

Appendix K

Watershed Control Program

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APPENDIX K – SOURCE WATER PROTECTION

A source water protection program is a vital part of the overall goal to provide safe and reliable drinking water. A source water protection program can provide awareness of the conditions and activities in the watershed, which may affect source water quality. The level of control provided by each water system is unique to the water system and watershed characteristics.

The City of Woodland's (City) only source of supply is the Ranney Collector Well, which is discussed in detail in **Chapter 2**. Since the Ranney Collector Well is an infiltration gallery, the source water quality does not have an immediate response to surface water quality. The presence of iron and manganese in the source water indicates that the source is more typical of groundwater characteristics most of the time. However, due to turbidity breakthrough during extreme past events, the City operates the water treatment plant as if the source is surface water. The City will continue to treat the source conservatively and will address source water protection accordingly from the standpoint of surface water. This allows the City more flexibility with regard to water resource allocation and use. Therefore, the City has developed a Watershed Control and Protection Program (WCPP) in accordance with Washington Administrative Code (WAC) 246-290-135(4) and WAC 246-290-668. Specifically, this WCPP is intended to comply with the November 1992 Washington State Department of Health (DOH) Policy "Minimum Watershed Control Program Requirements."

The property directly south of the Ranney Collector Well was purchased by the City since the last Water System Plan. The City utilizes this property when completing maintenance and improvements to the Ranney Collector Well as it provides better access to the well and better protection of the source and structure.

WATERSHED DESCRIPTION

The Lewis River Watershed is a tributary of the Columbia River and is within Water Resource Inventory Area (WRIA) 27. Watershed mapping and related data as published by the Washington State Department of Ecology (Ecology) is provided in **Attachment 1** of this appendix. The watershed is located in parts of Cowlitz, Clark, and Skamania Counties.

The Lewis River headwaters arise from the southern flank of Mount St. Helens and western flank of Mount Adams. The mainstem of the river, also known as the North Fork of the Lewis River, flows southwesterly from its source in Skamania County through three impoundments -- Merwin Lake (River Mile 19.5), Yale Lake (RM 34.2), and Swift Creek Reservoir (RM 47.9). Along the middle and lower sections, the river forms the boundary between Clark and Cowlitz Counties. A major tributary, the East Fork of the Lewis River, enters the mainstem at RM 3.5. From this point the Lewis River continues west, entering the Columbia River. The City's Ranney Collector Well is upstream of the East Fork at approximate RM 7. The river is tidally influenced at RM 7.

The terrain conditions within the watershed include steep slopes in excess of 70 percent in the headwater areas of most tributaries; present day landscape influenced by large ancient (Quaternary) landslides; and bench topography with steep stream-adjacent slopes in the lower watershed. Vegetation within the basin varies from heavily forested areas to open pastures. Average annual precipitation in the basin can vary from about 45 inches in the west to 110 inches in the eastern higher elevations. The watershed supports anadromous runs of spring Chinook, fall Chinook, Winter Steelhead, Summer Steelhead, Chum, and Coho. Bull Trout also reside in the upper reaches of North Fork Lewis River and tributaries.

WATERSHED OWNERSHIP AND USE

The North Fork Lewis River watershed adjacent to and approximately 5 miles upstream of the Ranney Collector Well is comprised of a very diverse private land ownership. There are no distinct majority land owners in this lower basin, and the predominant uses are residential, commercial, and non-industrial private timber harvesting. From 5 miles upstream of the Ranney Collector Well, ownership consists primarily of the following:

- U.S. Forest Service (USFS)
- U.S. National Park Service
- State of Washington Department of Natural Resources (DNR)
- Weyerhaeuser Co.
- Longview Fibre Co.
- PacificCorp

Of the upstream land, the majority is in public ownership. The vast majority of the public ownership is the Gifford Pinchot National Forest as identified on the maps in **Attachment 1** of this appendix. Consequently,

several state and federal resource agencies are involved in resource management in the watershed. The two primary uses of the upper watershed include timber production and hydroelectric power generation. Because of the state and federal interests, land uses and administrative controls for the upper watershed have been well defined and are summarized in the following discussion.

