debris flow hazard areas are classified as only moderate risk areas, as only 0.04 square miles of high risk areas occur in the watershed. Subwatersheds most at risk of increased sediment delivery to streams as a result of debris flow are Canyon creek, Headwaters Milk creek and Molalla River/Cedar Creek with 10.4, 8.4 and 7.6 miles of stream within debris flow hazard areas, respectively. These three watersheds also contain the highest proportions of debris flow hazard zones, largely a result of the prevalence of steeper hillslopes and topography in these areas. Overall, the watershed is at relatively low risk of significant sedimentation problems resulting from slope instability, as only 0.03% of the watershed is classified as being at high risk for debris flows.

The Molalla watershed contains 40 square miles of croplands within which 92.14 miles of streams occur. The Molalla subwatershed, alone, contains 35.8 square miles of croplands within which 68.08 miles of streams occur. The Lower Milk creek subwatershed contains 2.97 square miles of croplands, the only other subwatershed with more than 10% of its land use occurring as cropland. The Canyon creek and Headwaters Milk creek do not contain any croplands and the remaining four subwatersheds combine to contain only 1.18 square miles of croplands. The greatest risk of increased sediment loading to streams from cropland runoff occurs in the Molalla River/Willamette subwatershed. Further efforts to assess the effects of agricultural practices on delivery of sediment into watershed streams should focus on this subwatershed.

DATA GAPS

- Turbidity and streambed sediment data are lacking for the watershed, yet would be critical to identifying areas contributing most to sedimentation of watershed streams, with a focus on examining the effects of agricultural activities in the lower Molalla River floodplains.

RECOMMENDATIONS

- Restore and maintain riparian zones with replanting and implementation of BMPs on bottomlands.
- Maintain rural and forest roads with effective sediment traps, water bars, and restricted use during wetter months to help reduce sediment production and transport.
- A more complete inventory of stream habitat conditions in the watershed would provide valuable information that would both better characterize current streambank and streambed conditions and provide a baseline for comparison with future data.

CHANNEL MODIFICATION

Summary: Thirty-two channel modifications were identified in the watershed. Channelization to provide drainage for agricultural areas (31,100 stream-ft) and roads adjacent to stream beds (55,828 stream-ft) were the primary types of channel modification occurring in the watershed.

Nearly two-thirds of the channel modifications in the watershed occur in the lower reaches, in the Molalla River / Cedar Creek (33,470 str-ft, 36.4%), Molalla River / Willamette River (11,052 str-ft, 12.0%), and Lower Milk Creek (14,110 str-ft, 15.3%) subwatersheds. This is most likely a function of the agricultural nature of the lower watershed.

Channel modifications that have occurred in the watershed have resulted primarily from agricultural activities and placement of road infrastructure. The most common of these modifications, channelization, has contributed to alteration of channel dimensions and entrenchment of a number of stream segments. The continued presence and function of these modifications will prevent reestablishment of more stable channel conditions in the LMRMCW. Channel downcutting and alteration of flow regimes downstream of these areas will continue to result from these modifications.

DATA GAPS

- A complete inventory of channel modifications on private lands and in smaller streams where aerial photographs are of limited use in identifying channel modifications.

RECOMMENDATIONS

- Field inspect channel modifications to determine extent of modification to channel shape and function, fish habitat, and flows.

WATER QUALITY

Summary: Two river segments in the LMR&MC watershed are currently listed as water quality limited water bodies. Both of these segments occur on the mainstem Molalla River. DEQ currently monitors 156 sites across the state to provide water quality data for trending, standards compliance, and problem identification (DEQ 2000). The Molalla River at Knights Bridge in Canby (site 402314, RM 2.5) has been monitored under this program since 1985 (Figure 8.2). Currently, water quality data are collected from this site approximately bimonthly. Water temperature and fecal coliform data collected from this site have been used to place the lower Molalla River on the 303(d) list for standards violations of these parameters. Data collected from this station indicate that elevated levels of total phosphates, nitrate and ammonia nitrogen, fecal coliform, and biochemical oxygen demand occur in the fall, winter, and spring in Molalla River at Canby. High temperatures, high biochemical oxygen demand, and low dissolved oxygen concentrations also occur during low flow summer months and are attributable to non-point source pollution from agricultural areas in the lower watershed. The report concludes that these impacts have increased over time, as water quality had significantly declined during the reporting period of 1985-1995.

Water temperature data collected from the lower Molalla River and lower Milk Creek for this assessment indicate that summertime water temperatures in 2003 regularly exceeded the state's 64°F temperature standard. Maximum daily temperatures in the mainstem Molalla River above Milk Creek exceeded 64°F on 113 of 125 days (91%) data were collected, while daily maximums exceeded 64°F on 90 of 125 days (76%) on lower Milk Creek. Maximum daily stream temperatures on upper Milk Creek, although not as high as those on lower Milk Creek and the mainstem Molalla River, still exceeded the 64°F standard on 45 of 125 days between June and October, 2003. Because these data were collected during a drought year, when low flows occurred in the watershed, we recommend collection of additional summertime water temperature data from these water bodies to more thoroughly evaluate water quality.

