

CHAPTER 6: RECOMMENDED PLAN

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This chapter presents specific recommendations to provide the Recommended Service Level described in Chapter 5. Each recommendation has been keyed to a specific problem or problems described in Chapter 3. A brief project description and cost estimate follow each recommendation. Capitol improvement projects were evaluated by consulting engineers using a combination of HSPF and HYDRA computer models. Cost estimates are based on site specific considerations and 1992 average bid item costs. The costs are summarized in a table at the end of the chapter.

To be effective, capital facilities in this alternative depend on implementation of the Regional Nonstructural Management Plan adopted by the county in the Percival and Indian/Moxlie basin plans (see Appendix K for details). The capital facilities would have minimal benefits to the basin if the Regional Nonstructural Management Plan was not implemented.

6.1 MCALLISTER CREEK BASIN RECOMMENDATIONS

Facilities Construction, Operation and Maintenance

Recommendation 6.1.1: Rebuild and augment infiltration facilities in Evergreen Terrace at Tanbark Street and 8th Way SE

Problem Addressed: FL-1

- **Project Description** Failing gravel-filled infiltration trenches would be dug up, cleaned out, and rebuilt, and additional dry wells would be installed to increase the storage and infiltration capacity of the Evergreen Terrace drainage system.
- **Benefit** Chronic flooding problems would be solved, future property damage would be reduced, and public safety would be improved.
- **Estimated Cost** \$250,000

Recommendation 6.1.2: Construct a swale and pond to drain and infiltrate overflow from the Hidden Forest pond to the south.

Problem Addressed: FL-2

- **Project Description** Test holes would be dug in the vacant lot south of the Hidden Forest pond, to locate the water table, and a new pond would be constructed at an appropriate location to drain overflow from the existing pond. If the water table proves too high, the overflow would be conveyed to the Hawks Glen pond, which would be deepened.
- **Benefit** Severe local flooding would be solved, property damage would be reduced, and public safety would be improved.
- **Estimated Cost** \$35,000

Recommendation 6.1.3: Construct a regional stormwater detention and treatment facility at the head of the south branch of Little McAllister Creek

Problem Addressed: ER-1

- **Project Description** A regional facility would be constructed in the disturbed wetland at the head of the South Branch of Little McAllister Creek, south of Pacific Avenue. The pond would provide about 90 acre-feet of storage at the head of Little McAllister Creek. Runoff from 740 acres of rural and suburban development that currently goes straight into the creek would drain into the facility, which would slowly release it to Little McAllister Creek. The facility would moderate flows which are causing extensive downstream erosion now.
- **Benefit** The facility would slow down erosion in Little McAllister Creek, protect property adjacent to the creek, and reduce degradation of salmon habitat.
- **Estimated Cost** \$1,499,750

Recommendation 6.1.4: Increase the capacity and reduce the release rate of the pond at the head of the West Branch Little McAllister Creek

Problem Addressed: ER-1

- **Project Description** The pond between Meadows subdivision and Little McAllister Creek would be raised by rebuilding the low spot in the berm, and the release rate

would be reduced by installing a smaller orifice on the outlet. Runoff from the hillside on Mallard Drive and Pinedrop Loop would be rerouted through a pipe to the pond, and the culvert connecting the pond to the failing swale at the foot of the Mallard Drive Hill would be replaced by an overflow weir.

- **Benefit** The improvements would reduce erosion in Little McAllister Creek, reduce salmon habitat degradation, and improve water quality treatment for runoff from the adjacent hilltop development.
- **Estimated Cost** \$189,000

Recommendation 6.1.5: Construct additional dry wells in the Mt. Aire subdivision

Problem Addressed: FL-3

- **Project Description** New dry wells would be installed in Mt. Aire subdivision to augment existing facilities in areas of chronic flooding.
- **Benefit** The project would eliminate flooding in Mt. Aire subdivision.
- **Estimated Cost** \$200,000

Regulations and Acquisition

Recommendation 6.1.6: Protect the West Branch Little McAllister Creek watershed by negotiating conservation easements along the creek

Problem Addressed: ER-1

- **Project Description** The Little McAllister Creek watershed is an unstable, slide-prone ravine vulnerable to the impacts of logging and development. The creek contains some of the best salmon spawning habitat in the McAllister Creek basin, and the surrounding watershed contains excellent wildlife habitat. The county would negotiate conservation easements for the West Branch Little McAllister Creek watershed in the two parcels which the creek traverses between the Meadows community open space tract and the mouth. The easements will secure access to conduct stream restoration activities and provide additional protection for sensitive resources. The easements would be held by a non-profit land trust or public agency

as specified in the County's Open Space Tax Program. Conservation or open space easements would offer tax benefits to the land owners. If easements cannot be established, the County Stormwater Program would coordinate with the Parks and Recreation Department to purchase the property for a park.

