



**Submittal to NOAA Fisheries for
Coverage under Limit 10 of the 4(d) Rules for
Routine Road Maintenance**

**Multnomah County
Department of Community Services
Land Use and Transportation Division – Road Services**

May 2010

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I. ROAD MAINTENANCE PROGRAM SUMMARY

Program Area Description

Multnomah County's Land Use and Transportation Division is responsible for the design, construction, maintenance, and operation of 297 centerline miles of roads and streets, and bridges within the County. There are 26 vehicular bridges, of which six are the large Willamette River bridges. Work is conducted by the Road Maintenance section in four unique work districts, and by the Bridge Maintenance section on the Willamette River bridges (Figure 1).

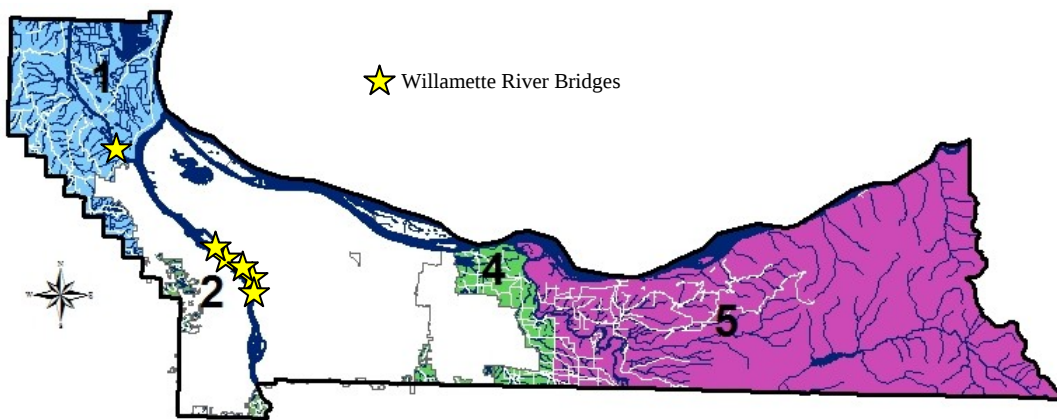


Figure 1. Map of the County road maintenance districts.

The County is a unique jurisdiction consisting of urban and rural roadways (Table 1). The County's responsibilities for roadways are largely to the rural roads in the east and west portions of the County (Districts 1 and 5). The Oregon Department of Transportation maintains several highways in these districts including the Columbia River Historical Highway, Highway 30 and Highway 26.

The Cities of Portland and Gresham occupy the majority of urban areas, and the County does not have responsibility for roadways within the boundaries of Portland or Gresham, except for the Willamette River bridges. There are several the urban unincorporated pockets within the City of Portland urban services boundary where the roads are owned by the County (District 2). However, these roads are maintained and operated by Portland Department of Transportation through an inter-governmental agreement. In the past year, the County has assisted the Portland program in those areas as a result of budget cuts. In the urban area within the Cities of Wood Village, Fairview and Troutdale the County owns and maintains an additional 28 miles of arterial roads (District 4).

Table 1. County road management areas.

<i>District number</i>	<i>Area</i>	<i>Road ownership</i>	<i>Management responsibility</i>
1	West Multnomah unincorporated County	Multnomah County	Multnomah County
2	Unincorporated pockets within Portland urban services area	Multnomah County	City of Portland
<i>Bridge Section</i>	Willamette River bridges (Sauvie Island, Broadway, Burnside, Morrison, Hawthorne, and Sellwood Bridges) and Stark St Bridge	Multnomah County	Multnomah County
4	Arterials within the Cities of Wood Village, Fairview, and Troutdale	Multnomah County	Multnomah County
4	Unincorporated pocket within Fairview (known as “Interlachen”)	Multnomah County	Multnomah County
5	East Multnomah unincorporated County	Multnomah County	Multnomah County

Program management and legal authority

The County road and bridge maintenance program is implemented by the Department of Community Services, Land Use and Transportation Division, Road Services and Bridge Services. All road and bridge maintenance activities are carried out by County maintenance staff (and/or contractors) under the supervision of Road Services Manager and the Bridge Services Manager. The County’s organizational chart is shown in Figure 2. Part V of this document describes how the program is implemented.

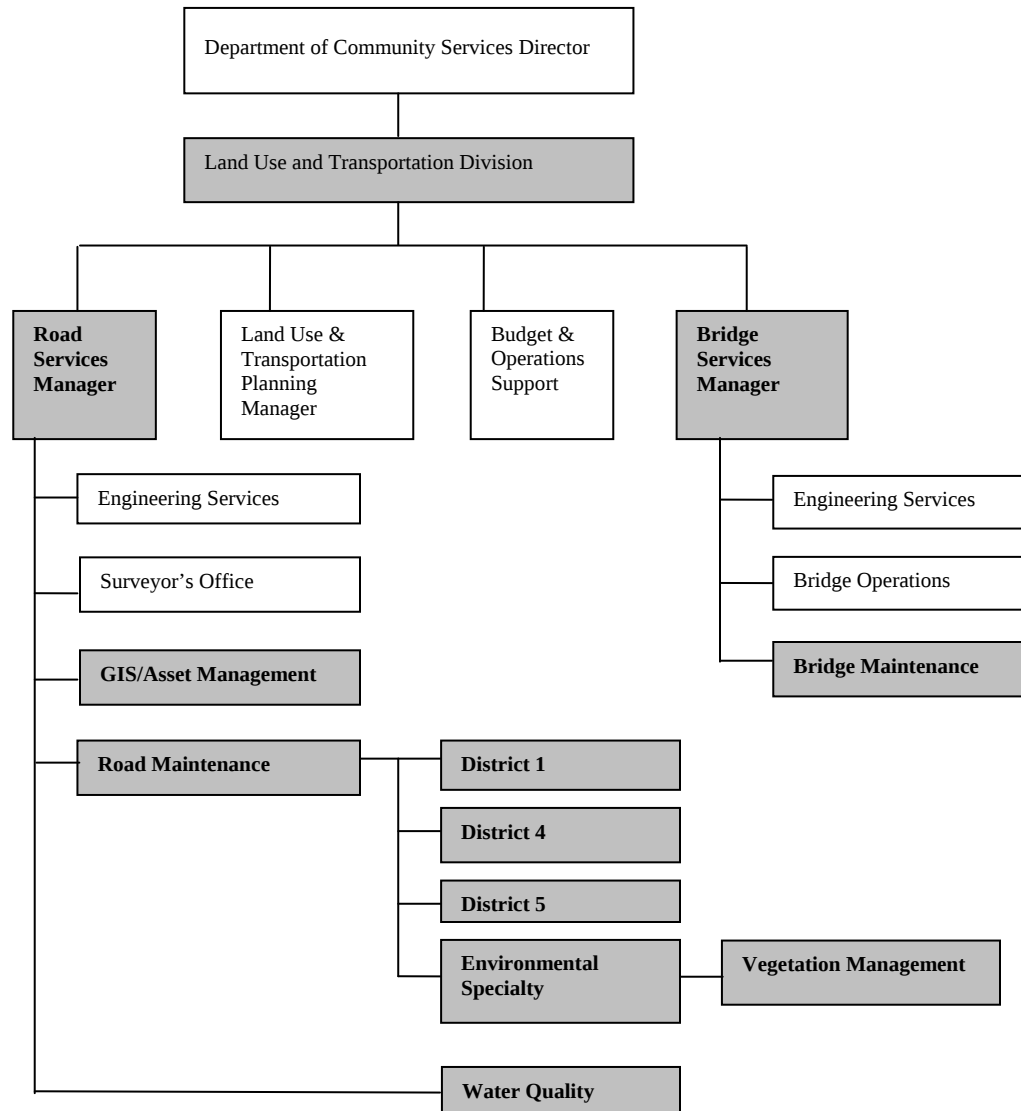
The Road Maintenance Manager directs each District Supervisor to implement the County’s Road Maintenance and Operations Manual (RMOM), the reference for routine road and bridge maintenance best management practices (BMPs). The Bridge Maintenance Manager develops detailed work orders with BMPs based on the RMOM for maintenance on the Willamette River Bridges. The Environmental Specialist with the Water Quality Program coordinates the development, evaluation and updates of the manual.

