Final Adopted

MAY CREEK BASIN ACTION PLAN

April 2001

CITY OF RENTON

KING COUNTY

Acknowledgments

John Affholter, a May Creek Citizens Advisory Committee (CAC) member and long-time May Valley resident and citizen activist, passed away during preparation of this plan. The participants in the development of this plan would like to acknowledge Mr. Affholter's commitment to the Valley and local residents, as embodied by the spirit and cooperation of all the CAC members. The development of the May Creek Basin Action Plan benefited greatly from the contributions of the CAC members. These dedicated volunteers participated throughout the planning process and provided guidance and direction on many of the plan's recommendations.

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1. EXECUTIVE SUMMARY

1.1 OVERALL PLAN GOALS

The May Creek Basin Action Plan provides a set of actions to: 1) address the threat of flooding of homes; 2) facilitate stormflow conveyance, stabilize steam banks and reduce erosion; 3)protect and enhance fish and wildlife habitat and water quality in the basin; and 4) prevent existing problems from becoming worse in the future.

1.2 BASIN OVERVIEW

May Creek is a 7-mile-long stream in the Lake Washington watershed. The creek originates in the steep forested slopes of Cougar and Squak Mountains and in the highlands of the Renton Plateau (Figure 1-1). As many of its tributaries converge on the flat floodplain and wetlands of May Valley, the creek broadens and slowly flows through rural pastures, small commercial areas, and suburban development until finally slicing through a deep canyon and flowing into Lake Washington.

May Valley is a natural floodplain and historically has experienced periodic and sometimes extensive flooding. Through the years, this problem worsened as channelizing of streams and development in upland areas increased stormflows to the valley, and as natural deposition of sediment in May Valley continued to reduce the conveyance capacity of the May Creek channel. May Creek canyon, through which lower May Creek flows, is an undeveloped park in the Cities of Renton and Newcastle where soft trails may be built in the future. Expansion of access to this park and the purchase of additional lands are priorities for the cities. Many residents view May Creek Park as an important community amenity. Erosion and sedimentation occur as a result of natural processes in all stream systems. Much of the erosion and–sediment transport in May Creek is a result of development in the basin. The May Creek basin continues to provide high quality tributary habitat to the Lake Washington watershed; however, use of May Creek by salmon and other wildlife is declining due to habitat loss, erosion, sedimentation, and deteriorating water quality. As more development occurs throughout the basin, many of these problems are anticipated to worsen unless steps are taken to address these issues. For this reason, measures are needed to restore the natural functions of the basin and maintain the quality of life for those who live and work in the basin.

1.3 COMPLIANCE WITH FEDERAL RESOURCE PROTECTION LAWS

It is important to note that in carrying out their jurisdictional responsibilities, the basin's Cities and King County have certain obligations for action that are founded in federal laws. Implementation of the measures recommended in this plan should help basin jurisdictions comply with the provisions of the Clean Water Act, a federal law implemented by the U.S. Environmental Protection Agency in conjunction with the Washington State Department of Ecology. More immediately, implementation of the plan will be affected by the listing of wild native salmonids under the federal Endangered Species Act (ESA). At the time of this writing, two salmonid stocks—chinook salmon and bull trout—present in the Lake Washington

watershed have beenlisted as threatened under the ESA. Additional listings for other Puget Sound salmonids may be forthcoming. Although May Creek and its tributaries do not provide physical habitat elements that would support a large presence of chinook salmon or bull trout, there has been an historic run of chinook in May Creek, and the system does provide habitat elements which still support coho salmon and sockeye salmon in addition to sea-run cutthroat trout and rainbow trout. ESA listings bring with them the potential for additional regulation of many activities of private and public landowners alike, including, for instance, land development and infrastructure maintenance. Affected activities will extend beyond those that result in direct alteration of riparian and instream areas to those whose effects (e.g., alteration of stormflows or an increase in the delivery of pollutants) would indirectly affect listed salmon or their habitat. The local response to ESA listings will probably also require the continuation or creation of monitoring programs that provide information necessary for determining the effectiveness of programs, projects, and/or regulations designed to promote species conservation and show compliance with the provisions of the ESA.

1.4 THE PLAN

The following pages outline an action plan for correcting adverse conditions in the May Creek basin. In its brevity and simplicity, the plan makes a departure from traditional basin planning efforts, focusing on projects that can be completed in the next three to five years within the limits of available funding. The plan recommends solving problems at their source when feasible and suggests some land use prescriptions and development restrictions toward this end.