Hydroelectric Power Generation

PacifiCorp operates four hydroelectric projects with a total capacity of 510 megawatts (MW). The sequence of the four North Fork Lewis River projects is: Merwin, Yale, Swift No. 2, and Swift No.1. These four projects are licensed separately by Federal Energy Regulatory Commission (FERC). Merwin (FERC No. 935), Yale (FERC No. 2071), and Swift No. 1 (FERC No. 2111) are owned and operated by PacifiCorp. Swift No. 2 (FERC NO. 2213) is owned by Cowlitz County Public Utility District (PUD) No. 1 and is operated in coordination with the other projects by PacifiCorp. These projects were re-licensed in 2008.

Placed in service in 1931, the Merwin project has a generating capacity of 136 MW. The dam creates Merwin Lake, a 4,040-acre impoundment popular with a wide variety of recreationists. The Yale project was completed in 1953. It features a 3,780-acre reservoir (locally known as Yale Lake, it also is a popular recreation site) and a main earthfill embankment dam that is 323 feet high. The two turbines in the Yale powerhouse recently were upgraded to a combined rated capacity of 134 MW. At 240 MW, Swift No. 1 is PacifiCorp's largest hydroelectric facility. The Swift Reservoir is 4,600 acres and provides a variety of fishing, camping, swimming, and other recreation. The discharge of Swift No. 1 enters a canal that transports the water through the 70 MW Swift No. 2 project owned by Cowlitz County PUD No. 1 before it is returned to the upper end of Yale Reservoir. In addition, PacifiCorp operates several recreational facilities associated with the Lewis River projects. These facilities include camping sites, picnic sites, several boat ramps, swimming beaches, fishing access, and day use areas.

Timber Production

Each forest landowner has different goals and objectives for managing forest lands based on their corporate or agency mission, as described below.

Private Industrial Forest Lands – Owners of private industrial forest lands in the North Fork Lewis River watershed are large companies and include Weyerhaeuser and Longview Fibre. Their primary objectives are to provide products to consumers and maximize the return to their corporate owners or shareholders.

Where feasible, clearcut harvesting practices are used; replanting is completed immediately to begin the next crop quickly; and species composition, stand densities, and rotation lengths are set to optimize economic return and provide the desired product. The protection of public resources (e.g., fish and wildlife) is generally accomplished through compliance with the Washington State Forest Practices Act (WSFPA), or as part of an approved habitat conservation plan.

State Forest Lands – DNR manages state trust lands to provide income for the benefit of schools and other state trusts. On behalf of the trust beneficiaries, DNR strives to produce the most substantial support possible for the trust over the long term, while exercising prudent management and preserving the trust estate. While private industrial timber companies may harvest on a 40 to 50 year rotation, the rotation age for DNR is generally less than 80 years. The management of forest practices on state lands is directed by the WSFPA and is guided by an approved habitat conservation plan.

Federal Forest Lands (non-wilderness) – USFS manages federal forest lands. These lands are managed following the principles of multiple uses to provide sustained yields of wood, water, forage, wildlife, and recreation. When timber production was emphasized in their management plans, USFS generally used a rotation age of approximately 120 years, depending on site conditions. In recent years, there has been a significant shift in the social objectives for federal land management. The change in social objectives culminated in the development of a northwest forest plan for the management of habitat for late successional forest-related species. This in turn has led to a greater emphasis on the management of wildlife and recreation resources.

Non-Industrial Private Forest Lands – Non-industrial private forest lands are owned by a wide range of individuals that are not associated with commercial timber companies. The forest management objectives for these lands depend upon each of the individual owners. As a group, the management style of these owners is considered episodic; they tend to harvest when timber prices are high, or when a personal need for cash arises. Other than harvesting and the required reforestation, active management of these lands is limited.

IDENTIFICATION OF ACTIVITIES/LAND USES DETRIMENTAL TO WATER QUALITY

In 2012, there were four areas of the Lewis River Watershed listed on Ecology's 2008 Water Quality assessment 303(d) list of water bodies that fail to meet state water quality standards (the list can be accessed at Ecology's web site). Those four sections exceeded temperature standards. All of the reaches exceeding temperature standards were located upstream of the Swift Reservoir. Printouts of the listings are located in **Table 1**. There are no permitted or otherwise known wastewater discharges to the river upstream of the potable water intake.