Routine Road Maintenance Program

The routine road and bridge maintenance programs of Multnomah County are guided by the County’s Road Maintenance and Operations Manual (RMOM), and supported in part by a detailed work order system. The RMOM is substantially similar to, and at least as

protective as, the 2004 ODOT Routine Road Maintenance program approved under the 4(d) limit 10. The RMOM is enclosed with this document in the County submittal packet.

Figure 2. Multnomah County Land Use and Transportation organizational chart



The RMOM largely parallels the 2009 ODOT Manual in the activities, and draws from two additional NOAA approved manuals: King County, Washington, and Washington County, Oregon. The RMOM features three elements that ensure the protection of listed species from County road maintenance practices. The best management practices in the RMOM are “outcome-based” focusing on avoiding and minimizing impacts from sediment, erosion, and pollutants, and maximizing opportunities to improve habitat.

Also, restricted activity zones (RAZ) are used to delineate sensitive areas near waterways. Finally, the RMOM always refers to the Environmental Specialist or other resources if questions arise from a unique situation.

The RMOM consists of 51 maintenance activities grouped into nine maintenance categories.

1. General work (e.g., equipment maintenance, material handling)
2. Vegetation management
3. Traffic Operations
4. Surface Maintenance
5. Right-of-way maintenance
6. Drainage maintenance
7. Emergency work
8. Bridge maintenance
9. In-water work

A comparison of the ODOT and County programs is shown in Appendix B. This matrix identifies areas where the County program differs from the ODOT program, either in organization or in substance, and describes how the County practices meets or exceeds the ODOT standard.

II. DESCRIPTION OF LISTED SPECIES AFFECTED BY THE PROGRAM

Evolutionary significant units of threatened salmonids potentially affected by the routine road and bridge maintenance program include the following species listed in Table 2.

Table 2. Listed salmonid status and distribution in the Multnomah County program area.

<i>Species</i>	<i>ESU</i>	<i>Distribution within Multnomah County program area</i>	<i>ESA Listing Status</i>
Coho Salmon	Lower Columbia River	Sandy River • <i>Gordon Creek</i> • <i>Trout Creek</i> • <i>Beaver Creek</i> Willamette River • <i>Johnson Creek</i> • <i>Columbia Slough</i> Columbia River • <i>Multnomah Channel</i> • <i>McCarthy Creek</i> • <i>Miller Creek</i> • <i>Sturgeon Lake (Sauvie Is.)</i> • <i>Nat. Scenic Area Tributaries</i>	Threatened

Chinook Salmon	Lower Columbia River	Sandy River • <i>Gordon Creek</i> • <i>Beaver Creek</i> • <i>Trout Creek</i> Willamette River • <i>Johnson Creek</i> • <i>Columbia Slough</i> Columbia River • <i>Multnomah Channel</i> • <i>Sturgeon Lake (Sauvie Is.)</i> • <i>Nat. Scenic Area Tributaries</i> • <i>Salmon Creek</i>	Threatened
	Upper Willamette River	Willamette/Tualatin River • <i>Rock Creek</i>	Threatened
Steelhead	Lower Columbia River	Sandy River • <i>Gordon Creek</i> • <i>Beaver Creek</i> • <i>Trout Creek</i> Willamette River • <i>Johnson Creek</i> • <i>Columbia Slough</i> Columbia River • <i>Multnomah Channel</i> • <i>Sturgeon Lake (Sauvie Is.)</i> • <i>Nat. Scenic Area Tributaries</i>	Threatened
	Upper Willamette River	Willamette/Tualatin River • <i>Rock Creek</i>	Threatened
	Middle Columbia River	Columbia River	Threatened
Chum Salmon	Columbia River	Columbia River	Threatened

Coho Salmon (*Oncorhynchus kisutch*) – Lower Columbia River ESU

Lower Columbia River coho were listed as a threatened species on August 29, 2005. The ESU includes all naturally spawned populations of coho salmon in the Columbia River and its tributaries from the mouth of the Columbia up to and including the Big White Salmon and Hood Rivers, and includes the Willamette River to Willamette Falls, Oregon. Twenty-five artificial propagation programs are considered to be part of the ESU.

Distribution

Critical habitat for this ESU had not yet been proposed by the time of this submittal. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 10,418 square miles in Oregon and Washington. The following Oregon counties lie partially or wholly within these basins: Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, Wasco, and Washington.

Coho salmon distribution in the Multnomah County road maintenance program area includes the streams listed in Table 2.

Chinook Salmon (*Oncorhynchus tshawytscha*) – Lower Columbia River ESU

Lower Columbia River Chinook were listed as a threatened species on March 24, 1999. The ESU includes all naturally spawned populations of Chinook salmon from the Columbia River and its tributaries from its mouth at the Pacific Ocean upstream to a transitional point between Washington and Oregon east of the Hood River and the White Salmon River, and includes the Willamette River to Willamette Falls, Oregon, exclusive of spring-run Chinook salmon in the Clackamas River. Seventeen artificial propagation programs are considered to be part of the ESU, including the Sandy River Hatchery (ODFW stock 11) Chinook hatchery programs.

Distribution

Critical habitat includes all river reaches accessible to listed Chinook salmon in Columbia River tributaries between the Grays and White Salmon Rivers in Washington and the Willamette and Hood Rivers in Oregon, inclusive. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). In addition, several fifth-field watersheds were excluded from critical habitat in 2005. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 6,338 square miles in Oregon and Washington. The following Oregon counties are considered as a part of this ESU: Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, Wasco, and Washington.

Chinook salmon distribution in the Multnomah County road maintenance program area includes the streams listed in Table 2.

Chinook salmon (*Oncorhynchus tshawytscha*) – Upper Willamette River ESU

Upper Willamette River Chinook were listed as a threatened species on March 24, 1999. The ESU includes all naturally spawned populations of spring-run Chinook salmon in the

Clackamas River and in the Willamette River, and its tributaries, above Willamette Falls, Oregon. Seven artificial propagation programs are considered to be part of the ESU.

Distribution

Critical habitat includes river reaches accessible to listed Chinook salmon in the Clackamas River and the Willamette River and its tributaries above Willamette Falls. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). In addition, several fifth-field watersheds were excluded from critical habitat by NOAA Fisheries in 2005, including the portions of the Tualatin River watershed that fringe Multnomah County. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 8,575 square miles. The following Oregon counties are considered as a part of this ESU: Benton, Clackamas, Clatsop, Columbia, Douglas, Lane, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill.

Chinook salmon distribution in the Multnomah County road maintenance program area includes the streams listed in Table 2.

Steelhead (*Oncorhynchus mykiss*) – Lower Columbia River ESU

Lower Columbia River steelhead were listed as a threatened species on March 19, 1998. The ESU includes all naturally spawned populations of steelhead (and their progeny) in streams and tributaries to the Columbia River between the Cowlitz and Wind Rivers, Washington (inclusive) and the Willamette and Hood Rivers, Oregon (inclusive). Excluded are steelhead in the upper Willamette River Basin above Willamette Falls and steelhead from the Little and Big White Salmon Rivers in Washington.

Distribution

Critical habitat includes river reaches accessible to listed steelhead in Columbia River tributaries between the Cowlitz and Wind Rivers in Washington and the Willamette and Hood Rivers in Oregon, inclusive. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Major river basins containing spawning and rearing habitat for this ESU comprise approximately 5,017 square miles in Oregon and Washington. The following Oregon counties are considered as a part of this ESU (or contain migration habitat for the species): Clackamas, Clatsop, Columbia, Hood River, Marion, Multnomah, and Washington.

Steelhead distribution in the Multnomah County road maintenance program area includes the streams listed in Table 2.