However, in doing so, the plan attempts to make use of existing County and City policies and stormwater management controls, such as those contained in the revised *King County Surface Water Design Manual* (SWDM). The May Creek Basin Action Plan was developed through funding by King County and the City of Renton, with the cooperation of the City of Newcastle and input from the Citizens Advisory Committee comprised of area residents. In developing this plan, the cooperating agencies have listened carefully to the needs and ideas expressed by local basin residents at several public meetings and have considered them in their analyses. The recommended solutions in this plan are intended to address existing critical problems over the next five years without causing more serious problems in other areas of the basin. The plan is not intended to be the single answer to all the basin's problems, but to work in conjunction with other existing and proposed City and County plans. The plan also contains recommendations for projects that should be undertaken beyond the initial five-year period after the adoption of the plan. Funding sources for these projects have been identified only in general terms, although the activities these projects entail will produce results that build upon those realized from projects undertaken within the primary recommendations of the plan.

The May Creek Basin Action Plan presents recommendations for solutions to problems identified in previous studies of the basin. Chapter 2 of the plan presents background on the basin, identifies existing problems, sets goals for improving conditions in the basin, and evaluates potential solutions upon which the recommendations of this plan are based. Recommendations are presented in Chapter 3. The proposed recommendations are classified as primary and secondary measures based on the anticipated availability of funding and the likelihood of implementation within the next five years. The major primary recommendations intended to deal with these goals are described below.

To undertake actions to reduce flooding problems in May Valley while improving its ecological health, the plan proposes property-specific measures in cooperation with local landowners. The plan also calls for a number of improvements intended to limit future increases in peak flood flows as well as removal of potential channel hazards which worsen flood conditions, including beaver dams, sediment plugs, and reed canary grass occlusions.

Figure 1-1: Basin Vicinity Map

Figure 1-1: Basin Vicinity Map (blank backside)

The density of upland development is a key contributing factor to the flooding that occurs in May Valley. The plan recommends that zoning densities not be increased above existing levels in upland areas draining to May Valley, including adopted pre-zoning for unincorporated areas to be annexed, unless the stormwater impacts of the increased density can be fully mitigated. As land use in the May Creek drainage area has changed, heavily vegetated areas have been replaced with pavement and structures. This conversion of land cover has disrupted the natural hydrologic cycle; ultimately, this significantly increases runoff originating in these areas. In proposing limitations on the density of new development and the retention of strict clearing standards, the Basin Action Plan limits the increase in future runoff to May Valley while supporting a growth management goal of maintaining the character of rural areas in King County.

Along with restrictions on zoning and clearing, the primary recommendations involve strict Retention/Detention standards for future development. When implemented, these measures will contribute to the protection of downstream areas from increases in both peak flows and flow duration.

In addition to these regulatory standards, flooding issues in May Valley are addressed by capital project recommendations aimed at both reducing the flood flows into the valley, and improving the low-flow, "ditched" section of May Creek channel to provide better aquatic habitat and to reduce flooding durations following storm events. These projects will be the top priority capital construction components for King County's implementation of this plan.

Several stream restoration projects also are proposed to improve degraded conditions or provide additional habitat throughout the basin. The plan would set the stage for potential improvements in the May Creek delta; improve fish habitat and stream stability by introducing additional large woody debris in May Creek Canyon; provide slope-stabilization measures to limit erosion and sediment delivery to the creek; and provide small conifer plantings throughout the basin to improve streambank stability, moderate stream temperatures, and become a source for vital organic inputs (e.g. large woody debris) to the stream over the long term. In key locations, projects proposed in the plan would eliminate fish-passage barriers in order to improve upstream access for species using May Creek and its tributaries.

The plan recommends the use of existing water quality programs in the County and Cities to resolve the May Creek basin’s most pressing water quality problems. Implementation of key objectives of water quality programs of the King Conservation District, the Seattle-King County Health Department, and others will also help promote efforts to protect surface and groundwater resources.

Finally, the plan contains a proposal for the establishment of a Basin Steward who would work with local property owners, businesses, and the development community to improve surface-water conditions in the basin through education, coordination, and implementation of many of these projects.

In addition to identifying the most important recommendations for action in the basin, the plan identifies potential funding sources and implementing agencies for each action. The primary recommendations would be funded and implemented by a range of entities, including the Cities of Renton and Newcastle and King County.

Secondary recommendations are proposed to provide longer-term solutions to issues similar to those addressed by the primary recommendations. Funding sources for secondary recommendations can be identified only to a very general level of detail. For this reason, the implementation schedule for these measures is uncertain. The secondary recommendations are shown in a prioritized order derived from a ranking process described in Appendix D. In addition to those projects that might be funded directly through agency involvement in the basin, secondary recommendations also include several projects that might be accomplished as mitigation measures for future development activities.