- **Benefit** This measure would prevent further erosion and protect the habitat from the impacts of logging, agriculture, and development.
- **Estimated Cost** \$15,800 (The financial impact to the county of reduced taxes has not been analyzed)

Riparian and In-stream Restoration

Recommendation 6.1.7: Systematically restore healthy native vegetation to the riparian corridors of McAllister Creek

Problem Addressed: HAB-1, WQ-1

- **Project Description** The county would assemble a watershed restoration team consisting of streamside landowners, volunteers, the Conservation District and federal, state and local agencies. The team would develop a comprehensive plan to systematically restore native vegetation and in-stream habitat, and reduce erosion along McAllister Creek. Project sites would be prioritized according to the severity of the problem. The plan would address the problem of maintaining the dikes around the pastures adjacent to the creeks while simultaneously preserving the native vegetation. The goal would be to restore the natural functions of the riparian corridor to the entire length of both streams. The success of the project will ultimately depend on the cooperation of all parties involved, as well as financial assistance from state and federal agencies.
- **Benefit** Fish habitat will be restored as closely as possible to natural conditions, providing the maximum long-term economic and environmental benefits to the county. Erosion will decrease, benefiting fish habitat and protecting property from damage, which will reduce long-term costs to county residents. Revegetation projects would help create jobs in the local economy.
- **Estimated Cost** \$271,650

Recommendation 6.1.8: Reroute the mouth of Little McAllister Creek to skirt south of agricultural drainage ditches

Problem Addressed: HAB-2

- **Project Description** The mouth of Little McAllister Creek would be rerouted about 10 feet south of the point where it currently enters a network of drainage ditches and tide gates. This would permit the stream to skirt south of the pastures and empty directly into McAllister Creek.
- **Benefit** Salmon would be able to enter the creek at any tide and find their way upstream to spawning habitat without losing their way in the drainage ditches. Salmon production could increase.
- **Estimated Cost** \$13,650

Monitoring

Recommendation 6.1.9: Install stream gauges on McAllister Creek and Little McAllister Creek

Problem Addressed: ER-1, HAB-1

- **Project Description** The county would initially install a continuous recording stream gauge on Little McAllister Creek, and would install a stage gauge on McAllister Creek to estimate tidal influence and the usefulness of installing a continuous gauge. Ultimately, this data would be used to analyze the stream and basin hydrology, and evaluate the effectiveness of regional detention facilities.
- **Benefit** The data would help to evaluate the effectiveness of proposed stormwater facilities at protecting the stream hydrology and preventing erosion, and would improve the county's ability to protect overall stream health.
- **Estimated Cost** \$5,000

Program Management

Recommendation 6.1.10: Coordinate monitoring and source control activities with state Health and Ecology departments to implement Nisqually Shellfish Closure Response Plan

Problem Addressed: WQ-1

- **Project Description** The state departments of Health and Ecology have started to work with the Nisqually Indian Tribe and the County Health Department to identify sources of fecal coliform contamination causing restrictions on commercial shellfish harvesting in Nisqually Reach. As sources are located, the county Stormwater Program would coordinate with state and local agencies to develop solutions aimed at re-certifying the commercial shellfish beds.
- **Benefit** The commercial shellfish beds in Nisqually Reach would be upgraded, providing benefits to the local economy.
- **Estimated Cost** \$1,100

6.2 EATON CREEK BASIN RECOMMENDATIONS

Regulations and Acquisition

Recommendation 6.2.1: Negotiate a conservation easement for 100' on either side of Eaton Creek and Raymond Ditch, and permit land use activities within the easement which protect and maintain the water resources

Problem Addressed: ER-2, WQ-2, HAB-5, WQ-5, WQ-7

- **Project Description** The County would negotiate a conservation easement along the Eaton Creek corridor in order to prevent further erosion, habitat degradation, and water quality problems in Eaton Creek, much of which ends up in drinking water supplies in the McAllister GSA. The easement will secure access to conduct stream restoration activities and provide additional protection for sensitive resources. The easement would be held by a non-profit land trust or public agency as specified in the County's Open Space Tax Program, and would qualify for a 90% property tax

reduction. The stream banks would be protected from further impacts and revegetated with native plants and hardwoods (see Recommendation 6.2.2) in order to filter nutrients from surface and subsurface flow. The County would develop a program for landowners to use the easements for economically viable activities that also protect water quality and aquatic resources, such as planting and harvesting fast-growing hardwoods on a scheduled rotation (see Recommendation 6.4.9). Current research indicates high potential for such a managed approach to protect water quality and provide an economic return.

- **Benefit** This recommendation would improve water quality, improve fish and wildlife habitat, and protect drinking water, while offering an economic return to the landowners.
- **Estimated Cost** \$77,000 (The impact of reduced taxes has not been analyzed)

Riparian and In-stream Restoration

Recommendation 6.2.2: Systematically restore healthy native vegetation to the riparian corridor of Eaton Creek and Raymond Ditch

Problem Addressed: HAB-5, ER-2, WQ-2, WQ-5

- **Project Description** The county would assemble a watershed restoration team consisting of streamside landowners, volunteers, the Conservation District and federal, state and local agencies. As the County negotiated the Eaton Creek and Raymond Ditch easements, the team would systematically restore native vegetation and in-stream habitat, and reduce erosion along the streams. Project sites would be prioritized according to the severity of the problem. The goal would be to restore the natural functions of the riparian corridor to the entire length of both streams. Once the stream banks have been stabilized, the county would begin the program for easement land use activities described in Recommendation 6.2.1. The success of the project will ultimately depend on the cooperation of all parties involved, as well as financial assistance from state and federal agencies.
- **Benefit** Water quality in Eaton Creek and Lake St. Clair would improve. Fish habitat would be restored as closely as possible to natural conditions, providing long-term economic and environmental benefits. Erosion would decrease, benefiting fish habitat and protecting property from damage, which would reduce long-term costs to county residents. Revegetation projects would help create jobs in the local economy.
- **Estimated Cost** \$214,600