Table 1

| LISTING_ID | AU ID | CATEGORY | TMDL_NAME | WATERBODY NAME | PARAMETER NAME | MEDIUM NAME | WRIA | WQ IMPROVEMENT PROJECT |
|------------|----------------|----------|-----------------------------------|----------------|---------------------|-------------|----------|-----------------------------------|
| 6532 | 17080002000150 | 4B | Lewis River Hydropower Project 4B | LEWIS RIVER | Total Dissolved Gas | Water | 27-Lewis | Lewis River Hydropower Project 4B |
| 6535 | 46122A2F6 | 4B | Lewis River Hydropower Project 4B | LEWIS RIVER | Total Dissolved Gas | Water | 27-Lewis | Lewis River Hydropower Project 4B |
| 6542 | 17080002018508 | 4B | Lewis River Hydropower Project 4B | LEWIS RIVER | Total Dissolved Gas | Water | 27-Lewis | Lewis River Hydropower Project 4B |
| 37818 | 17080002000158 | 5 | | LEWIS RIVER | Temperature | Water | 27-Lewis | - |
| 37833 | 17080002000171 | 5 | | LEWIS RIVER | Temperature | Water | 27-Lewis | - |
| 37843 | 17080002000176 | 5 | | LEWIS RIVER | Temperature | Water | 27-Lewis | - |
| 37856 | 17080002000183 | 5 | | LEWIS RIVER | Temperature | Water | 27-Lewis | - |

In general, potential activities and land uses detrimental to water quality can occur throughout the watershed and include both point and non-point potential contaminant sources. Since the City utilizes a Ranney Collector, surface water contamination will have to be pervasive to impact the City water supply. The following activities and land uses are discussed in order of priority based upon their potential to degrade water quality.

Stormwater

The stormwater collection and disposal systems operated by the City and Clark and Cowlitz Counties within the lower reaches of the North Fork Lewis River basin are likely to have a higher relative impact on the water supply than other potential sources of contamination. Stormwater may carry oil and gasoline, agricultural chemicals, nutrients, heavy metals, and other toxic substances, as well as bacteria, viruses, and oxygen-demanding compounds that can originate from farmland, streets, parking lots, construction sites, or other sources. Some of these contaminants may be persistent enough to affect the water source at lower levels, within the type of urban and suburban settings within the lower watershed.

Transportation

There are numerous county roads in the watershed used for activities varying from logging to private transportation to transportation of petroleum products, chemicals, and other materials. The primary contaminants of concern from the roadway are volatile organic compounds (VOCs) from automobiles entering the storm drains in the lower basin. A low probability concern is a spill or leak from transporters. Even if the spill reaches the water body, the likelihood of contamination to the City's water supply is minimal due to the use of the Ranney Collector Well rather than a direct surface water withdrawal.

Forest Practices

Large quantities of soil can be exposed through the logging process (e.g. tractor skidding) and deficient road building resulting in ditch erosion and cut bank failures. The consequences of these activities include changes in water quality and quantity, changes in stream flow extremes, increases in sedimentation, and destabilization of the streambed. However, much of the forest practices are conducted above the hydroelectric dams. The flow control at the dams is advantageous in that it provides a reduction in the sediment load of the lower river. An additional benefit is maintenance of minimum flows throughout the dry season. There is minor contamination potential at the dams due to the recreational uses of the reservoirs. Due to the volume of water in the upstream reservoirs, contamination will be diluted, and travel time delayed significantly before the lower reaches would see water quality effects, if any at all.

Other Potential Impacts

On-site septic systems are a minor concern since they would need to fail at an extremely high rate to cause a water quality issue in this case. Proper administrative controls are in effect at Clark and Cowlitz Counties to prevent this occurrence. Observed levels of agricultural land uses do not appear to be at a proportionate intensity that could degrade water quality in the Lewis River. Any potential effects from medium scale agriculture are mitigated through current state regulatory and technical assistance programs. Wildlife habitat plays a minor role in potential contamination. Impacts are unavoidable in the watershed setting and are accounted for in the provision of filtration and disinfection at the water treatment plant.