The only known sampling in the lower watershed to evaluate biological integrity occurred in 2001 and 2003 by ABR and Molalla River Watch. Biological integrity, based on multimetric scores, ranged from slightly impaired four miles below the confluence with the North Fork of the Molalla River, to severely impaired approximately one mile above the confluence with the Pudding River. Sites located between these two locations scored in the moderately impaired range. The data exhibited a strong trend in increasing biological impairment to benthic communities with increasing distance downriver.

DATA GAPS

- Water quality data for most of the watershed are lacking. Continuous efforts to monitor water quality in the watershed have occurred only in the lower mainstem in Canby.

RECOMMENDATIONS:

- Implement a water quality monitoring program in the watershed that would include larger tributaries and several stations along both the Molalla River and Milk Creek. Monitoring should be designed to include regular sampling of temperature, conductivity, dissolved oxygen, and bacterial and nutrient concentrations. Much of this work could be performed through a volunteer-based program with proper training and oversight from DEQ staff.
- Continue to monitor water temperature with continuous recording devices during summer months to better characterize thermal regime of the river.

FISH & FISH HABITAT

Summary: The Molalla River watershed, owing to its wide range of aquatic habitats, supports a diverse assemblage of fish species, including numerous species of both native and introduced origins. Fish populations and fish communities have been altered by changes to physical, chemical, and biological components of streams and rivers through land use practices and introductions of non-native fish species and stocks. Fish habitat quality in the LMR&MC watershed has been degraded by a combination of forestry practices, agricultural practices, roads and road crossings, and residential and industrial development. Salmonid production in the watershed is limited by combined effects of water quality and quantity, and physical habitat degradation.

- The Molalla River watershed is one of only three river systems above the Willamette Falls supporting native winter steelhead that have not yet been severely affected by hydropower development. Redd counts performed between 1980 and 2000 on index streams within entire the Molalla River watershed indicate that steelhead abundance was generally declining through the 1980s and into the mid 1990s, and has since generally increased. These counts primarily represent steelhead use of the upper Molalla River watershed, above the Glen Avon Bridge and outside the assessment area.
- Summer steelhead are not native to the Molalla River watershed and are no longer planted in the river. Releases of summer steelhead into the Molalla were restricted to the lower reaches of the mainstem to avoid potential negative effects on the

native winter steelhead and were terminated in 1999. Natural production by summer steelhead was unknown, but was thought to be minimal.

- Spring chinook salmon were native to the Molalla River watershed. The original run is thought to be extinct from the watershed (BLM & USFS 1999). Current runs of chinook salmon into the Molalla River watershed are thought to consist largely or entirely of fish of hatchery origin. Currently, spring chinook released into the Molalla River are from broodstock collected at the S. Santiam Hatchery. Fish are reared from early egg stage to their time of release at the Willamette hatchery (ODFW 2001). Recent ODFW surveys that approximately 2% of returning spring chinook salmon are stream-bred fish. ODFW plans to continue spawning surveys in the Molalla River to estimate the relative abundance of hatchery and wild fish, and will also perform spring juvenile surveys to determine the abundance of stream-bred juvenile chinook salmon in the Molalla River watershed.
- Rainbow trout are thought to be native to the Molalla River watershed. Because resident rainbow trout are very difficult to distinguish from juvenile steelhead, rainbow trout distribution in the watershed is unknown. Isolated populations of resident rainbow trout occur in several tributaries in the upper watershed, but none are known to occur in the lower watershed within the geographic scope of this assessment. No population estimates currently exist of rainbow trout in the LMR&MC watershed.
- Coastal cutthroat trout, *Onchorhynchus clarki clarki,* are native to the Molalla River watershed. Cutthroat trout occur in the upper mainstem Molalla and tributaries throughout the upper watershed. Despite numerous surveys to determine the distribution and estimate population sizes of resident trout in the upper watershed, information describing cutthroat trout distribution and population sizes in the LMR& MC watershed is scarce. ODFW fish presence surveys performed in the 1980s documented cutthroat trout use of Bittner Creek.