Recommendation 6.2.3: Modify the culvert carrying Eaton Creek under Yelm Highway to make it passable for fish

Problem Addressed: HAB-3

- **Project Description** Baffles would be installed in the Yelm Highway culvert to create resting places for fish trying to pass through the culvert. A two-tiered sill structure would be constructed at the culvert outfall to create a ladder for migrating fish.
- **Benefit** Three to six miles of upstream habitat would become available for fish spawning and rearing, which would improve the sustainability of fish runs in Eaton Creek and Lake St. Clair.
- **Estimated Cost** \$35,000

Recommendation 6.2.4: Build a fish passage structure at the mouth of the culvert carrying Eaton Creek under Evergreen Valley Road

Problem Addressed: HAB-4

- **Project Description** A log sill structure would be installed at the mouth of the Evergreen Highway Culvert in order to improve fish passage.
- **Benefit** The headwaters of Eaton Creek would be made available for fish spawning and rearing, which would improve the viability and productiveness of fish runs on Eaton Creek and Lake St. Clair.
- **Estimated Cost** \$5,000

Recommendation 6.2.5: Determine the cause of flooding in Raymond Ditch above Evergreen Valley Road and develop measures to prevent manure from draining into the ditch

Problem Addressed: FL-6, WQ-2, WQ-5

- **Project Description** A backwater analysis of Raymond Ditch at Evergreen Valley Road would be conducted in order to determine the cause of pasture flooding upstream of the culvert. Solutions will be proposed based on this analysis. If the cause proves to be related to the culvert and ditch configuration, possible solutions include replacing the culvert and dredging the ditch. If a high water table causes natural flooding, the county would work with the Conservation District and the landowner to improve pasture management.
- **Benefit** Fecal coliform contamination of Raymond Ditch, Eaton Creek, and Lake St. Clair would be significantly reduced. Monitoring has identified Raymond Ditch as the site of the worst fecal coliform contamination in the basin, with fecal coliform levels four times higher than the allowable maximum.
- **Estimated Cost** \$20,000

Monitoring

<u>Recommendation 6.2.6:</u> Calibrate Lake St. Clair flooding model with lake level data and establish new lake flood elevations
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Problem Addressed: FL-4

- **Project Description** Lake St. Clair levels would be monitored for 5-10 years, and the data would be used to calibrate the flood prediction model developed by Brown and Caldwell and to establish new lake flood elevations.
- **Benefit** Accurate flood level information would enable the county to set reliable design standards to protect against future property damage.
- **Estimated Cost** \$15,000

6.3 MCALLISTER GEOLOGICALLY SENSITIVE AREA RECOMMENDATIONS

Facilities Construction, Operation, and Maintenance

Recommendation 6.3.1: Pending completion of Olympia's water supply plans for the McAllister GSA area, reroute hazardous truck traffic away from sensitive areas, install spill control structures at high risk intersections on the designated route, install road signs designating the truck route, and conduct an outreach campaign to commercial haulers

Problem Addressed: WQ-3

- **Project Description** Olympia is currently finalizing their long-term water supply plans and deciding how to comply with the Surface Water Treatment ruling for McAllister Springs. If Olympia continues to draw significant drinking water supplies from McAllister basin north of SR 510, stormwater catch basins at high risk intersections identified by the McAllister/Eaton Creek Ground Water Risk Assessment would be retrofitted with vaults or ponds capable of detaining hazardous materials spills. The structures would be sized to contain at least 2,500 gallons, or half the capacity of the largest containers typically moved by road. They would be placed strategically in the road right-of-way to protect the most vulnerable areas. Street signs would be installed to direct truck traffic onto the routes with spill controls, and the county would contact commercial haulers to explain the new routes. If Olympia decides to move the drinking water source south of SR 510 or to another location, the spill protection measures will be re-evaluated and coordinated with Olympia's wellhead protection program (see Recommendation 6.3.4).
- **Benefit** Spill traps, signage and an education program would substantially reduce the risk of drinking water contamination from traffic-related accidents.
- **Estimated Cost** \$507,500

Regulations and Acquisition

Recommendation 6.3.2: Develop pretreatment designs for McAllister GSA infiltration facilities

Problem Addressed: WQ-7

- **Project Description** The county would conduct a thorough review of all available technologies for treating stormwater prior to infiltration, emphasizing methods for removing soluble contaminants which traditional systems do not capture. Based on this review, the county would develop specific designs appropriate for pre-treating runoff in the basin, and would include them in the basin's drainage design standards.
- **Benefit** Appropriate designs would empower engineers to design stormwater systems which better protect water quality, and systems which remove soluble contaminants would reduce the risk of contaminated drinking water.
- **Estimated Cost** \$5,000

Public Involvement and Education

Recommendation 6.3.3: Develop an education and technical assistance program to enlist the help of McAllister GSA homeowners in conserving water and protecting ground water quality

Problem Addressed: WQ-4, WQ-6

- **Project Description** The county would work with Olympia to provide McAllister GSA homeowners with the knowledge and tools they need to reduce their impacts on ground water resources. The program would include such activities as model home tours, landscaping workshops, septic system maintenance training, training on pesticide and fertilizer use, water conservation incentives, and hazardous materials drop-off sites. In addition, point-of-purchase programs would be offered to provide information to consumers on least-toxic alternatives.
- **Benefit** The risk of drinking water contamination would be reduced.
- **Estimated Cost** \$20,000