Steelhead (*Oncorhynchus mykiss*) – Upper Willamette River ESU

Upper Willamette River steelhead were listed as a threatened species on March 25, 1999. The ESU includes all naturally spawned populations of winter-run steelhead in the Willamette River, Oregon, and its tributaries upstream from Willamette Falls to the Calapooia River, inclusive. Portions of the Tualatin River watershed that fringe Multnomah County were excluded from critical habitat by NOAA Fisheries in 2005.

Distribution

Critical habitat includes river reaches accessible to listed steelhead in the Willamette River and its tributaries above Willamette Falls upstream to, and including, the Calapooia River. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). In addition, several fifth-field watersheds were excluded from critical habitat by NOAA Fisheries in 2005, including the portions of the Tualatin River watershed that fringe Multnomah County. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 4,872 square miles in Oregon. The following counties lie partially or wholly within these basins (or contain migration habitat for the species): Oregon - Benton, Clackamas, Clatsop, Columbia, Lincoln, Linn, Marion, Multnomah, Polk, Tillamook, Washington, and Yamhill.

Steelhead distribution in the Multnomah County road maintenance program area includes the streams listed in Table 2.

Steelhead (*Oncorhynchus mykiss*) – Middle Columbia River ESU

Middle Columbia steelhead were listed as a threatened species on March 25, 1999. The ESU includes all naturally spawned populations of steelhead in streams from above the Wind River, Washington, and the Hood River, Oregon (exclusive), upstream to, and including, the Yakima River, Washington. Excluded are steelhead from the Snake River Basin.

Distribution

Middle Columbia River steelhead migrate through Multnomah County, and rear in the Columbia River, its tributaries and Sturgeon Lake.

Chum salmon (*Oncorhynchus keta*) – Columbia River ESU

Columbia River chum were listed as a threatened species on March 25, 1999. The ESU including all naturally spawned populations of chum salmon in the Columbia River and its tributaries in Washington and Oregon, as well as three artificial propagation programs:

the Chinook River (Sea Resources Hatchery), Grays River, and Washougal River/Duncan Creek chum hatchery programs.

Distribution

Critical habitat includes all river reaches accessible to listed chum salmon (including estuarine areas and tributaries) in the Columbia River downstream from Bonneville Dam, excluding Oregon tributaries upstream of Milton Creek at river km 144 near the town of St. Helens. Excluded are tribal lands and areas above specific dams or above longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). In addition, several fifth-field watersheds are proposed for exclusion from critical habitat but these exclusions are still under review by NOAA Fisheries. Major river basins containing spawning and rearing habitat for this ESU comprise approximately 4,426 square miles in Oregon and Washington. The following Oregon counties are considered as a part of this ESU: Clatsop, Columbia, Multnomah, and Washington.

Chum salmon distribution in the Multnomah County road maintenance program area includes the streams listed in Table 2.

III. DESCRIPTION OF GEOGRAPHIC AREA TO WHICH THE PROGRAM APPLIES

This section provides an overview of existing environmental baseline conditions within the geographic area of the County road maintenance program area. The waterbodies in the program area include the mainstem and tributaries of the Lower Willamette, Sandy, and Columbia Rivers, and tributaries of the Tualatin River (Table 3). The potential impacts from maintenance activities are mostly related to sediment and vegetation, therefore the health of the small headwater tributaries are at greater risk of disturbance. Despite their size, these stream reaches are very important for fish rearing, food production, and water quality, not only to ESA listed fish, but other at-risk and resident native fishes. The following physical, biological and chemical conditions are presented as an environmental baseline of habitat quantity and quality:

- instream flow
- water quality
- riparian conditions
- channel conditions
- migration barriers
- biological integrity

Also, each waterbody description lists the significant County roads in the watershed, and the salmonid species if the waterbody contains a ESA Critical Habitat designation. Potential impacts to stream health are discussed in general. More discussion is contained

in the RMOM for each activity category, but these are not described specifically for each stream.

Not all waterbodies have the same level of monitoring history. In many cases, no quantitative information exists for baseline information. However, qualitative descriptions may exist in a number of citations, which can be found in section V, if more detailed information or information sources are needed. Improvements to stream health are continually being done by local watershed councils, the Soil & Water Conservation Districts, local municipalities, and neighborhood groups. The County has established partnerships with the various groups within the unincorporated area, as well as to establish interjurisdictional cooperation for monitoring according to the County's TMDL plans for westside and eastside streams.

Table 3. Waterbodies in the program area.

<i>Watershed</i>	<i>River / Stream</i>
Lower Sandy River	• <i>Lower Sandy / Minor tributaries</i>
	• <i>Gordon Creek / Trout Creek</i>
	• <i>Beaver Creek</i>
Lower Willamette River	• <i>Lower Willamette River</i>
	• <i>Johnson Creek</i>
	• <i>Columbia Slough / Fairview Creek</i>
Columbia River	• <i>Multnomah Channel</i>
	• <i>McCarthy Creek</i>
	• <i>Miller Creek</i>
	• <i>National Scenic Area tributaries</i>
	• <i>Salmon Creek / Arata Creek</i>
Tualatin River (Willamette River)	• <i>Rock Creek</i>

Lower Sandy River (and minor tributaries)

Roads: Stark St bridge; numerous rural local and collector roads in District 5, which discharge runoff to minor Lower Sandy River tributaries with natural fish barriers near the mouths (Big Creek, Buck Creek, Smith Creek).

Critical habitat: Chinook (mainstem), Steelhead (mainstem and tributary reaches below natural barriers).

- Instream flow:** The Sandy River flows typically range in the 1,500 cubic feet per second range. Flows for the minor tributaries have not been quantified, but as forest and agricultural land uses dominate, flow modifications would be expected to be low to moderate.
- Water quality:** The lower Sandy River is water quality limited primarily by temperature as a result of channel widening, inadequate stream shading by mature riparian trees, and water impoundments. Some of the minor Sandy River tributaries are also impaired by temperature as a result of the lack of riparian vegetation in some agricultural areas.
- Riparian conditions:** Riparian conditions of the Sandy River tend to be of higher quality than those of the tributaries primarily as a result of its location in a canyon and public land ownership. Vegetation cover is dominated by mixed coniferous/deciduous forest, with pockets of old growth. Upstream of Stark Street, the riparian area is in good condition with second growth conifers and deciduous trees. Downstream of Stark Street, there is more development but the riparian corridor is only moderately degraded.
- Riparian areas in the minor tributaries have been impacted by agricultural practices where the buffers are reduced or non-existent. A lack of instream wood is pervasive in many streams.
- Channel conditions:** The Sandy River's upper stretch (within Multnomah County) is a moderate gradient (40-feet per mile), large boulder-choked pool/drop channel commonly referred to as the "Sandy River Gorge". Shallow bedrock (Boring lava and Troutdale formation) is often exposed in the proximity of the Sandy River Gorge due to down-cutting of the tributaries. The Sandy River itself is a large, meandering river deeply incised within the Sandy River Gorge. The river's gradient flattens out significantly near Oxbow Park where the average gradient is reduced to one-third the previous gradient. The change of gradient and geomorphology around Oxbow Park forces sand-sized material to be deposited out of the main flow.
- Migration barriers:** Natural migration barriers exist on many of the minor tributaries of the lower Sandy. These falls and impassible cascades are part of the natural geography of the Sandy River canyon and anadromous fish use is limited to short distances above the confluence of these tributaries and the Sandy River. Some culverts upstream of the anadromous zone are barriers to fish resident fish migration.
- Biological integrity:** No quantitative data exists for the minor tributaries listed above.

Potential impacts: Stormwater discharge from agricultural and forestry areas.
Potential sediment discharge from road maintenance practices, including ditch and shoulder maintenance.