Few physical habitat surveys have been performed in the LMR&MC watershed. ODFW performed coarse surveys of instream habitat conditions throughout the mainstem of the Molalla River in 1980 and 1981. More recently, ABR, Inc. and Molalla RiverWatch performed habitat surveys of four reaches in the lower Molalla River in 2001 and in two reaches in Milk Creek in 2003. Despite the lack of data available to document and quantify stream and river habitat conditions, aquatic habitat has clearly been degraded throughout much of the LMR&MC watershed. Degradation has resulted from timber harvest, agricultural practices, and residential and industrial development in the watershed producing the following types of disturbance:

- Loss of riparian vegetation
- Changes in stream and rivers flows
- Barriers to fish movement and migration
- Stream channelization
- Increased sedimentation
- Increased water temperatures

Clackamas County's Transportation Maintenance Division initiated culvert inventories throughout the County in 2002. The project, currently in progress, will include a complete inventory of all stream crossings along county maintained roads within the LMR&MC watershed. An estimated 1,311 road/stream crossings occur within the County; of these, 975 are estimated to be barriers to fish passage. Since 1998, 20 fish passage barriers have been replaced by the county, opening 47.5 miles of stream to upstream fish passage within the watershed.

DATA GAPS

- Information describing current distribution of salmonids (resident and anadromous) in the watershed, particularly on tributary streams.

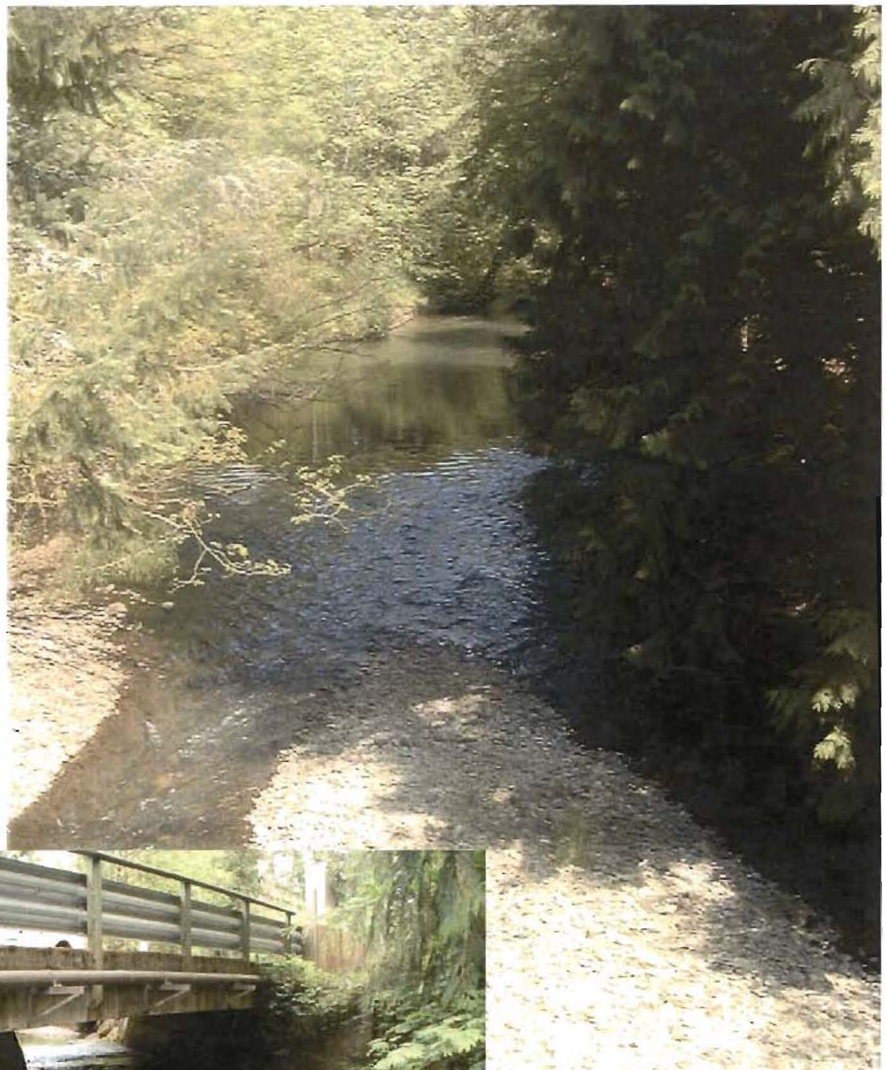
- Fish community surveys of tributaries to examine community composition and salmonid abundance.
- Inventories of habitat quantity and quality for salmonids in Milk Creek and tributary streams.

RECOMMENDATIONS

- Perform surveys to determine the extent of fish distribution within tributary systems.
- Survey fish communities and habitat conditions on Milk Creek and tributaries to determine habitat conditions and fish community composition in the watershed. Use these data in conjunction with physical and chemical data to determine where impairment to biological communities is occurring. Select stream reaches where water quality monitoring will also occur and establish these reaches as permanent monitoring stations to track trends in watershed conditions. These data will also assist with identifying priority restoration needs and locations within the watershed.