Chapter 4 presents the expected results of the recommendations made in Chapter 3. During the first three to five years of implementation of this plan, King County would pursue resolution of the worst flooding problems encountered by basin residents in recent years. The plan is also expected to help restore May Creek fish habitat and riparian areas in general. Through cooperative measures and the use of appropriate development standards, the plan would help perpetuate the improvements put in place now through stewardship and public education efforts. As the recommended plantings mature, they will discourage non-native invasive species from becoming established. Habitat diversity would increase, at least in localized areas, which in turn would provide the foundation for an increase in the diversity of wildlife that would reside in or pass through the basin

To ensure successful implementation, this plan recommends formulation of a monitoring program to enable basin agencies to determine the effectiveness of the proposed measures. The monitoring program will provide evaluation criteria for measuring the performance of specific actions and projects to ensure that desired goals are being met, and will be designed at a scale appropriate to the level of capital projects being implemented in the basin. The monitoring and evaluation process allows for corrective actions and adjustments to be made when actions and projects are not producing the desired results. Monitoring also will help agencies and citizens ensure that the improvements achieved through implementation of the plan will continue to be effective and meaningful in the future. Monitoring undertaken to help determine plan effectiveness will likely be coupled with monitoring undertaken as part of ESA response to help identify the effectiveness of broader local efforts to conserve species and comply with regulatory requirements.

2. INTRODUCTION

2.1 About This Plan

This plan has been funded by King County and the City of Renton Surface Water Utility. The City of Newcastle incorporated after a substantial portion of the plan was completed. It has not provided funds for the plan, but has participated in its development in a review capacity. The City of Newcastle has completed and adopted its own Stormwater Management Comprehensive Plan (SMCP). While Newcastle's SMCP and this plan contains similar recommendations for surface-water management projects derived from the hydrologic conditions in the basin, the Newcastle SMCP addresses surface-water concerns for areas outside of the May Creek basin within the City.. The City of Newcastle will coordinate with King County and the City of Renton in commencing implementation of recommended actions before completion of the SMCP if circumstances warrant more immediate action for certain projects. Newcastle formally adopted this plan in late 2000, and the City of Renton plans do so in April or May 2001.

Basin planning has been undertaken recognizing that urban activities contribute to changes in the natural characteristics of watersheds that frequently threaten healthy watershed systems. The focus of basin plans has been on reducing flood damages, protecting stream and wetland habitats, and improving the quality of surface and groundwater. The primary goals of the May Creek Basin Action Plan are the following:

- Reduce the threat of flooding to citizens in the May Creek Basin;
- Make infrastructure improvements that will facilitate stormflow conveyance, stabilize stream banks, and reduce erosion;
- Protect and enhance fish and wildlife habitat and water quality in the basin; and
- Take reasonable steps to prevent existing problems from worsening in the future.

This plan contains strategic recommendations to correct or reduce problems identified through the planning process. The plan also provides guidelines for future actions with the objective to improve overall conditions within the basin. As with all natural systems, watersheds are comprised of relationships between land use, water quantity, water quality, and aquatic habitat. As a result of these relationships, activities in one part of the basin influence, and in turn are influenced by, activities elsewhere. These relationships are particularly relevant to the consideration of proposed remedies to problems in the basin. For example, erosion control cannot take place effectively without consideration of the high water flows that cause erosion, and aquatic habitat cannot be maintained or restored and effectively managed without considering the land uses and hydrologic conditions that surround important habitat areas.

Because this is one of many ongoing planning and implementation efforts undertaken by the basin's three jurisdictions, there are limitations on funding and resources available to provide the many improvements that are desirable in this basin and other basins for which the jurisdictions are responsible. Therefore, a portion of the recommendations made within this plan will be implemented within three to five years, while others may not be accomplished for many years. Actions recommended by the plan are separated into primary and secondary recommendations based on ranking criteria applied to each of the problems identified for the basin, along with the feasibility and availability of funding for each solution. Ranking criteria included flooding

frequency, severity, and the potential for damage to human health, property, and important fish and wildlife habitat.

In categorizing recommendations, those that directly address the most significant problems and are expected to be within the funding capability of these local sources are considered primary, with the understanding that the provision of funding from King County and the Cities of Renton and Newcastle for implementation of the recommendations will require approval by their respective Councils. Other, more long-term solutions without definite funding were defined as secondary recommendations. This methodology for distinguishing between recommended actions differs somewhat from that used in other Basin Action Plans and has resulted in more attention being focused on implementable solutions while still providing a comprehensive approach to addressing problems in the basin. In addition to providing near-term improvements to May Creek surface-water conditions, this plan should provide a foundation upon which to build efforts for long-term improvements.