Project Management

Recommendation 6.3.4: Coordinate with Olympia to implement a Wellhead Protection program

Problem Addressed: WQ-3, WQ-4, WQ-5, WQ-6, WQ-7, WQ-8, WQ-9

- **Project Description** County staff would utilize monthly meetings, electronic mail, and other communication tools to coordinate implementation of basin plan recommendations with wellhead protection plan implementation. The city and county would share the cost of measures to protect McAllister Springs.
- **Benefit** The city and county would cooperate to work efficiently and prevent duplication of services, and the cost would be shared equitably.
- **Estimated Cost** \$1,100

Recommendation 6.3.5: Investigate alternative railway routes for hazardous materials and encourage Burlington Northern to use routes which avoid the McAllister GSA

Problem Addressed: WQ-9

- **Project Description** The county would work with Olympia and state and federal agencies to persuade Burlington Northern to move hazardous materials on alternate railroad routes which avoid the McAllister GSA.
- **Benefit** The risk of a railroad accident contaminating drinking water supplies at McAllister Springs would be virtually eliminated.
- **Estimated Cost** Done

6.4 MCALLISTER/EATON BASIN-WIDE RECOMMENDATIONS

This section contains recommendations which would be implemented throughout the McAllister/Eaton Creek basin.

Facilities Construction, Operation, and Maintenance

Recommendation 6.4.1: Evaluate the potential for converting underground stormwater pipes to grassy swales, and replace piped systems with swales wherever practical and effective

Problem Addressed: WQ-7

- **Project Description** The potential to convert underground, piped stormwater conveyances in the basin to grassy swales would be evaluated against criteria such as: cost; land availability; aquifer sensitivity; threat to public health; compliance with regulatory requirements; and water quality benefit. The piped systems would be converted to swales wherever the evaluation indicates a high benefit-cost ratio or a public health threat. The site constraints of existing developments will limit the number of conveyances where conversion is possible. The cost estimate represents the upper end of the range for potential system conversions. Within the list of priority projects, sites with currently available land that might be developed will be targeted first.
- **Benefit** Runoff would receive the maximum possible treatment prior to infiltration, which would reduce the risk of ground water contamination and significantly reduce the required maintenance of infiltration facilities.
- **Estimated Cost** \$224,400

Recommendation 6.4.2: Evaluate the potential to install sand filters or other pre-treatment systems on infiltration facilities in the basin, and install pretreatment wherever practical and effective

Problem Addressed: FL-1, FL-3, WQ-7

- **Project Description** The potential to install pretreatment systems on stormwater infiltration systems in the basin would be evaluated against criteria such as: cost; land availability; aquifer sensitivity; threat to public health; compliance with regulatory requirements; and water quality benefit. Sand filters, leaf compost filters, wet vaults or other pre-treatment devices would be installed on existing infiltration facilities wherever the evaluation indicates a positive benefit-cost ratio or a public health threat. The existing site constraints will limit the number of systems which can be fitted with pre-treatment devices. The cost estimate represents the upper end of the range for potential filter installations. Within the list of priority projects, sites with currently available land that might be developed will be targeted first. The cost of increased maintenance required to ensure the proper functioning of the pre-treatment filters is included in the maintenance program proposed in Recommendation 6.4.4.
- **Benefit** Pre-treatment filters would prevent clogging and increase the effectiveness of infiltration systems at removing sediments, and would increase the life of many of those systems.
- **Estimated Cost** \$1,410,000

Recommendation 6.4.3: Evaluate the potential to enlarge and retrofit all existing stormwater ponds which do not meet the storage and release requirements proposed in Recommendation 6.4.6, and bring existing ponds up to the proposed standards wherever practical and effective

Problem Addressed: FL-2, FL-4, FL-5, ER-2, ER-3, HAB-5

- **Project Description** Stormwater facilities in the basin would be evaluated against the standards proposed in R-6.4.6 as well as criteria such as cost, land availability, stream sensitivity, compliance with regulatory requirements, and water quantity benefit. Facilities which don't meet the standards and which offer a good benefit-cost ratio would be upgraded. The site constraints of existing developments will limit the number of ponds which can be enlarged. The cost estimate represents the upper end of the range for potential upgrades. Within the list of priority projects, sites with currently available land that might be developed will be targeted first.
- **Benefit** Cumulative impacts from existing development would be reduced. Downstream erosion, property damage, and habitat loss would decrease.
- **Estimated Cost** \$459,000

Recommendation 6.4.4: Develop a policy for maintaining stormwater facilities in the basin and a strategy to implement a scheduled maintenance program

Problem Addressed: FL-1, FL-3, WQ-7

- **Project Description** The county would develop a policy to insure maintenance for existing stormwater facilities in the basin as part of the utility-wide maintenance program currently being developed. The county would also review new developments to ensure that the facilities will be maintained according to county standards.
- **Benefit** Stormwater ponds would be properly maintained and would more effectively reduce contamination and pollution and prevent flooding. The maintenance program would also bring the basin into compliance with state requirements.
- **Estimated Cost** This does not entail basin-specific costs. The cost would be part of the utility-wide maintenance program included in the Nonstructural Recommendations.