Gordon and Trout Creeks (Sandy River tributaries)

Gordon Creek and its main tributary, Trout Creek, are small tributaries of the Lower Sandy River that are significant because they lack the natural barriers common to the minor tributaries of the Lower Sandy River reach. Gordon Creek is the only remaining free-flowing, unobstructed tributary in this watershed and is an important spawning tributary for threatened wild fall Chinook and winter steelhead trout. The land use is nearly entirely zoned for commercial forestry. Road crossings are limited to one crossing on Gordon Creek at the mouth, and two crossings on Trout Creek.

Roads: Gordon Creek Road and Trout Creek Road (District 5)

Critical habitat: Steelhead, Chinook

Instream flow: No quantitative information exists, however as both streams are located in canyons with significant forest canopies, flow modifications are expected to be low.

Water quality: Temperature is a limiting factor in Gordon Creek.

Riparian conditions: Riparian areas are forested to a large degree. Inadequate riparian buffers from past forestry practices exist in places.

Channel conditions: Tributary channels typically consist of a gravel/cobble bottom with undercut banks and frequent channel incision. Channel stability and sediment load are the main limiting factors for salmonids in Gordon Creek and Trout Creek.

Migration barriers: One step/velocity barrier culvert and a natural barrier falls on Trout Creek. One natural barrier falls in upper Gordon Creek.

Biological integrity: No biological information has been collected.

Potential impacts: Potential impacts from road maintenance are very low risk as there are few road crossings and very few road miles in these watersheds.

Beaver Creek (Sandy River tributary)

Beaver Creek is the lowest tributary on the Sandy River, with the lower reaches located within the Metro Urban Growth Boundary in the Cities of Gresham and Troutdale. The watershed contains a mix of urban and rural development, as well as an abundance of commercial nurseries and other agricultural activities dominating in the upper watershed.

Roads:	Several rural collector and local roads in the unincorporated area (District 5). Within the City of Troutdale, the County maintains arterial and collector roads (District 4).
Critical Habitat:	Chinook, steelhead
Instream flow:	Several inline and off-line irrigation ponds are used in Beaver Creek's agricultural headwaters that impact the summer flows. Winter flows are exasperated by the use of drain tiles, poor riparian conditions, and erosion.
Water quality:	The stream is water quality limited by temperature and bacteria. Pesticide and fertilizer use, as well as stormwater pollutants impact the stream health.
Riparian conditions:	Conditions vary widely, however the lower reaches within the Troutdale valley have good canopy cover. Upper reaches in the agricultural area have very poor to no riparian vegetation in much of the basin. The East Multnomah Soil & Water Conservation District has launched the Stream Care program to provide riparian planting and maintenance for streamside landowners.
Channel conditions:	Habitat diversity and sediment load are the main limiting factors for Beaver Creek. Silt and sand are mixed with pockets of gravel. Large instream wood is very limited in the upper watershed.
Migration barriers:	The Army Corps of Engineers are currently conducting a feasibility study to replace the lowest three large culverts at Troutdale Rd, Stark St and Cochran Rd. Several upstream culverts on Beaver Creek tributaries are partial barriers.
Biological integrity:	No recent quantitative data exists, except for one macroinvertebrate sampling in 2008, which indicated a low biotic integrity. Annual macroinvertebrate monitoring will continue from 2008.
Potential impacts:	Excess runoff from agricultural lands can cause localized erosion in County ditches. Potential erosion from road maintenance practices including ditch and shoulder work may be a risk.

Lower Willamette River

The lower Willamette River drains a watershed covering 11,500 square miles consisting of forested, agricultural, and urban lands. The main stem of the Willamette River begins at the confluence of the Coast Fork Willamette and Middle Fork Willamette Rivers near the City of Eugene. It flows north for 187 miles, dropping 350 feet in elevation, and empties into the Columbia River in north Portland. Several rivers flow into the Lower Willamette main stem, including the Tualatin and Clackamas Rivers.

Roads:	Willamette River Bridges
Critical habitat:	Coho, Chinook, Steelhead
Instream flow:	Flow rates throughout the city range from 5,000 cubic feet per second during the summer to approximately 80,000 cubic feet per second during high-flow periods in the winter and spring. Peak flows after heavy rains have been recorded as high as 400,000 cubic feet per second. The hydrology of the lower Willamette River has been altered by various hydropower operations, storage reservoirs, and urban stormwater flows.
Water quality:	Elevated levels of DDT, PCB's, PAH's and heavy metals, as well as elevated temperatures, low dissolved oxygen levels, and presence of bacteria and toxins contribute to water quality degradation. Bacteria from combined sewer overflows are being remedied by the City of Portland. The impact from County road and bridges is <i>de minimis</i> for most pollutants because of the stormwater filters used on bridge ramps.
Riparian conditions:	Riparian areas through the Portland reach are dominated with seawalls, riprap structure, engineered fill, docks and piers.
Channel conditions:	Historically, the lower Willamette River meandered through a complex braided channel and island system. Today, the river is confined, diked and dredged into a slow-moving system through the City of Portland. The river velocity is reduced around the Sellwood Bridge area, causing deposition of fine sediment. Gradient through the Portland reach is very low.
Migration barriers:	None within program area
Biological integrity:	The existing fish community in the Lower Willamette River includes over 33 warm, cool and coldwater species, including several federally listed salmonid species. The cumulative impacts to water quality and riparian conditions have threatened salmonid

populations. The introduction of nuisance species to the river has led to increased competition for the existing habitat.

Potential impacts: Catch basin stormwater filters are used on several approach ramps including the Broadway, Burnside and Morrison Bridges to reduce stormwater pollutants. Bridge washing may put bird fecal matter into the river, but when done at high flows according to ODFW bridge washing protocols, impacts are minimized. Mechanical fluids leaks are kept in check through regular maintenance and use of BMPs.

Johnson Creek

Johnson Creek flows for 25 miles westward from its headwaters in east Multnomah County, through the Cities of Gresham and Portland, and discharges into the Willamette River in the City of Milwaukie. The Johnson Creek watershed is approximately 54 square miles and intersects several political jurisdictions, including the cities of Damascus, Gresham, Portland, Happy Valley and Milwaukie, and Clackamas and Multnomah Counties. Major tributaries in the unincorporated County include, Kelley Creek, North Fork Johnson Creek, Sunshine Creek and Badger Creek. The upper watershed is a mix of rural residential and agricultural land use.

Roads: Rural roadways cross the mainstem and tributaries numerous times (District 5).

Critical habitat: Chinook (lower mainstem), steelhead

Instream flow: General hydrologic flows are driven by rainfall and groundwater flows. The creek suffers from low summer baseflow through early fall. Flows in the middle and upper watershed frequently do not meet flow targets set by ODFW.

Water quality: Johnson Creek is limited by temperature, fecal bacteria, DDT, Dieldrin, and mercury, for which TMDLs have been implemented in 2006.

Riparian conditions: Riparian conditions vary in width from extensive vegetated areas over 600 feet to reaches with little or no vegetation along the bank. Headwater streams in the unincorporated County flowing through agricultural and rural lands typically lack healthy riparian vegetation. Riparian areas are either narrow, or dominated by invasive plants.

Channel conditions: The floodplain connection is still intact in portions of the upper reaches, however there are extremely low volumes of instream wood, and consequently low habitat diversity. Historic and current

removal of instream LWD by landowners continues to reduce habitat complexity.

Migration barriers: There are several culverts in the upper watershed, but only two are barriers for juveniles. The County replaced the velocity barrier culvert at 282nd in 2008. There are no culverts on the mainstem in the urban areas.

Biological integrity: Johnson Creek provides habitat for several fish species, primarily those species tolerant of more degraded habitat conditions such as redbreasted sunfish, reticulate sculpin, and speckled dace. In smaller numbers there are also pacific lamprey, cutthroat trout and ESA-listed populations of Coho and Chinook salmon, steelhead, and pacific lamprey. Salmonid populations are significantly reduced from historic levels as a result of urbanization and associated habitat. A 2001 ODFW biological monitoring study showed that fish assemblages were severely impaired in 21 out of 23 reaches of Johnson Creek. Low abundance of salmonids were reported in the Portland study, and no anadromous fish were found in the upper reaches. However the presence of coho juveniles was reported by Clackamas Department of Transportation on Badger Creek (upper watershed tributary) for a past road projects.