LOWER MOLALLA RIVER & MILK CREEK WATERSHED ASSESSMENT

APPENDIX OF PHOTOGRAPHS



PREPARED FOR

MOLALLA RIVERWATCH, INC.
MOLALLA, OREGON

PREPARED BY

ABR, INC.
FOREST GROVE, OREGON

LIST OF PHOTOS

Photo #	Date	Location	Description
5	5/22/2003	Molalla mainstem	From Glen Avon Bridge
7	5/22/2003	Dickey Creek	From Odeane road crossing
8	5/22/2003	Dickey Creek	Tree farm
9	5/22/2003	Woodcock Creek	Downstream from culvert
10	5/22/2003	Woodcock Creek	Culvert from downstream looking up
11	5/22/2003	Woodcock Creek	Upstream of culvert
12	5/22/2003	Hancock Creek	Culvert
13	5/22/2003	Hancock Creek	Upstream above road crossing
14	5/22/2003	Bull Creek	Upstream above road crossing
15	5/22/2003	Woodcock Creek	Downstream
16	5/22/2003	Woodcock Creek	Culvert from downstream looking up
17	5/22/2003	Woodcock Creek	Culvert from upstream looking down
18	5/22/2003	Upper watershed	Typical hobby farm
19	5/22/2003	Dickey Prairie	Upriver from Right/Fernwood intersection
20	5/22/2003		S. Callahan/S. Ramsby road crossing looking upstream
21	5/22/2003	Milk Creek	Drainage looking up valley from Highway 211
22	5/22/2003	Milk Creek	Upstream from Dhooghe Bridge
23	5/22/2003	Milk Creek	Downstream
24	5/22/2003	Canyon Creek	Haskinmill road crossing looking upstream
25	5/22/2003	Canyon Creek	Haskinmill road crossing looking upstream
26	5/22/2003	Canyon Creek	Haskinmill road crossing looking downstream
27	5/22/2003	Canyon Creek	Upstream (Green Mountain)
28	5/22/2003	Canyon Creek	Inlet of box culvert
29	5/22/2003	Canyon Creek	Side channel
30	5/22/2003	Unnamed trib to Bee Creek	Unnamed trib to Bee Creek
31	5/22/2003	Bee Creek	Upstream
32	5/22/2003	Bee Creek	Culvert
33	5/22/2003	Bee Creek	Downstream
34	5/22/2003	Milk Creek	Valley
35	5/22/2003	Milk Creek	Upstream from Grays Hill
36	5/22/2003	Milk Creek	Downstream from Grays Hill
37	5/22/2003	Jackson Creek	Upstream
38	5/22/2003	Jackson Creek	Downstream
39	5/22/2003	Mill Creek	Upstream
40	5/22/2003	Mill Creek	Downstream
41	5/22/2003	Dorn Creek	Downstream from Elwood road crossing
42	5/22/2003	Dorn Creek	Upstream from Elwood road crossing
43	5/22/2003	Dorn Creek	Culvert outlet
44	5/22/2003	Bittner Creek	Cow tracks
45	5/22/2003	Bittner Creek	Downstream
46	5/22/2003	Bittner Creek	Upstream
47	5/22/2003	Bittner Creek	Land use adjacent to creek
48	5/22/2003	Nate Creek	Upstream from Unger road crossing
49	5/22/2003	Nate Creek	Downstream from Unger road crossing
50	5/22/2003	Randall Road Creek	Upstream from Unger road crossing
51	5/22/2003	Randall Road Creek	Stream restoration sign
52	5/22/2003	Randall Road Creek	Downstream from Unger road crossing

53	5/22/2003	Randall Road Creek	Culvert upstream
54	5/22/2003	Cedar Creek	Watershed from Windy City road crossing
55	5/22/2003	Milk Creek	Downstream from Windy City road crossing
56	5/22/2003	Milk Creek	Upstream from Windy City road crossing
57	5/22/2003	Milk Creek	Downstream from Graves road crossing
58	5/22/2003		Upstream
59	5/22/2003		Stream restoration sign
60	5/22/2003		Down through culvert
61	5/22/2003		Up through culvert
62	6/11/2003	Molalla mainstem	Temp Recorder Site - behind Gymkowski's
63	6/11/2003	Molalla mainstem	Temp Recorder Site - behind Gymkowski's
64	6/11/2003	Molalla mainstem	Temp Recorder Site - behind Gymkowski's
65	6/11/2003	Molalla mainstem	bank erosion from 96 flood - behind Gymkowski's
69	6/11/2003	Milk Creek	Temp recorder Site - at Bonney Road Bridge
70	6/11/2003	Molalla mainstem	Temp recorder Site - Molalla R behind Milk Ck tree farm
71	6/11/2003	Molalla mainstem	Temp recorder Site - Molalla R behind Milk Ck tree farm
72	6/11/2003	Molalla mainstem	Japanese knotweed along Molalla R
73	6/11/2003	Woodcock Creek	at Callahan Road
74	6/11/2003	Woodcock Creek	at Callahan Road
75	6/11/2003	Bull Creek	riparian zone along 211
76	6/11/2003	Bull Creek	at 211 (above box culvert)
77	6/11/2003	Milk Creek	at Hult Road - facing down
78	6/11/2003	Nate Creek	at Hult Road - facing up
79	6/11/2003	Nate Creek	at Hult Road - facing bridge
80	6/11/2003	Milk Creek	watershed from upper Hult Road
81	6/11/2003	Milk Creek	watershed from upper Hult Road
82	6/11/2003	Milk Creek	watershed from upper Hult Road
83	6/11/2003	Milk Creek	watershed from upper Hult Road
84	6/11/2003	Randell Creek	at Hult Road
85	6/11/2003	Randell Creek	at Hult Road