Regulations and Acquisition

Recommendation 6.4.5: Encourage clustering of developments in the basin through the incentives of the "Planned Rural Residential Development" section of the Rural Zoning Ordinance

Problem Addressed: FL-4, FL-5, ER-1, ER-2, WQ-4, WQ-6, WQ-7

- **Project Description** Cluster developments would be encouraged according to the provisions of the Planned Rural Residential Development section of the Rural Zoning Ordinance, in order to preserve permanent open space which would otherwise be developed.
- **Benefit** By preserving undeveloped forests, stormwater runoff would be minimized and the basin's vital wildlife habitat functions would be protected. Development would also have less impact on ground water quality.
- **Estimated Cost** No cost

Recommendation 6.4.6: Require 3 times the minimum storage and 1/3 the maximum release rate specified in the 1991 Regional Drainage Manual for runoff in Class C and D soils

Problem Addressed: FL-4, FL-5, ER-1, ER-2, WQ-7

- **Project Description** The basin's drainage design standards would be modified to require up to 3 times more storage and 1/3 of the current (1991) release rate for facilities in soils that infiltrate poorly (see Appendix M for the 1991 requirements). This is the level required to prevent cumulative increases in peak flow from development, according to extensive hydrologic computer modeling of Percival basin, which has similar soils and precipitation levels. The storage and release requirements would be reduced from the maximum level on a sliding scale related to the soil drainage characteristics. Requirements would be reduced from current standards for sites with soils with rapid drainage. Map 6 in Appendix A shows the affected areas. A map of the affected sites and the appropriate standards would be inserted into the drainage manual, which provides specifically for higher standards to be defined by basin plans (Drainage Manual Section 1.3, "Basin Plan Supersedes MANUAL").
- **Benefit** Cumulative impacts on stream resources from runoff generated by new

subdivisions would be avoided, which would prevent the need for additional regional facilities in the future, and would ultimately protect fish, water quality, and property.

- **Estimated Cost** \$1,800 (The cost estimate includes preparing and printing the new standards, but the cost impact to the design-review process has not been analyzed.)

Recommendation 6.4.7: Develop standard designs to insure that new homes and remodels which are not required to submit full drainage and erosion control plans, meet the minimum stormwater retention-detention requirements of the Drainage Manual

Problem Addressed: FL-4, FL-5, ER-1, ER-2, WQ-7

- **Project Description** The Drainage Manual is intended to prevent new developments from cumulatively increasing runoff to streams and sensitive resources. New homes and remodels that create less than 5000 square feet of impervious area are currently exempt from preparing an engineer-approved drainage plan. The County would provide standard designs to proponents of these projects, which fulfill the stormwater goals of the Drainage Manual to prevent new runoff. The designs would relate to the range of typical site conditions, and would become conditions of the building permits. These would apply only to sites without sufficient existing facilities; projects on sites with sufficient existing stormwater capacity (such as individual lots in new subdivisions) would not have to build additional stormwater facilities beyond what is currently required.
- **Benefit** The cumulative impacts of single family home construction and remodelling on stream flows would be significantly reduced. Modeling has shown single family homes to be major contributors of stormwater runoff in similar basins around north Thurston County.
- **Estimated Cost** \$5,000

Recommendation 6.4.8: Make constructed wetlands the preferred option for stormwater treatment in new subdivisions

Problem Addressed: WQ-6, WQ-7

- **Project Description** The basin's drainage design standards would emphasize

constructed wetlands as the preferred stormwater treatment method for new subdivisions and large developments. Constructed wetlands are more effective than other systems for removing nutrients that can contaminate ground water.

- **Benefit** The risk of ground and surface water contamination from new development would decrease, and wildlife habitat would increase.
- **Estimated Cost** \$1,800

Recommendation 6.4.9: Develop Critical Areas Ordinance guidelines and other incentives to promote the use of riparian buffers for activities which improve water quality and provide an economic return

Problem Addressed: HAB-1, HAB-5, ER-2, WQ-5

- **Project Description** The county would develop standards for economically viable uses for stream buffers which also protect water quality, such as sustained harvest of hardwoods, and add them to the next update of the Critical Areas Ordinance. Other incentives such as tax exemptions would be investigated and developed. Studies in Maryland and Oregon have proven that hardwood stream buffers can remove up to 75% of the nitrates from agricultural runoff. European countries have successfully converted agricultural streamsides to rotational hardwood harvesting for firewood. Puget Sound streamsides offer strong potential for growing alder, which has recently become a valuable timber species for furniture construction.
- **Benefit** Land that is removed from development to protect stream resources could be put to other economic uses, benefiting the land owner and the local economy.
- **Estimated Cost** \$3,680

Recommendation 6.4.10: Enforce the Nonpoint Source Pollution Control Ordinance

Problem Addressed: WQ-1, WQ-2, WQ-5

- **Project Description** The county would provide training to health department staff and, if necessary, hire additional staff to enforce the Nonpoint Source Pollution Control Ordinance. Enforcement actions would be coordinated with the Conservation

District with the goal of attaining voluntary cooperation and compliance.