Recent macroinvertebrate sampling (2008) in the upper watershed showed low Benthic-IBI scores.

Potential impacts: Ditch maintenance and shoulder work can potentially impact the stream if proper timing or erosion control BMPs are not used.

Columbia Slough/Fairview Creek

The Columbia Slough is a narrow waterway, about 19 miles (31 km) long, in the floodplain of the Columbia River. From its source in the Fairview, the Columbia Slough meanders west through Gresham and Portland to the Willamette River, about 1 mile (1.6 km) from the Willamette's confluence with the Columbia. The Multnomah County Drainage District (MCDD) manages a series of floodgates to control water flows, and anadromous fish use is limited to the lowest section of the slough.

Fairview Creek begins at a series of springs and wetlands near Grant Butte in Gresham, flowing north for five miles before emptying into Fairview Lake at the head of the Columbia Slough. County roads discharge stormwater into Fairview Creek and its tributaries from several County owned arterials in the City of Fairview, and from the residential neighborhood of Interlachen. The County has coverage under a NPDES stormwater permit for those areas.

Roads:	Major arterials including Sandy Blvd, Halsey St, Arata Rd, and 223 rd Ave (District 4)
Critical habitat:	Steelhead, Chinook (downstream of MDD pump at 33 rd Ave in City of Portland)
Instream flow:	Columbia Slough has been diverted, diked and channelized for flood control, with pump stations to manage drainage and flow. These activities have resulted in extensive loss of off-channel habitat and degradation of existing aquatic habitat. Flows are highly controlled throughout the year in the Upper Columbia Slough. During winter months, most of the flows in the upper watershed come from stormwater flows and from Fairview Creek. From May to October, nearly all the flow is held in the lake for recreational purposes, and .
Water quality:	Columbia Slough is water quality limited for chlorophyll a, dissolved oxygen, bacteria, toxins (DDT, DDE, PCBs, and dioxin), and lead. Fairview Creek is water quality limited by pH and bacteria.
Riparian conditions:	The riparian buffer has been greatly disturbed in areas adjacent to private industrial lands along the banks of the Slough, where native plant species have largely been replaced by invasive monocultures of reed canary grass, non-native blackberry and scotch broom. Riparian canopy vegetation in the Fairview Creek subwatershed is patchy and consists mostly of hardwood species such as cottonwood and alder. Understory vegetation is lacking and invasive species make up the majority of vegetation cover along several reaches. Urban encroachment in the riparian area is pervasive along the entire length of the creek.
Channel conditions:	Channel alterations are considered to be the most important factor causing aquatic habitat loss in the Columbia Slough watershed. A series of dams, levees, and pump stations built over the past 85 years have disconnected the main channel of the Slough from the Columbia River floodplain and from off-channel wetlands. In addition, channel structure and function has been impaired as a result of extensive industrial and urban development in the watershed. Much of the mainstem Fairview Creek stream channel has been straightened and a significant percentage of banks have been hardened to protect residential developments. Channel restoration projects have been undertaken at the Fairview Creek headwaters area and approximately 1.5 miles downstream.

- Migration barriers: A pump station at NE 33rd Avenue in Portland managed by the MCDD completely blocks fish passage to the upper watershed, barring the presence of anadromous fish in the Upper Slough and Fairview Creek.
- Biological integrity: Fish communities are dominated by nonnative warm water species like carp and bluegill. Salmon, lamprey and other native coldwater fish species are generally absent from the Columbia Slough, although juvenile Chinook and Coho salmon have been observed in the Lower Slough. Resident cutthroat trout are present in the Fairview Creek watershed, along with pacific lamprey, sculpins, perch, largemouth bass and mosquito fish. In 2001, an index of biotic integrity (B-IBI) study using benthic invertebrates was conducted at four sites on Fairview Creek. All four sites were found to have low biological integrity.
- Potential impacts: Road maintenance in the urban area consist of street sweeping, catch basin cleaning, winter sanding and vegetation management to a large degree. The largest potential impact to water quality is spill management.

Multnomah Channel

Located on the west side of Sauvie Island, Multnomah Channel flows north as a channel of the Willamette River. The Willamette River Channel (formally referred to as Multnomah Channel) joins the Columbia River near the City of St. Helens north of Multnomah County. Small tributaries feeding the Channel off the east slope of the West Hills include Joy, Jones, Patterson, Crabapple, McCarthy, and Miller Creeks. The land draining the West Hills contributing to the channel flow includes a mix of forest, farms, and residential uses; roughly 75% of the west hills area is forested.

- Roads: A mix of a rural arterial, rural collectors and local roads (District 1)
- Critical habitat: Chinook, steelhead
- Instream flow: The hydrology of the channel is similar to the main hydraulic contributor – the Willamette River. The channel is also impacted by tidal influences. The highest annual flows through the channel are typically seen in the winter and spring
- Water quality: The water quality issues in the Multnomah Channel therefore are similar to that of the Willamette River. Elevated levels of DDT, PCB's, PAH's and heavy metals, as well as elevated temperatures, low dissolved oxygen levels, and presence of bacteria and toxins

contribute to water quality degradation. The drainages on the east side of the West Hills draining into Multnomah Channel run down steep terrain, with significant erosion potential associated with the West Hills.

Riparian conditions: The Sauvie Island levee runs parallel to the east bank of the channel, and the vegetation on its slopes is largely grass. A mix of bottomland and wetland forests dominates the west bank.

Channel conditions: Multnomah Channel is a nearly flat, broad waterway with a silted bottom and short, steep banks overgrown with vegetation. Erosion along the banks is not uncommon, although the sandy consistency of the banks tends to curtain significant water quality problems associated with small bank sluffs. Erosion within incised tributaries of the West Hills that contribute to the channel's base flow is much more common.

Migration barriers: None in program area. Bridge replacement corrected previous barriers.

Biological integrity: Multnomah Channel has summer and winter runs of steelhead and Chinook. The presence of Chum Salmon is suspected but has not been verified. The probability that these salmonid populations are present in the minor West Hills tributaries is low because the steep topography of the hills likely is a barrier to fish migration except in the larger tributaries, Miller and McCarthy Creeks.

Potential impacts: Stormwater runoff in ditches may cause sedimentation in smaller streams or exacerbate bank erosion. Potential impacts from sediment disturbing activities including ditch maintenance.

Columbia River tributaries in the National Scenic Area

The Columbia River flows westerly through the Gorge proper separating Washington State to the North from Oregon to the South. Other tributaries flowing through unincorporated Multnomah County's portion of the national scenic area tend to be unnamed intermittent or low flow streams cascading over the edge of the Gorge onto the valley floor, ultimately terminating within the Columbia River after meandering across the Columbia River's floodplain. More well-known tributaries include McCord Creek, Moffett Creek, Tanner Creek, Oneonta Creek, Horsetail Creek, Multnomah Creek, Latourell Creek, Young Creek, Bridal Veil Creek, Donahue Creek, Coopey Creek, Wakeena Creek and Tumalt Creek. Upper watershed access for spawning fish is prohibited where the steep topographic rise of the Gorge walls reach thousands of feet in height. Tributaries within the Columbia River Gorge National Scenic Area tend to be more pristine and less impacted by agricultural and residential operations than in other portions of unincorporated Multnomah County.