Molalla River

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Dickey Creek

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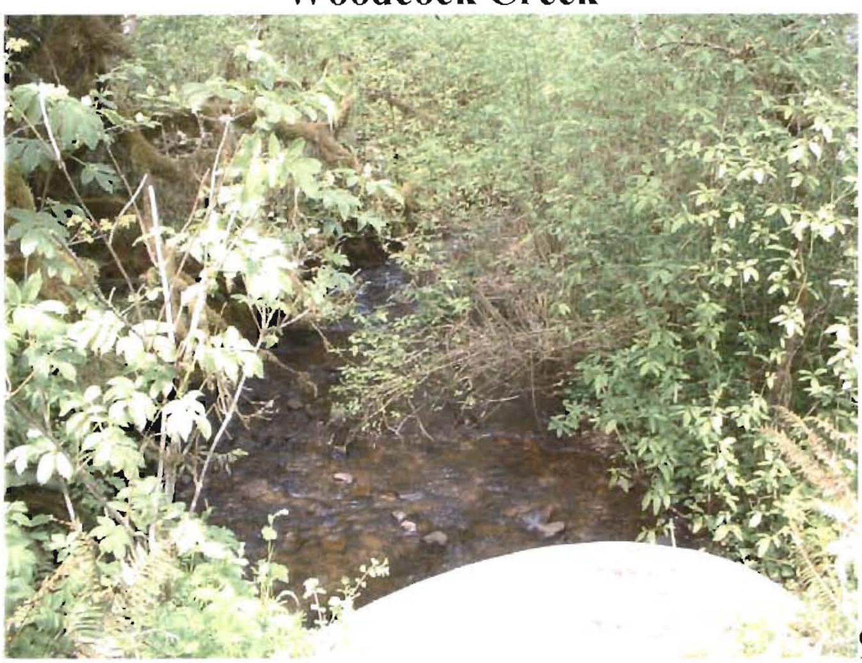
Woodcock Creek



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Hancock Creek

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Bull Creek

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Woodcock Creek

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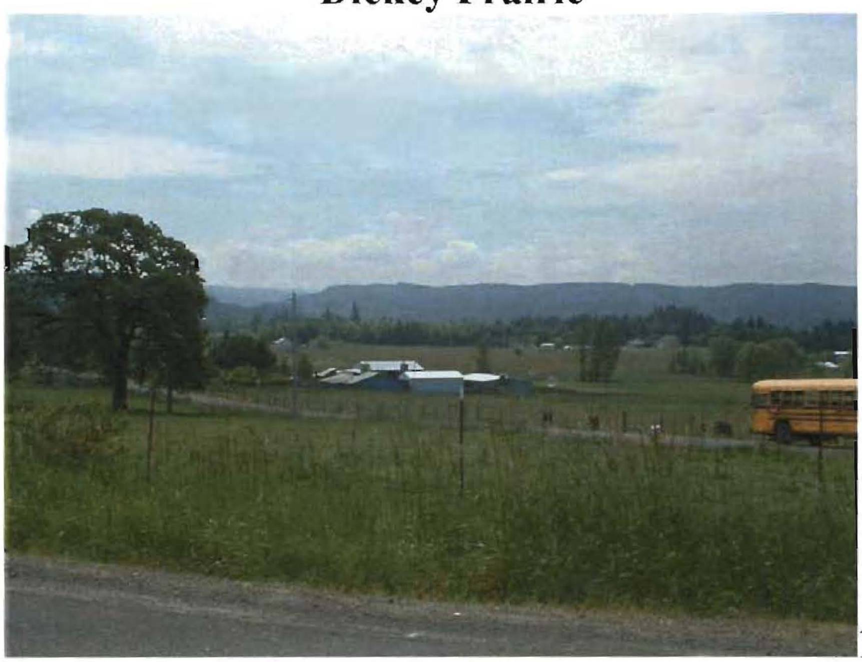
Dickey Prairie