- **Benefit** Nonpoint source pollution would be reduced.
- **Estimated Cost** Accomplished in 1993; no additional cost

Monitoring

Recommendation 6.4.11: Conduct periodic, quantitative stream habitat surveys of McAllister and Eaton creeks

Problem Addressed: ER-1, ER-2, HAB-1, HAB-5

- **Project Description** The county would survey McAllister and Eaton Creeks at scheduled intervals, using detailed, replicable methods of quantitative measurement, based on the techniques developed by E.G. Robison for the Oregon State University Department of Fisheries and Wildlife (see References). The work would be conducted by county crews or contracted out.
- **Benefit** The information would establish a physical profile of the stream, from which the effectiveness of flow control projects could be evaluated.
- **Estimated Cost** \$24,000 every 5 years

Recommendation 6.4.12: Monitor McAllister and Eaton creeks to trace sources of known hot spots, including fecal coliform at the mouth of McAllister Creek and on Raymond Ditch

Problem Addressed: WQ-1, WQ-2

- **Project Description** The County Health Department would review existing ambient monitoring data and develop a source tracking plan for known contamination spots.
- **Benefit** Contamination sources would be identified, which is the first step toward remedying existing water quality problems. This would provide information for evaluating the effectiveness of fecal coliform source reduction measures.
- **Estimated Cost** \$10,000

Recommendation 6.4.13: Monitor stream habitat on Eaton, McAllister and Little McAllister Creeks in cooperation with the T-F-W program

Problem Addressed: ER-1, ER-2, HAB-1, HAB-5

- **Project Description** The county would enter into a cooperative agreement with the Timber-Fish-Wildlife program of the Northwest Indian Fisheries Commission to conduct habitat monitoring of Eaton, McAllister, and Little McAllister creeks. Staff and volunteers would conduct the monitoring, and T-F-W would provide training and quality control. The results would be compiled and reported regularly.
- **Benefit** Stream habitat monitoring would provide indication of trends in overall stream health and give early warning of problems such as erosion and pollution. This would help to evaluate the effectiveness of habitat improvements and fish blockage removal in both creeks.
- **Estimated Cost** Included in Nonstructural Recommendations

Recommendation 6.4.14: Incorporate monitoring into all capital facilities and habitat restoration projects

Problem Addressed: All

- **Project Description** All of the capital facilities and restoration projects proposed in the plan would include a monitoring element in order to evaluate the projects' effectiveness. Monitoring would include gathering pre-project baseline data as well as multiple years of post-projects monitoring. Measurable parameters such as nitrates, fecal coliform, vegetation cover, and fish and aquatic insect population would provide valuable indications of a project's effectiveness.
- **Benefit** Project evaluation would help the county to make future decisions on spending and land use, and would provide important documentation towards re-opening restricted shellfish beds.
- **Estimated Cost** The cost has been included in the project estimates.

Project Management

Recommendation 6.4.15: Train staff and educate developers and residents on the use and implementation of the basin plan

Problem Addressed: All

- **Project Description** The county would compile the basin plan requirements in a simple format to be used by staff, project proponents and basin residents. Drainage standards, zoning requirements, land use regulations, and other recommendations would be distributed to the appropriate staff in a format that would integrate easily with such daily operations as permit application intake, drainage design review, and environmental review. Staff would also receive training to further clarify the basin plan's recommendations.
- **Benefit** The basin plan would be implemented efficiently, consistently, and with consideration for providing the best possible customer service to project proponents.
- **Cost** \$10,000

6.5 RECOMMENDED PLAN ESTIMATED COST

The following table summarizes the estimated cost of implementing the Recommended Plan, in 1993 dollars. The recommendations have been divided into capital facilities and nonstructural recommendations. Capital facilities include construction, repair, and upgrading of physical stormwater facilities. Capital facilities would be included in the county's Capital Facilities Plan and weighed against all the county's other capital construction needs, such as roads, parks, and sewage systems. Nonstructural recommendations include regulations, public education, and other measures which do not involve actually building physical structures.

Table 6.1: Recommended Plan estimated cost

CAPITAL FACILITIES			NONSTRUCTURAL RECOMMENDATIONS		
Recommendation	Description	Estimated Cost-\$	Recommendation	Description	Estimated Cost-\$
MCALLISTER CREEK BASIN					
6.1.1	Evergreen Terrace dry wells	250,000	6.1.6	Little McAllister easement	15,800
6.1.2	Hidden Forest pond	35,000	6.1.7	McAllister revegetation	271,650
6.1.3	Little McAllister pond	1,499,750	6.1.9	Stream gauges	5,000
6.1.4	Mallard Pond	189,000	6.1.10	Shellfish plan coordination	1,100
6.1.5	Mt. Aire dry wells	200,000			
6.1.8	Little McAllister mouth	13,650			
SUBTOTAL		2,187,400			293,550
EATON CREEK BASIN					
6.2.3	Yelm Hwy culvert	35,000	6.2.1	Eaton Creek easement	77,000
6.2.4	Evergreen Valley Rd culvert	5,000	6.2.2	Eaton Creek revegetation	214,600
			6.2.5	Raymond Ditch flooding	20,000
			6.2.6	Lk St Clair model calibration	15,000
SUBTOTAL		40,000			326,600
MCALLISTER GEOLOGICALLY SENSITIVE AREA					
6.3.1	Spill control structures	507,500	6.3.2	Infiltration pretreatment designs	5,000
			6.3.3	Homeowner education and assistance	20,000
			6.3.4	Wellhead plan coordination campaign	1,100
SUBTOTAL		507,500			26,100