2.2 FUNDING SOURCES AVAILABLE FOR IMPLEMENTATION

Most of the projects identified in the May Creek Basin Action Plan are expected to be implemented by one of three jurisdictions in the May Creek basin: the Cities of Renton and Newcastle, and King County. Each jurisdiction has a public works or surface-water utility that is responsible for planning efforts and implementation of capital projects related to flood reduction, habitat restoration, and water quality improvement. Each jurisdiction has responsibility for geographic areas broader than the May Creek basin, however, and therefore must prioritize its use of financial resources across its entire jurisdiction.

The King County Water and Land Resources (WLR) Division, formerly known as the Surface Water Management Division, has established a process to prioritize capital expenditures across its service area. WLR's large project capital program is funded by bond revenues. The most recent bond issues in 1992, 1995, and 2000 have been used for construction of high priority projects throughout the County, most of which have been completed. New priorities for capital projects are determined each year based on capital needs throughout the unincorporated portions of King County.

As of March, 2001, funds allocated for May Creek Basin Action Plan implementation totaled $840,000 from 1995 and 2000 capital bonds and King Conservation District funds. Of this amount, approximately $290,000 has been expended for one property purchase and structure demolition; data gathering and assessment, survey, and mapping; and preliminary design work on valley and ravine projects. Although funding from WLR for major projects recommended in this plan is presently limited to the amounts in the current project budgets, additional funding may be available in the future from new bond issues or "pay as you go" (annually budgeted) capital funding. Future capital funds will be allocated across multiple watersheds according to WLR's countywide capital priorities, so funding available for projects in May Creek basin will vary from year to year.

In addition to CIP bond-funded projects, WLR has contributed in the past, and will continue in the future to contribute funds to recommended projects through the Small Habitat Restoration Program, the Drainage and Habitat Improvement Program, and the Neighborhood Drainage

Assistance Program, if circumstances allow. These funds, awarded to projects costing up to $70,000, are distributed on a competitive, priority basis and are largely limited to use on projects within the King County surface-water management service area.

The King County Department of Transportation represents another important participant in, and source of funding for, implementation of Basin Action Plans in King County. The Department of Transportation maintains several databases of priority projects based on a variety of factors. Currently, the two projects focused on the major bridge crossings of May Creek in May Valley do not rank high enough for funding in the near future and therefore are secondary recommendations. Several smaller projects focused on culverts, for example the culvert at S.E. May Valley Road at the East Fork of May Creek, are prioritized differently and are likely to be funded. The WLR Office of Open Space has recently contributed to improvements in the basin through the purchase of parcels at the Pacific Topsoils quarry site, with the intent of maintaining that land as open space with a public access element. The Office of Open Space will be pursuing additional purchases of open space at this old quarry site.

The City of Renton Surface Water Utility's proposed six-year CIP currently identifies a need of $550,000 for implementation of recommended capital projects in future years in the Renton portion of the May Creek basin. The availability of this funding is subject to approval by the Renton City Council.

Newcastle staff have indicated that a high importance is placed upon May Creek basin surface-water issues, especially in the Lake Boren/Boren Creek sub-basin. The City of Newcastle has developed a Stormwater Management Comprehensive Plan (SMCP) identifying its needs and anticipated costs in addressing stormwater issues in its jurisdiction. Newcastle's SMCP is intended to work in concert with this Basin Action Plan for that portion of the City located in the May Creek Basin. Because major capital funds may be limited, Newcastle expects to concentrate on projects that are already budgeted, such as several road improvement projects, and incorporate surface-water needs as appropriate and feasible.

In addition to these major funding sources, project funding from additional sources also may be available. State, federal, and private grant funds, or mitigation dollars resulting from major developments or infrastructure projects in the basin, such as the expected widening of SR 900 or of I-405, may be available for some measures.

Funds from the Cities of Renton and Newcastle are expected to raise the total May Creek basin capital budget to almost $2 million. This money will represent a significant contribution to protecting and enhancing environmental quality within the basin.

The need for surface-water improvements in the basin, however, is much greater than what the $2 million figure implies. The secondary recommendations, which may be implemented as additional funding becomes available, represent more than $20 million of long-term improvements. The establishment of a Basin Steward – a primary recommendation in this plan – will provide a person within the basin to serve as an advocate for continuing efforts to improve local conditions, including those specified for actions in the secondary recommendations list. As King County and the Cities of Renton and Newcastle monitor the results of implementing this

Basin Action Plan, it is expected that additional funding for important projects will be identified as part of their respective surface-water management programs.