Roads:	Rural local roads and a few gravel roads (District 5)
Critical habitat:	Chinook, steelhead
Instream flow:	Tributaries flowing into the Columbia River Gorge tend to be flashy during periods of rainfall, with very low flows during the summer months.
Water quality:	Water quality is expected to be very good in the tributaries feeding the Columbia River Gorge due to the short, fast flow path, small drainage basin and heavily forested terrain.
Riparian conditions:	The tributary riparian areas tend to be very natural and heavily wooded, particularly in the eastern portion of unincorporated Multnomah County.
Channel conditions:	Tributaries flowing over the edge of the Gorge down into the Columbia River floodplain below tend to be incised, heavily wooded, extremely well shaded, narrow, turbulent, and very high gradient. The majority of the tributaries in the Columbia River Gorge form cascading and free-falling waterfalls prohibiting fish passage
Migration barriers:	Only the lower portions of the tributaries feeding the Columbia River are accessible to migrating fish due to the natural barrier created by the Columbia Gorge walls. Partial barriers for resident fish exist in the headwaters of two tributaries: Young and Latourell Creeks.
Biological integrity:	The main stem of the Columbia River hosts a wide range of salmonid species (roughly 12 different endangered salmonid stocks). Habitat in the lower tributary reaches is reasonably good for Chinook and Steelhead, although culverts associated with Interstate I-84 currently pose fish passage obstacles.
Potential impacts:	Program activities that cause sediment disturbance (e.g., ditch maintenance, shoulder maintenance) or create sediment issues (e.g. sanding, sweeping) are carefully managed to avoid or minimize impacts.

Salmon Creek and Arata Creek

Salmon Creek and its major tributary Arata Creek are heavily urbanized streams that drain to the Columbia River. The streams originate from seeps located south of the I-84

Freeway, and drain through a series of manmade channels and some natural stream channels that travel across to the Troutdale Airport and other industrial areas of Troutdale. The streams are located within the Cities of Wood Village and Troutdale. Tidal effects from the Columbia River are regulated by a tidegate at 223rd Ave near the mouth of Salmon Creek. The lowest reach is morphologically a slow moving slough.

- Roads: The County owns and maintains several arterial roads in Wood Village and Troutdale that discharge stormwater to the creek.
- Critical habitat: None. Fish presence above the tidegate is unknown, and may be unlikely given the size and impacts to the drainage area.
- Instream flow: No quantitative flow measurements are collected for the streams. The flows originating from the slopes of Wood Village and Troutdale run year round, however at very low volumes during summer months. Stormwater dominates much of the flow during rain events.
- Water quality: The principal water quality concerns for Salmon and Arata Creek area stormwater inputs.
- Riparian conditions: The riparian corridor conditions are generally non-existent or poor throughout the drainage. Riparian vegetation is limited to the uppermost headwater of Arata Creek that provides shade, habitat cover and natural bank stabilization.
- Channel conditions: The upper reaches of Arata Creek has a natural stream channel that flows through a condominium complex, however, the stream quickly becomes channelized downstream to its confluence with Salmon Creek. Similarly, Salmon Creek is a series of channelized stream reaches for nearly its entire length. Below the Tidegate there is a remnant tidal stream channel, which has also been channelized.
- Migration barriers: The Tidegate at 223rd is a complete barrier to fish passage.
- Biological integrity: It is uncertain whether any fish are present in the Salmon Creek system upstream of the tidegate.
- Potential impacts: Program activities that reduce sediment inputs (e.g. street sweeping, catch basin cleaning) are the focus activities in the basin.

Rock Creek (Tualatin River watershed)

The only part of unincorporated Multnomah County that lies within the Tualatin River watershed is in the upper northeastern ridges of the West Hills, southwest of Skyline Road. While this 7,500-acre area comprises less than 2% of the 698 square mile Tualatin River drainage basin, the West Hills does include important and significant headwater areas for Rock Creek and several tributaries, including Bronson and Abbey Creeks. The streams flow through agriculture and forest zoned land and interspersed rural residential development.

Roads:	Rock Creek Road and similar low traffic rural roads
Critical habitat:	One barrier culvert in the upper watershed approximately 300 feet below a private inline pond, which is formed by an impassible dam.
Instream flow:	The head water flows of Abbey, Bronson and Rock Creek become intermittent during some years in the summer.
Water quality:	The principal water quality concerns for Rock Creek and its tributaries are temperature and bacteria. Phosphorus loading from native sediment is also a concern. County data show exceedances of temperature during the summer; however these are associated with low flows, intermittent flows, or beaver impoundments. Bacteria levels occasionally spike, but whether these inputs are associated with agricultural practices or wildlife (especially beaver) are not known.
Riparian conditions:	The riparian corridor conditions are generally good with well-established riparian vegetation providing shade, habitat cover and natural bank stabilization.
Channel conditions:	The upper reaches of the Tualatin River tributaries in unincorporated Multnomah County are typically high gradient headwaters with waters cascading over large boulders. The streams transition to lower gradient reaches with gravel beds as they flow from the foothills, and become meandering clay channels on the valley floor. Gradients of the tributaries range widely from cascading drops in the higher elevations to low gradient reaches (roughly 5.3%) in the lower sections of Rock Creek, for example. Rock Creek is dominated by exposed bedrock with some gravel in the program area. Abbey Creek and Bronson Creek have significant gravel beds. Beaver dams are found in each stream.
Migration barriers:	None in program area

Biological integrity: It is uncertain whether steelhead trout are present in upper Rock Creek. If steelhead are present, it is likely that they are located in areas downstream from unincorporated Multnomah County within Washington County.

Potential impacts: Program activities that cause sediment disturbance (e.g., ditch maintenance, shoulder maintenance) or create sediment issues (e.g. sanding, sweeping) are carefully managed to avoid or minimize impacts.

IV. RELEVANT REPORTS AND INFORMATION

The following reports were used to compile the salmon and habitat information in this submittal (Table 4).

Table 4. Relevant Reports and information

<i>Report</i>	<i>Source</i>
Total Maximum Daily Load • <i>Lower Willamette Subbasin TMDL (2006)</i> • <i>Sandy River Basin TMDL (2005)</i> • <i>Columbia Slough TMDL (1998)</i> • <i>Tualatin Subbasin TMDL (2001)</i>	Oregon DEQ
Multnomah County TMDL Implementation Plan for the Lower Willamette and Sandy River Basins (2008)	Multnomah County
Total Maximum Daily Load Implementation Plan for Non-Point Sources for Multnomah County (Tualatin Basin) (2003)	Multnomah County
Johnson Creek Restoration Plan (2001)	City of Portland
Hydrology of the Johnson Creek Basin, Oregon (2009)	USGS
Organochlorine Pesticides in the Johnson Creek Basin, Oregon 1988-2002 (2004)	USGS
Johnson Creek Legacy Pesticide 2003-2005 (2006)	Johnson Creek Watershed Council
Johnson Creek Watershed Action Plan (2004)	Johnson Creek Watershed Council
Lents Fish Salvage Memorandum (2006)	City of Portland
Aquatic Inventories Project – Physical Habitat Surveys 1999-2000 – Johnson Creek and Tributaries	ODFW
Abundance and Distribution of Fish in the City of Portland Streams (2003)	ODFW

<i>Report</i>	<i>Source</i>
Abundance and Distribution of Fish Species in the City of Portland Streams (2009)	ODFW
Columbia Slough Watershed Action Plan (2003)	Columbia Slough Watershed Council
Sandy River Basin Characterization Report (2005)	Sandy River Basin Partners
Sandy Basin Anchor Habitat Report (2005)	Sandy River Basin Partners
Sandy Basin Aquatic Habitat Restoration Strategy: An Anchor Habitat-Based Prioritization of Restoration Opportunities (2007)	Sandy River Basin Partners
Development and Application of the EDT Database and Model for the Sandy River Basin (2004)	Sandy River Basin Partners
Distribution of fish and crayfish, and measurement of available habitat in the Tualatin River Basin (2002)	ODFW
2007 Assessment of Macroinvertebrate Communities of the Tualatin River Basin, Oregon	Clean Water Services
Water quality data 2009 – Bronson Creek (unpublished)	Clean Water Services
Healthy Streams Plan (2005)	Clean Water Services
Water quality data 2008-2009 – Beaver Creek (unpublished)	Multnomah County
Water quality data 2008-2009 – Rock, McCarthy, Bronson, and Abbey Creeks (Unpublished)	Multnomah County
Water quality data 2008-2009 – Johnson Creek (unpublished)	City of Gresham
Macroinvertebrate data 2008 – Johnson Creek (unpublished)	City of Gresham
Water quality data 2007 – Johnson Creek (unpublished)	Oregon DEQ
Sandy Subbasin Agricultural Water Quality Management Area Plan (2008)	Oregon Department of Agriculture
Lower Willamette Agricultural Water Quality Management Area Plan (2007)	Oregon Department of Agriculture
ODFW Natural Resources Information Management Program – Data Resources (nrimp.dfw.state.or.us/nrimp/default.aspx?p=259)	ODFW
ODFW Fish Distribution GIS data (nrimp.dfw.state.or.us/nrimp/default.aspx?pn=fishdistdata)	ODFW
Habitat and Reach GIS data for NW Oregon (oregonstate.edu/dept/ODFW/freshwater/inventory/nworgis.html)	ODFW