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Milk Creek valley

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Milk Creek

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Canyon Creek

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Bee Creek tributary

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Bee Creek

31

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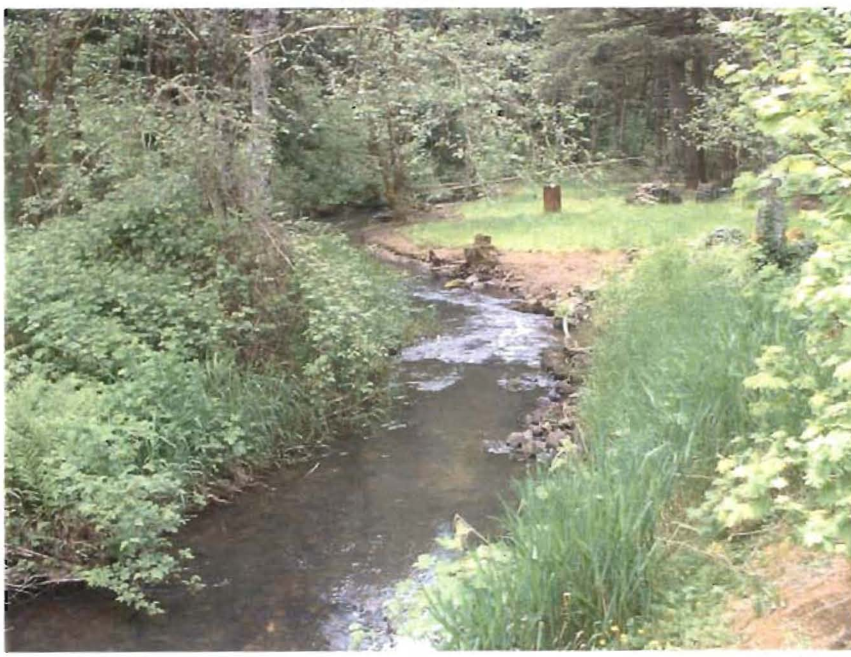

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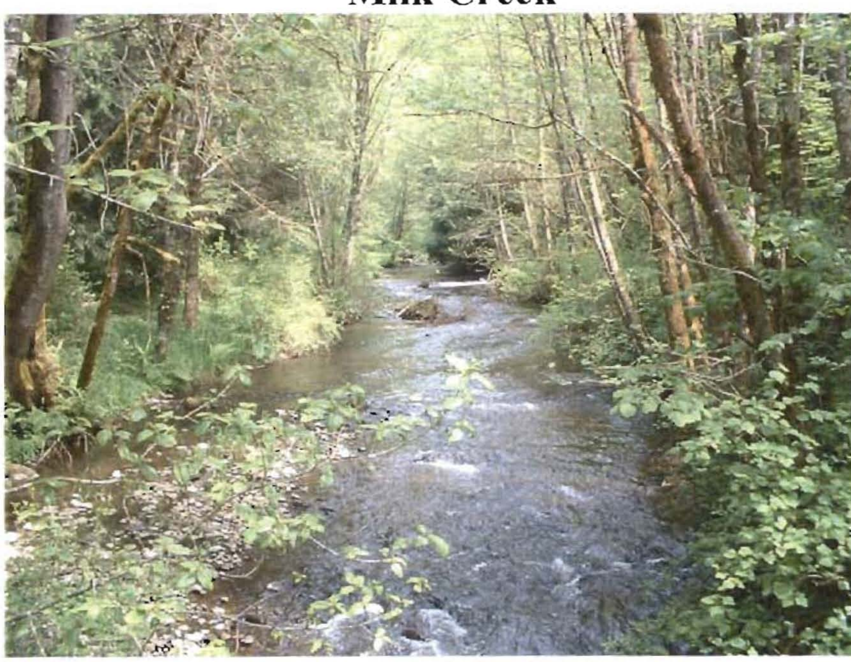
Milk Creek valley