CAPITAL FACILITIES			NONSTRUCTURAL RECOMMENDATIONS		
Recommendation	Description	Estimated Cost-\$	Recommendation	Description	Estimated Cost-\$
MCALLISTER/EATON CREEK BASIN-WIDE					
6.4.1	Install grassy swales	224,400	6.4.4	Improved maintenance	**
6.4.2	Install sand filters	1,410,000	6.4.5	Encourage cluster zoning	NC
6.4.3	Upgrade stormwater ponds	459,000	6.4.6	Increase storage and release standards	1,800
			6.4.7	Drainage designs for remodels and single family homes	5,000
			6.4.8	Emphasize constructed wetlands for runoff treatment	1,800
			6.4.9	Riparian buffers	3,680
			6.4.10	Enforce nonpoint ordinance	NC
			6.4.11	Quantitative stream habitat monitoring	24,000
			6.4.12	Water quality monitoring	10,000
			6.4.13	T-F-W habitat monitoring	**
			6.4.14	Monitor capital and restoration projects	***
			6.4.15	Disseminate basin plan requirements and train staff	10,000
SUBTOTAL		2,093,400			56,280
TOTAL		4,828,300			702,530

** The cost of these recommendations are part of the utility-wide work program described in Appendix K

*** These costs have been incorporated into the individual project estimates

CHAPTER 7: MINIMUM SERVICE ALTERNATIVE

CHAPTER 7: MINIMUM SERVICE ALTERNATIVE

This chapter presents specific recommendations to provide the Minimum Service Level described in Chapter 5. The recommendations are designed to meet all state and federal requirements and resolve historical problems which pose a current threat to public health and safety or natural resources. Each recommendation is keyed to a problem or problems described in Chapter 3. The recommendations are organized according to geographic area: McAllister basin, Eaton basin, McAllister GSA, and McAllister/Eaton basin-wide. A brief description, discussion, and explanation of costs and benefits follows each recommendation. Capital improvement projects were evaluated by consulting engineers using a combination of HSPF and HYDRA computer models. Cost estimates are based on site specific considerations and 1992 average bid item costs. The end of the chapter contains an estimated cost for the entire set of recommendations.

Capital facilities in this alternative depend for their effectiveness on implementation of the Regional Nonstructural Management Plan adopted by the county in the Percival and Indian/Moxlie basin plans (see Appendix K for details). The capital facilities would have minimal benefits to the basin if the Regional Nonstructural Management Plan was not implemented.

7.1 MCALLISTER CREEK BASIN RECOMMENDATIONS

The following recommendations listed under the Recommended Plan for McAllister Creek basin (Chapter 6, section 6.1) are also recommended under the Minimum Service Alternative, because they are needed to correct existing conditions which cause road and house flooding or erosion and habitat degradation. These recommendations include:

- 6.1.1: Evergreen Terrace dry wells repair and construction
- 6.1.2: Hidden Forest stormwater pond and swale construction
- 6.1.3: Little McAllister regional stormwater detention facility construction
- 6.1.4: Meadows subdivision Mallard pond improvements
- 6.1.5: Mt. Aire dry well construction
- 6.1.6: Little McAllister watershed protection
- 6.1.8: Reroute mouth of Little McAllister Creek
- 6.1.9: Install stream gauges on McAllister and Little McAllister creeks
- 6.1.10: Coordinate monitoring and source control with state Health and Ecology depts.

7.2 EATON CREEK BASIN RECOMMENDATIONS

The following recommendations listed under the Recommended Plan for Eaton Creek basin (Chapter 6, section 6.2) are also recommended under the Minimum Service Alternative

because they are needed to correct existing conditions which cause flooding and water pollution or erosion and habitat degradation. These recommendations include:

- 6.2.3: Modify the Eaton Creek/Yelm Highway culvert
- 6.2.4: Improve fish passage at the Eaton Creek/Evergreen Valley Road culvert
- 6.2.5: Solve fecal coliform problem at Raymond Ditch/Evergreen Valley Road

The Minimum Service Alternative for Eaton Creek basin does not include Recommendations 6.2.1 and 6.2.2 to acquire and revegetate a conservation easement along Eaton Creek. Instead, the following recommendations are proposed as minimum service alternatives:

Regulations and Acquisition

Recommendation 7.2.1: Designate the Eaton Creek corridor as a Special Management Area under the next update of the Critical Areas Ordinance

Problem addressed: ER-2, WQ-2, HAB-5, WQ-5, WQ-7

- **Project Description** The Eaton Creek corridor would be designated a Special Management Area under the county's Critical Areas Ordinance, due to the creek's critical role in protecting McAllister GSA's water quality and its high habitat value. Special land use performance standards would be developed for the area. The standards would require a 100' buffer on either side of the creek. No development or clearing or cutting of native vegetation would be permitted within the buffer, except for sustainable hardwood harvesting developed as part of the program described in Recommendation 6.4.9. Stock be prohibited from using the corridor, except at designated watering sites developed according to Conservation District guidelines.
- **Benefit** Water quality protection for McAllister Springs and Lake St. Clair would be improved, and fish and wildlife habitat along Eaton Creek would be protected.
- **Estimated Cost** \$17,500

Riparian and In-stream Restoration

Recommendation 7.2.2: Restore native vegetation to selected erosion sites on Eaton Creek