WATERSHED MANAGEMENT AND CONTROL MEASURES

It is unreasonable to expect the City to control and/or monitor all the potential contaminant sources identified above. The City will focus its resources on the potential sources of contamination with a relatively

higher impact and higher degree of potential for administrative control. Therefore, the City will focus on City and Clark and Cowlitz County stormwater systems in the lower basin.

The City currently administers a stormwater collection and treatment program. New development and upgrade of existing stormwater systems are required to comply with the 1992 Puget Sound manual. The City's current stormwater collection and treatment consists mainly of infiltration ponds and laterals throughout the City. There are a couple of City stormwater discharges to the river upstream of the Ranney Collector Well. Clark and Cowlitz Counties administer the stormwater program for areas outside the City. Clark and Cowlitz Counties also require compliance with Ecology Stormwater Requirements for new development and repairs to existing stormwater systems. Clark and Cowlitz Counties do not have standards for retention or treatment of stormwater from road projects in rural areas. Therefore, the City will review Clark and Cowlitz Counties' road priorities on an annual basis and provide input regarding projects upstream of the Ranney Collector Well.

In addition, the City will place a high priority on participation in future basin planning. The City participates in the overall Lower Columbia watershed planning process to ensure that overall source protection issues are addressed.

PERIODIC WATERSHED MONITORING AND EVALUATION

Assessment of this WCPP will be based upon routine drinking water quality compliance related data collection. Specific monitoring includes coliform bacteria and other source water testing required by DOH.

This WCPP shall be reviewed in subsequent WSP updates and updated as appropriate. At a minimum, the WCPP shall be updated every 6 years and resubmitted to DOH. To ease the update process, the following information should be tracked and kept on file:

- Adverse conditions or activities that impact source water quality;
- Significant changes in physical characteristics of the watershed (development); and
- Changes in water quality parameters and water quality monitoring.