<i>Report</i>	<i>Source</i>
ODF Fish Presence and Stream Size GIS data (www.odf.state.or.us/GIS/fishpres/default.asp)	Oregon Department of Forestry
NOAA Salmon ESU boundaries GIS data (www.nwr.noaa.gov/ESA-Salmon-Listings/)	NOAA – NMFS
Updated Status of Federally Listed ESUs of West Coast Salmon and Steelhead - NOAA Technical Memorandum (2005)	NOAA – NMFS
2005 Oregon Native Fish Status Report – volume I: SMU Summaries (2005)	ODFW Fish Division

V. PROGRAM IMPLEMENTATION, EVALUATION AND REPORTING

Training

The Road Maintenance and Operations Manual (RMOM) contains best management practices (BMPs) for 51 separate road and bridge maintenance activities to minimize and avoid impacts to instream and riparian habitat. The companion Field Guide is the training manual and field reference for the RMOM material.

The RMOM and field guide are designed to be outcome-based, giving the staff a range of tools from which to most effectively and efficiently conduct the activity and maintain protection against impacts. In streamside areas, a series of maps and corresponding road markers in the field delineate “Restricted Activity Zones” or RAZ, where additional BMPs are needed to further reduce risks to the environment.

The RMOM relies on the use of “best professional judgment”, experience learned in the classroom and in the field, using reference materials as needed. The ODOT Erosion Control Manual, County Spill Control Manual, and RMOM Field Guide are to be used together with annual training to implement the road maintenance program.

Annual timeline

Each year, as part of the budget process, training needs for the following fiscal year are identified and a schedule is developed (Table 5). Some of the training is provided annually while other training is provided on a less frequent basis. In house staff may provide a portion of the training while outside trainers may be selected, based on expertise and cost, to provide training for which there is no in-house resource. Training opportunities are scheduled throughout the year, depending on the workload demands of the various crews and the availability of trainers. Occasionally, crews have been invited to attend relevant training provided by other jurisdictions. Training that meets agency environmental goals is mandatory and crews are released from their regular work to attend the training.

Budget and Staffing

Multnomah County funds a Water Quality Program (currently 1 FTE: Water Resources Specialist) to assist program managers with the information they need to comply with federal, state, regional, and local environmental laws and mandates. The Water Resources Specialist, who acts as the RMOM Environmental Specialist, works with LUT managers with developing the RMOM program and the associated program training. The County's Water Quality Program, Road Maintenance Program, and Bridge Maintenance Program are predominantly funded by the Transportation Fund, which is supported by a percentage of gasoline tax revenue.

Table 5. Training timeframes for RMOM and related activities.

<i>Training/Updates</i>	<i>Facilitator</i>	<i>Timeframe</i>
New employee orientation	Environmental Specialist	As needed
Daily environmental and safety briefing	District Supervisor/Lead	Daily
Weekly Supervisors Meeting	Road Maintenance Manager	Weekly
RMOM Evaluation and Review	Environmental Specialist	Quarterly
RMOM Training	Environmental Specialist	Annual
Water Quality Program Update	Environmental Specialist	Annual
Spill Response Committee meeting	City of Portland	Quarterly
Spill Response Training	County Risk Management	Annual
Erosion Control Training	ODOT/varies	As needed
Professional symposiums/conferences	Varies	As needed

Program Tracking and Evaluation

The activities conducted by the Road Maintenance crews will be handled according to the RMOM, using the BMPs given. Unusual or problematic situations may arise given the site location, equipment issues, emergencies, storms and other factors that will require special attention. Some issues will be situational, while other may become chronic in nature. To capture the issues in a problem solving manner, close coordination between the Environmental Specialist and the Road Maintenance crews and leadership is needed.

The Environmental Specialist will meet quarterly (seasonally) with the District Supervisor, Lead Worker, and staff in each district to discuss the program elements (eg. BMPs, erosion control techniques, RAZ area delineation, etc). A special form to review the issues (Appendix C) will allow the range of issues to be covered, and will provide an opportunity for each District to document their practices and problems.

Environmental monitoring is conducted on some (but not all) streams within the County jurisdiction (Table 6). This monitoring has been established for the TMDL and NPDES program to determine the long term trends in stream health. The data collection is limited primarily to water quality measurements and macroinvertebrate surveys. Collecting regular quantitative information of fish use and abundance is cost prohibitive for a single entity such as the County with limited jurisdiction and funding. Grant funding may be available for such studies. Surrogate measures for stream health such as macroinvertebrate surveys are the preferred measure of biotic health.

Table 6. Stream monitoring in the Program Area for 2009.

<i>Stream</i>	<i>District</i>	<i>Water quality</i>	<i>Biotic integrity</i>
Rock Creek	1	Temp, dissolved oxygen, pH, bacteria	Macroinvertebrates ²
Bronson Creek	1	Temp, dissolved oxygen, pH, bacteria ¹	Macroinvertebrates ²
Abbey Creek	1	Temp, dissolved oxygen, pH, bacteria	Macroinvertebrates ²
McCarthy Creek	1	Temp, dissolved oxygen, pH, bacteria	none
Fairview Creek	4	Temp, dissolved oxygen, pH, bacteria, TSS, metals ³	Macroinvertebrates ³
Johnson Creek	4, 5	Temp, dissolved oxygen, pH, bacteria, TSS, metals ³	Macroinvertebrates ³
Beaver Creek	5	Temp, dissolved oxygen, pH, bacteria, TSS metals ³	Macroinvertebrates ³

¹ Data collection by Clean Water Services

² Data collection by West Multnomah Soil & Water Conservation District

³ Data collection by City of Gresham

Reporting

Annual reports on program activity and evaluation will be submitting to NOAA Fisheries upon approval of the RMOM and County road/bridge maintenance program. The elements that will be included in the report are:

- Summary of routine work that has been accomplished throughout the year, using representative BMPs, including documentation of field inspections;
- Summary of investigations of complaints received from or by agency staff, other agencies, or members of the public on impacts to the environment from routine road and bridge maintenance activities. The documentation will

include the basis of the complaint, results of the investigation, and the resolution of the issue and any recommendations;

- Challenges, controversies and successes affecting the implementation of the BMPs;
- Results of research and any recommendations for modifications to BMPs;
- Summary of crew level, program level, and activity specific training, as appropriate;
- Summary of other programmatic elements implemented by the program;
- Summary of culvert/fish passage improvement projects;
- Documentation of any fish capture, rescue and/or salvage that has occurred under this program;
- Summary of leaks and/or spill locations that have occurred as a result of an Road Maintenance action, and that have been reported to OERS, including type of material, size of spill, response and resolution;
- And a program budget for the following fiscal year.

APPENDIX A: Comparison of RMOM with ODOT Routine Road Maintenance Manual

The following table compares the 2009 ODOT Routine Road Maintenance Manual activities with the activities in the Multnomah County Road Maintenance and Operations Manual. The County's Road Maintenance program is substantially similar (and nearly identical) to ODOT's in those areas that are common to both. Notes are included where County activities differ from ODOT. Activities in *italics* are found in the 2004 ODOT manual, which were not included in the revised edition.