34

Milk Creek



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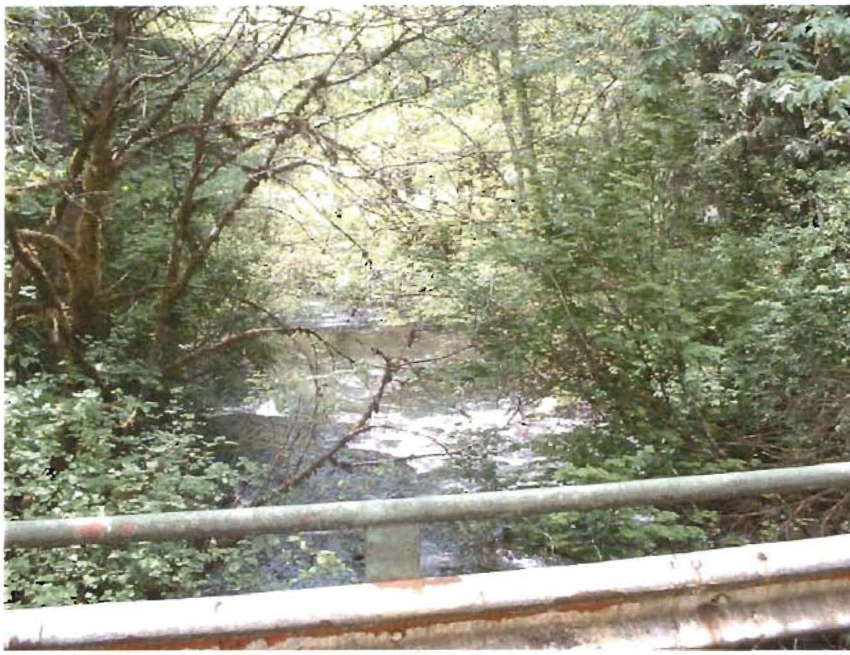

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Jackson Creek

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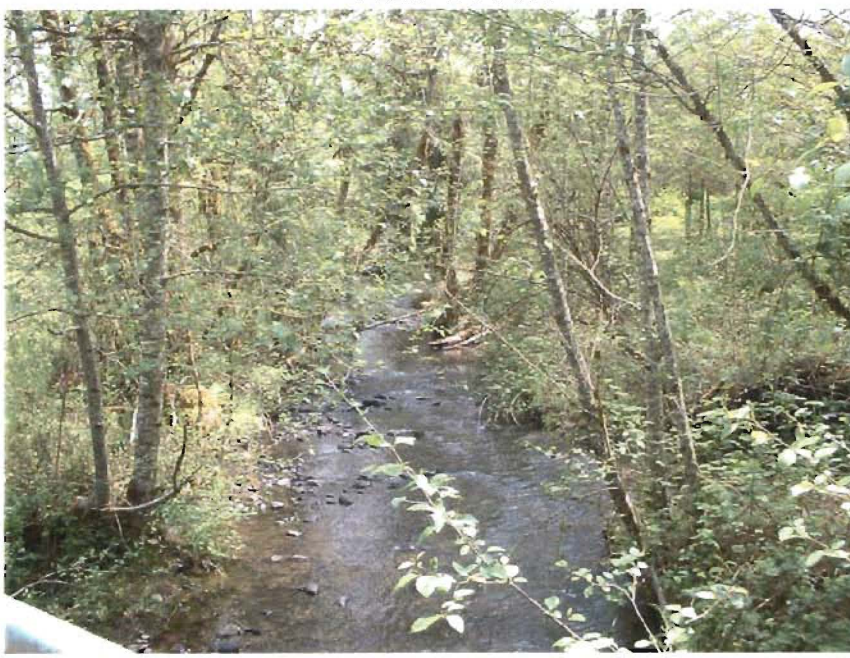
38

Mill Creek


39

Mill Creek

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Dorn Creek

41


42


43

Bittner Creek

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45

46

47

Nate Creek

48

49

Randall Road Crossing

50

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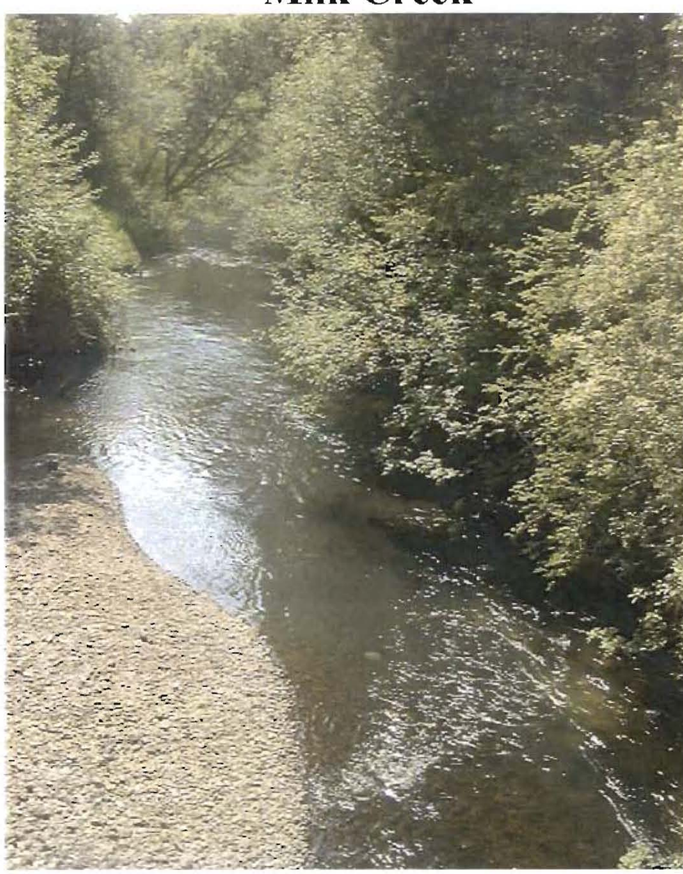
54