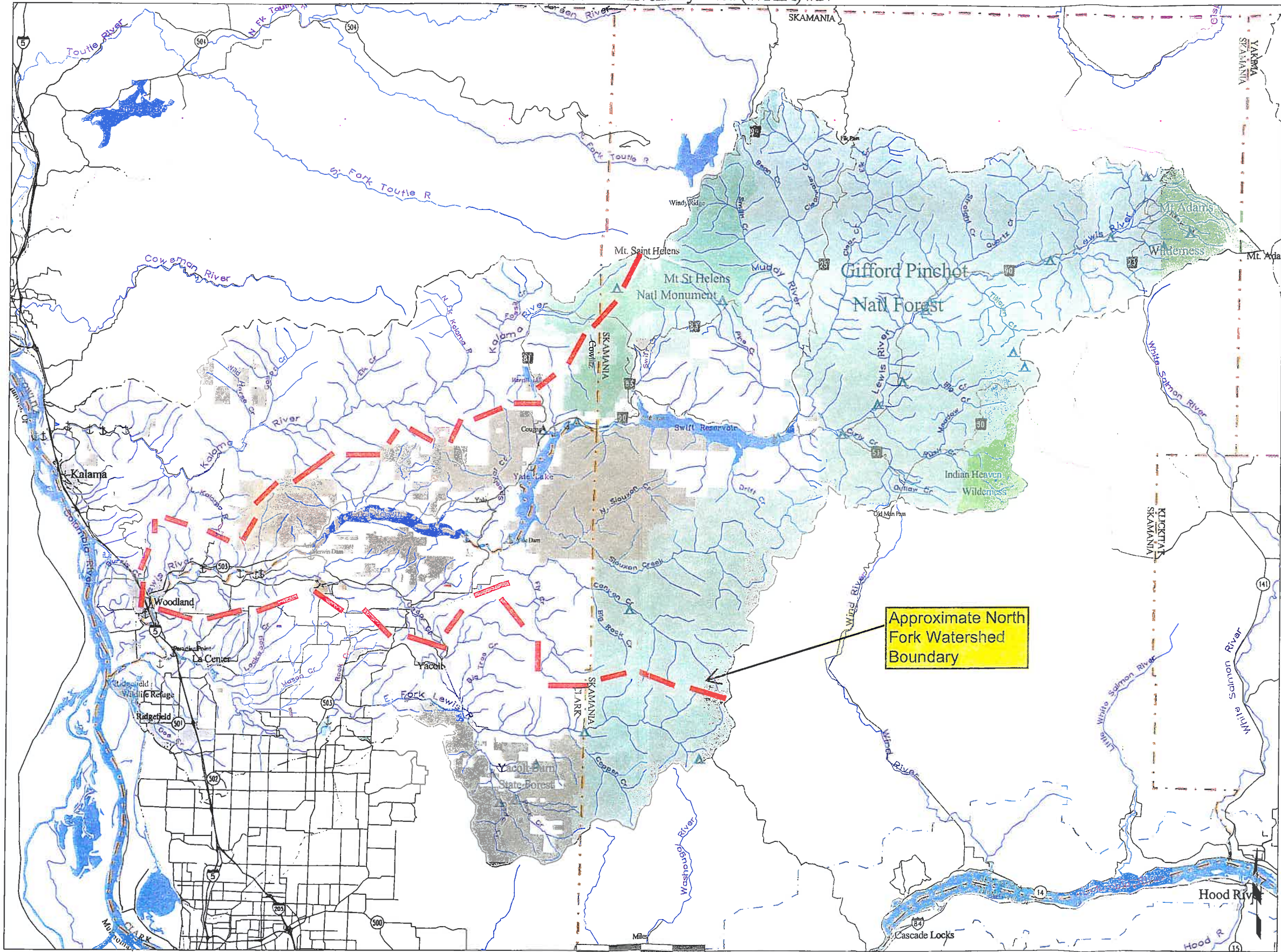
SYSTEM OPERATION

Water system facilities, routine operation, and emergency response are addressed in other sections of this WSP. The emergency response program contains basic contingencies for failure and/or limited use of the source