<i>Ref</i>	<i>RMOM Activity</i>	<i>2009 ODOT Activity</i>	<i>As protective as ODOT?</i>	<i>Notes</i>
A	General Work			
1	Moving equipment	<i>Equipment maintenance and operation (2004)</i>	Yes	
2	Equipment maintenance		Yes	
3	Stockpiling	Stockpiling	Yes	
4	Material handling/loading	<i>Material handling and housekeeping (2004)</i>	Yes	
5	Vehicle washing	<i>Vehicle washing (8 or more per week)(2004)</i>	Yes	The County already has a wash bay with an oil/water separator.
		<i>Vehicle washing (7 or less per week)(2004)</i>	Yes	
6	Aboveground storage tanks and fueling	<i>Fueling areas (2004)</i>	Yes	Existing fueling tanks area placed on foundations and protected from vehicle impact.
		<i>Aboveground storage tanks (2004)</i>	Yes	
B	Vegetation Management			
1	Integrated Vegetation Management Plan (IVM)	Vegetation management program (IVM)	Yes	

<i>Ref</i>	<i>RMOM Activity</i>	<i>2009 ODOT Activity</i>	<i>As protective as ODOT?</i>	<i>Notes</i>
2	Grass mowing	Mowing, brush mowing; brush cutting (hand); landscape area maintenance; Bridge vegetation management	Yes	
3	Brush mowing		Yes	
4	Hand brushing and pruning		Yes	
5	Median landscape maintenance		Yes	
6	Herbicide application and chemical inventory	Spraying	Yes	
7	Hazard tree removal	Vegetation management program; Tree management	Yes	
C	Traffic Operations			
1	Striping	Striping	Yes	
2	Sign installation	Sign installation	Yes	
D	Surface Maintenance			
1	Release Agents	Release agents	Yes	
2	Asphalt Concrete Patching	Surface work - void filling	Yes	ODOT manual has specific BMPs for filling voids with foam or quickset materials; however the County does not use either of these types of materials. The County fills voids with cold patching or crack sealer depending on the type of voids occur. BMPs for both of these applications are included in the RMOM.
3	Grinder Patching		Yes	
4	Cold Patching		Yes	
5	Tarpot Patching		Yes	
6	Chip Sealing		Yes	

<i>Ref</i>	<i>RMOM Activity</i>	<i>2009 ODOT Activity</i>	<i>As protective as ODOT?</i>	<i>Notes</i>
7	Crack Sealing		Yes	
8	Sweeping and Flushing – non-pick up	Sweeping and Flushing – non-pick up	Yes	
9	Sweeping and Flushing – pick up	Sweeping and Flushing – pick up	Yes	
10	Gravel Roads		N/a	ODOT manual does not specify BMPs for gravel roads, except for dust abatement. The County does not use dust palliatives except for water.
E	Right-of-Way Maintenance			
1	Shoulder maintenance	Shoulder blading and repair	Yes	
		Shoulder rebuilding	Yes	
2	Litter removal and Adopt-a-Road Program		N/a	Not included in ODOT manual
3	Owner-Maintained ROW program		N/a	Not included in ODOT manual
4	Curb and sidewalk maintenance		N/a	Not included in ODOT manual
5	Guardrail maintenance	Guardrail replacement	Yes	
		Guardrail cleaning	Yes	The County uses inmate crews to hand brush around guardrails. See hand brushing and pruning BMPs in Section B: Vegetation Management.
F	Drainage Maintenance			
1	Stormwater management	Stormwater management	Yes	The County constructs new impervious area according to the Multnomah County Design & Construction Manual. BMPs for stormwater management are included in the County's Stormwater Management Plan for the NPDES

<i>Ref</i>	<i>RMOM Activity</i>	<i>2009 ODOT Activity</i>	<i>As protective as ODOT?</i>	<i>Notes</i>
				MS4 Phase I permit.
2	Ditch maintenance	Ditch shaping and cleaning	Yes	
3	Culvert maintenance	Culvert/inlet repair	Yes	This County activity is for culverts that carry stormwater only. See Instream Culverts for BMPS regarding fish passage issues.
4	Sump maintenance		N/a	Not included in ODOT manual
5	Catch basin cleaning and repair	Catch basin and sumps in maintenance yards	Yes	The County maintains catch basins on roadways according to the Stormwater Management Plan for the NDPES MS4 Phase I permit.
6	One-call response for drainage system		N/a	Not included in ODOT manual
7	Water quality facilities	Water quality facilities	Yes	
G	Emergency Maintenance			
1	Snow plowing	Snow and ice removal	Yes	
2	Sanding	Sanding and pre-wetting	Yes	The County does not use pre-wetting agents. Stockpiling BMPs are in effect.
3	Anti-icing	Anti-icing and deicing	Yes	The County does not use de-icing agents.
4	Storm clean-up	(See Vegetation maintenance)	Yes	BMPs similar those in ODOT vegetation maintenance
5	Slides and washouts	Settlements and slides	Yes	
		Erosion repair	Yes	
6	Emergency response	Emergency maintenance	Yes	
		Accident clean-up	Yes	
		Spill prevention and clean up	Yes	

<i>Ref</i>	<i>RMOM Activity</i>	<i>2009 ODOT Activity</i>	<i>As protective as ODOT?</i>	<i>Notes</i>
		Extraordinary maintenance	Yes	
H	Bridge Maintenance			
1	Bridge Maintenance	Bridge cleaning and maintenance; water withdrawals and use	Yes	
2	Bridge Repair	Bridge repair	Yes	
3	Drift Removal	Drift removal	Yes	
I	In-Water Work			
1	Fish habitat restoration	Fish habitat restoration	Yes	
2	Fish passage improvement	Fish habitat and passage improvement	Yes	
3	Instream culvert debris removal	Culvert cleaning and debris dam removal; trash rack maintenance	Yes	See also Culvert Maintenance activity and Drift Removal activity
4	Beaver dam removal	Beaver dam removal	Yes	
5	Temporary water management	Temporary water management	Yes	
6	Channel maintenance	Channel maintenance	Yes	
		Additional ODOT activities		
		Dust abatement	N/a	The County does not use any dust palliatives, except for water.
		ODOT pavement production	N/a	The County does not produce asphalt.
		Tidegate maintenance	N/a	The County does not own or operate tide gates.
		Attenuator maintenance	N/a	The County uses attenuators with solid foam material.

APPENDIX B. Activity Review Form

Road Maintenance and Operations Manual Activity Review Form



District	Past Quarter in Review	Completed by: _____ Date: _____
1 2 4 5 Env.	Winter Spring Summer Fall	

Site Specific Issues	Broad / Chronic Issues
Spill and accident reports (location, description, waterbody, RAZ)	☐ Clean up ☐ Snow / Ice ☐ RAZ protection ☐ Other
Storm and slides reports (location, description, waterbody, RAZ) ☐ New ☐ Recurring	☐ Clean up ☐ Engineering ☐ Restoration ☐ Other
Erosion repair issues (location, description, waterbody, RAZ) ☐ Drainage ☐ Culvert ☐ Shoulder	☐ Erosion control techniques ☐ Restoration ☐ Agriculture ☐ Other
BMP Application	BMP Review
☐ General ☐ Vegetation ☐ Traffic Ops ☐ Surface ☐ ROW ☐ Drainage ☐ Emergency ☐ Bridge ☐ In-Water ☐ Erosion control	CONCERNS: ☐ Safety ☐ Equipment ☐ Weather/timing ☐ Resources ☐ Fish/wildlife ☐ Water quality ☐ Restoration ☐ Coordination
Road Waste Issues:	RAZ area delineation:
Other questions or concerns:	<u>Environmental Specialist contact:</u> Roy Iwai, Water Resources Specialist Office: (503) 988-5050 ext 28031 Cell: (503) 969-9569