Milk Creek



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Milk Creek tributary

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61

Molalla River

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Milk Creek

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Molalla River

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71

72

Woodcock Creek

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74

Bull Creek riparian zone

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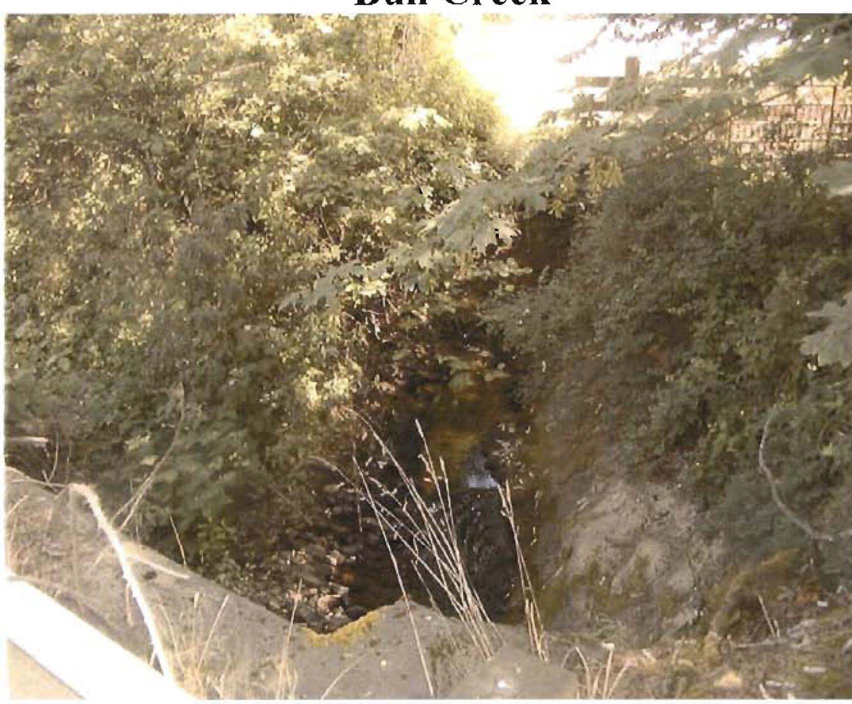
Bull Creek



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Milk Creek

77

Nate Creek

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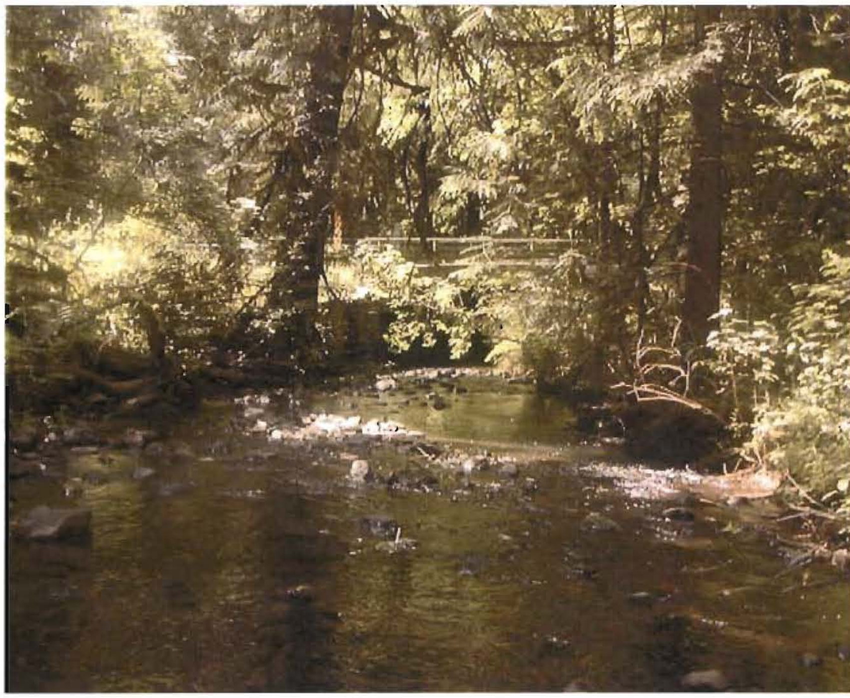

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Milk Creek watershed view

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83

Randall Creek

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