of supply in the event of physical/mechanical failure or adverse water quality conditions.

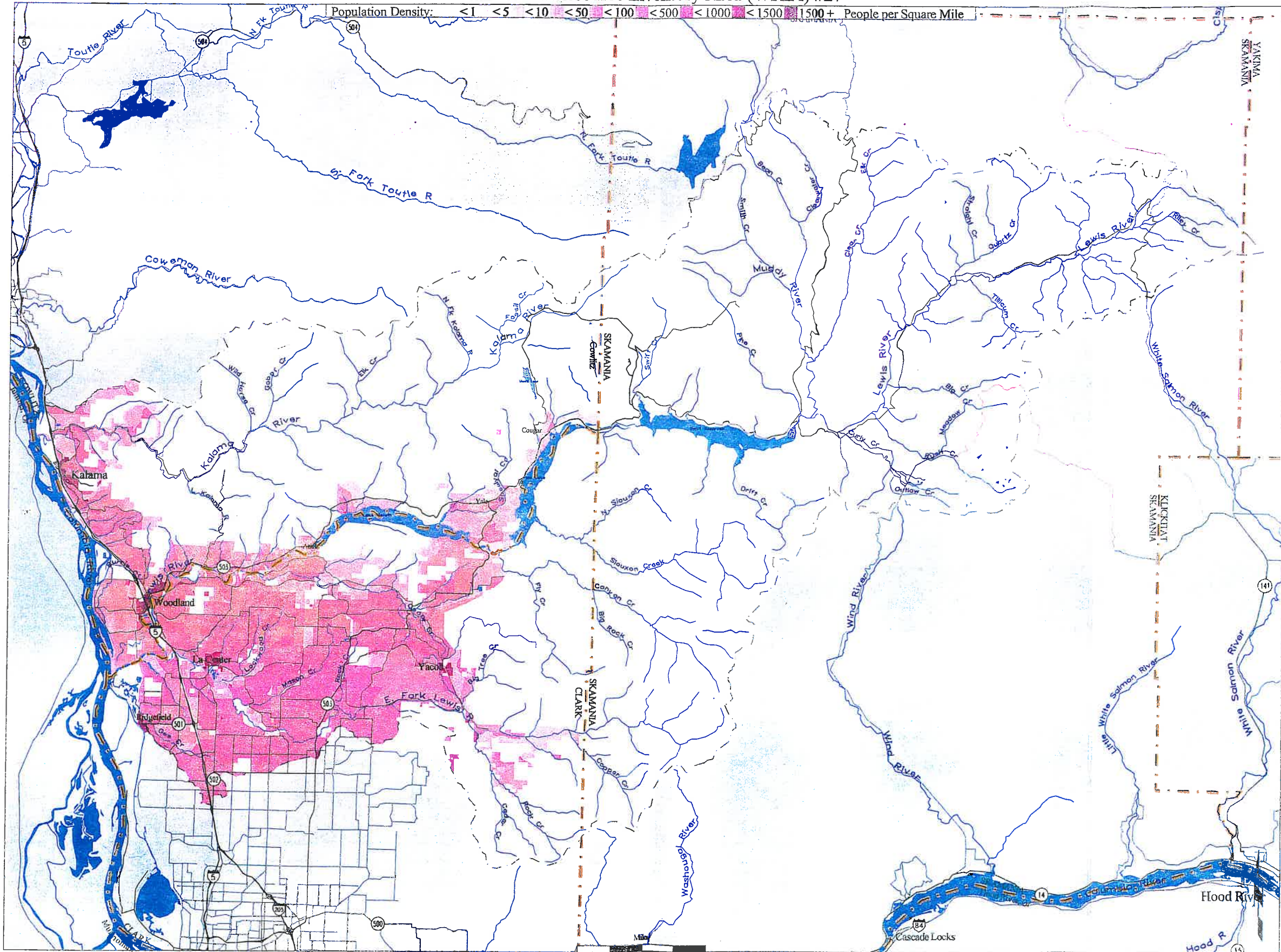
A copy of this WCPP will be submitted to Clark and Cowlitz County Emergency Management agencies and the Cowlitz County Health Department.