Problem addressed: HAB-5, ER-2, WQ-2, WQ-5

- **Project Description** The county would work with streamside landowners, volunteers, and federal, state and local agencies to revegetate high-priority erosion sites on Eaton Creek. Revegetation sites would include the stretch immediately above and below the Yelm Highway culvert. The county would use volunteer Stream Teams and pursue grant funding as much as possible, in order to reduce the cost to the county.
- **Benefit** Fish habitat would be restored in high-priority areas and erosion would be reduced, which will also protect property from further damage.
- **Estimated Cost** \$15,000

7.3 MCALLISTER GEOLOGICALLY SENSITIVE AREA RECOMMENDATIONS

All of the recommendations listed under the Recommended Plan for McAllister Geologically Sensitive Area (Chapter 6, section 6.3) are also recommended under the Minimum Service Alternative, because they are needed to correct existing conditions which could cause significant drinking water contamination. These recommendations include:

- 6.3.1: Build spill control structures, install road signs and reroute truck traffic away from vulnerable areas in the McAllister GSA
- 6.3.2: Develop pretreatment designs for stormwater infiltration facilities in the GSA
- 6.3.3: Develop an education and assistance program for McAllister GSA homeowners
- 6.3.4: Coordinate with Olympia to implement a wellhead protection program
- 6.3.5: Investigate alternative railroad routes for hazardous materials

7.4 MCALLISTER/EATON BASIN-WIDE RECOMMENDATIONS

The Minimum Service Alternative for the entire McAllister/Eaton Creek basin includes the following recommendations from the Recommended Plan for McAllister/Eaton basin (Chapter 6, section 6.4), which are needed to reduce existing flooding, to evaluate the effectiveness of the preceding recommendations, and to reduce water pollution in both creeks:

- 6.4.4: Implement a county maintenance program for stormwater facilities
- 6.4.9: Promote the use of riparian buffers for tree farming
- 6.4.10: Enforce the Nonpoint Source Pollution Control Ordinance
- 6.4.11: Conduct periodic, quantitative stream habitat surveys
- 6.4.12: Monitor fecal coliform contamination on both creeks
- 6.4.13: Monitor habitat on both streams using the T-F-W program
- 6.4.14: Monitor capital facilities and restoration projects
- 6.4.15: Disseminate basin plan requirements and train staff

7.5 MINIMUM SERVICE ALTERNATIVE ESTIMATED COST

The following table summarizes the estimated cost of implementing the Minimum Service Alternative, in 1993 dollars. The recommendations have been divided into capital facilities and nonstructural recommendations. Capital facilities include construction, repair, and upgrading of physical stormwater facilities. Capital facilities would be included in the county's Capital Facilities Plan and weighed against all the county's other capital construction needs, such as roads, parks, and sewage systems. Nonstructural recommendations include regulations, public education, and other measures which do not involve actually building physical structures.

Table 7.1: Minimum Service Alternative estimated cost

CAPITAL FACILITIES			NONSTRUCTURAL RECOMMENDATIONS		
Recommendation	Description	Estimated Cost-\$	Recommendation	Description	Estimated Cost-\$
MCALLISTER CREEK BASIN					
6.1.1	Evergreen Terrace dry wells	250,000	6.1.6	Little McAllister easement	15,800
6.1.2	Hidden Forest pond	35,000	6.1.9	Stream gauges	5,000
6.1.3	Little McAllister pond	1,499,750	6.1.10	Shellfish plan coordination	1,100
6.1.4	Mallard Pond	189,000			
6.1.5	Mt. Aire dry wells	200,000			
6.1.8	Little McAllister mouth	13,650			
SUBTOTAL		2,187,400			21,900
EATON CREEK BASIN					
6.2.3	Yelm Hwy culvert	35,000	7.2.1	Eaton Cr. special management area	17,500
6.2.4	Evergreen Valley Rd culvert	5,000	7.2.2	Eaton Creek revegetation	15,000
			6.2.5	Raymond Ditch flooding	20,000
SUBTOTAL		40,000			52,500
MCALLISTER GEOLOGICALLY SENSITIVE AREA					
6.3.1	Spill control structures	507,500	6.3.2	Infiltration pretreatment designs	5,000
			6.3.3	Homeowner education and assistance	20,000
			6.3.4	Wellhead plan coordination	1,100
			6.3.5	Railroad alternate routes	1,100
SUBTOTAL		507,500			27,200

CAPITAL FACILITIES			NONSTRUCTURAL RECOMMENDATIONS		
Recommendation	Description	Estimated Cost-\$	Recommendation	Description	Estimated Cost-\$
MCALLISTER/EATON CREEK BASIN-WIDE					
	6.4.4	Improved maintenance	**		
	6.4.9	Riparian buffers	3,680		
	6.4.10	Enforce nonpoint ordinance	NC		
	6.4.11	Quantitative stream habitat monitoring	24,000		
	6.4.12	Water quality monitoring	10,000		
	6.4.13	TFW habitat monitoring	**		
	6.4.14	Monitor capital and restoration projects	***		
	6.4.15	Disseminate basin plan requirements and train staff	10,000		
SUBTOTAL		-0-			47,680
TOTAL		2,734,900			149,280

** The cost of these recommendations are part of the utility-wide work program described in Appendix K

*** These costs have been incorporated into the individual project estimates