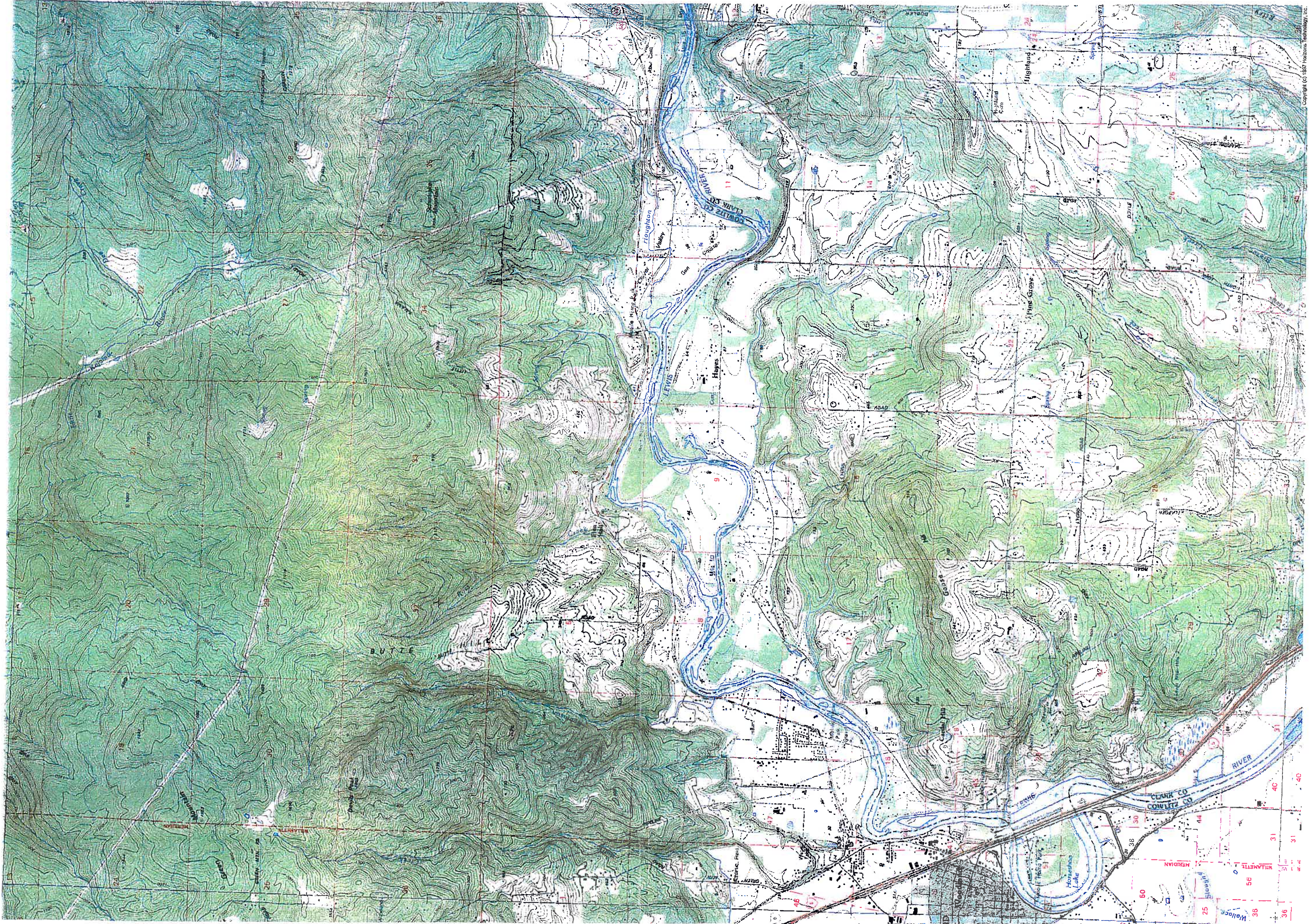
Attachment 1

Lewis Water Resource Inventory Area (WRIA) #27



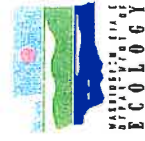
Lewis Water Resource Inventory Area (WRIA) #27











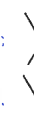


1998 303(d) List for: Lewis Water Resource Inventory Area (WRIA) #27

| Id# | Parameter, Name segment# | Id# | Parameter, Name segment# |
|-----|---------------------------------------|------|---|
| 524 | Fecal Coliform, E F Lewis R [EI60MF] | g235 | 4,4'-DDE, Columbia River [NNS7SG] |
| 524 | Temperature, E F Lewis R [EI60MF] | g235 | Bis(2-ethylhexyl) phthalate(t), Columbia River [NNS7SG] |
| 525 | Temperature, E F Lewis R [EI60MF] | g235 | Dieldrin(t), Columbia River [NNS7SG] |
| 526 | Fecal Coliform, E F Lewis R [EI60MF] | g235 | PCB-1254(t), Columbia River [NNS7SG] |
| 534 | Temperature, Hatchery Cr [FX65ID] | g236 | Total Dissolved Gas, Columbia River [NNS7SG] |
| 535 | Fecal Coliform, McCormick Cr [GF76XA] | g242 | Arsenic, Columbia River [NNS7SG] |
| 535 | Temperature, McCormick Cr [GF76XA] | g242 | Temperature, Columbia River [NNS7SG] |
| 540 | Fecal Coliform, Yacolt Cr [KS71ST] | | |
| 541 | Fecal Coliform, Rock Cr [MI81KO] | | |
| 546 | Temperature, Kalama R [QB31IV] | | |
| 551 | Fecal Coliform, Rock Cr [XD64JB] | | |
| 552 | Fecal Coliform, Lockwood Cr [YD45IJ] | | |



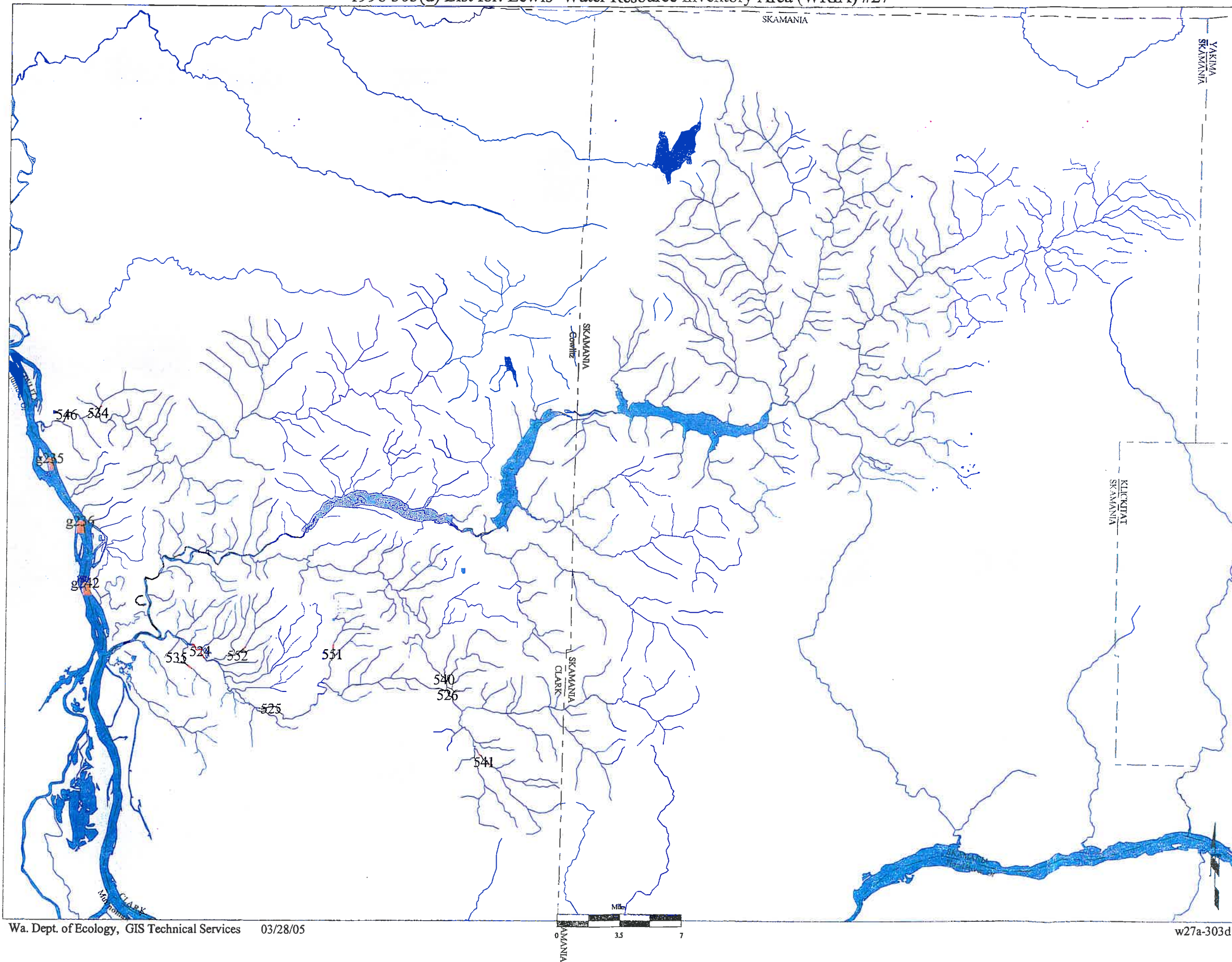
GIS Technical Services
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-  1998 303(d) Streams
-  1998 303(d) Waterbodies
-  (s) Sample from Sediment
-  (t) Sample from Tissue
-  (h) Sample from Habitat
-  Rivers/Streams
-  Intermittent
-  Canal/Pipe
-  County

Feature Source:
 ECOLOGY - 303(d) List 1998 1:100K (WC_LIST, WB_LIST, WG_LIST)
 ECOLOGY - Water Resource Inventory Areas 2002 1:24K (WRIA)
 ECOLOGY/WDFW - Hydrography 1998 1:100k (HYDROFW)

Notes:
 (*) Legend page for individual 303(d)/WRIA area maps, 1 - 62

1998 303(d) List for: Lewis Water Resource Inventory Area (WRIA) #27



Lewis Water Resource Inventory Area (WRIA) #27