2.3 THE MAY CREEK BASIN

The May Creek basin encompasses an area of 14 square miles that drains to the southeast portion of Lake Washington (Figure 2-1). May Creek is approximately 7 miles long. It is the primary stream within the basin, but the basin also contains numerous tributaries, including Honey Creek, Boren Creek, and the North, East, and South Forks of May Creek. Two lakes also are located within the basin: Lake Kathleen in the southeast portion of the basin and Lake Boren in the northwest portion of the basin.

The basin has been divided into four regional subareas (Figure 2-1), or subbasins, for analysis and discussion:

- Lower Basin Subarea – extending from the mouth of May Creek at Lake Washington upstream to River Mile 3.9, above the Coal Creek Parkway S.E. crossing;

- May Valley Subarea – the floodplain of upper May Creek and the adjacent lower valley areas from River Mile 3.9 to the hydrologic divide to the east;

- Highlands Subarea – the area lying north of May Valley and east of the Lower Basin, including the steep southern slopes of Cougar Mountain and the southwest portion of Squak Mountain; and

- East Renton Plateau Subarea – the area lying south of May Valley and east of the Lower Basin Subarea.

The basin was the site of hunting and fishing by early settlers who later conducted mining, logging, and farming operations within the region. Since that time, land use within the basin has changed to more intensive residential use in its western portion, while retaining a mix of rural residential, small farms, and some forest land in the east. The western one-third of the basin has been incorporated by the Cities of Renton and Newcastle, and the remaining area is in unincorporated King County. Although City boundaries are expected to expand somewhat in the future, the Urban Growth Area Boundary bisects the basin at 148th Avenue S.E., ensuring that the eastern half of the basin will remain rural for the foreseeable future.

Figure 2-1: Water Features/Subareas Map

Figure 2-1: Water Features/Subareas Map (blank backside)

May Valley is largely composed of a natural floodplain that periodically filled with floodwaters even before this region was settled. Development in the basin has reduced forest cover, increased impervious surface area, and filled in wetlands. All of these changes have aggravated the valley's natural, periodic flooding regime. The amount of effective impervious area has increased to a basinwide average of 7% under current conditions. Most of this impervious surface is in the Lower Basin Subarea. Without any changes in zoning or development protections, the amount of impervious surface is expected to increase to 12% in the future.

The change from a predominantly forested basin to one with an increasing percentage of impervious surface has had significant hydrologic implications. This change has caused the amount of stormwater runoff to increase throughout the basin, dramatically in some locations. Flood flows have increased as well, resulting in additional erosion of hillsides, flooding and sediment deposition in the valley, erosion in the canyon downstream of the valley, and flooding and deposition near the mouth of May Creek.

Human activity in the basin also has affected local water quality. Pollution from businesses and agricultural processes, road and highway runoff, and residential septic tank failures have contributed to the degradation of May Creek and its tributaries. In addition, reductions in base flow to streams and removal of riparian vegetation have increased water temperature. Collectively, impacts associated with human activities have reduced the habitat value of local streams, which has reduced the capacity of the May Creek system to support migratory and resident salmonids. These impacts also increase the risks to the quality of underground drinking water supplies, critical to residents of the basin and the City of Renton. Because human use of the basin is expected to increase in the future, these concerns must be addressed to improve existing conditions and prevent further deterioration of watershed resources important to humans and native wildlife and plants.

2.4 CONDITIONS WITHIN THE BASIN

Recent basin management planning began with preparation of the *May Creek Current and Future Conditions Report* issued by King County and the City of Renton in August 1995. This report assesses current conditions and predicts future trends in the May Creek basin. The report also identifies significant conditions and issues to be addressed in the May Creek Basin Action Plan. Key findings of the *Current and Future Conditions Report* include the following:

- The dominant hydrologic function of the May Valley is storage of floodwaters. Substantial storage occurs in the valley floodplain. In performing this function, May Valley is sometimes subject to long-duration flooding, which in turn directly contributes to reduced peak flood flows downstream. Removal of the substantial storage in May Valley could increase these downstream flood flows by as much as 30%.

  Currently, retention/detention ponds are not required for most low-density residential development in areas draining to May Valley. Furthermore, reductions in flooding that would result from construction of such ponds would be limited because flooding in the valley is primarily caused by the volume of water, which would be delayed, but not reduced, by such retention and detention structures.

- The most extensive flooding problems in the May Creek basin occur in May Valley. Through the years, development, dredging, and filling within the May Creek floodplain have altered natural drainage patterns, reduced natural storage areas, and placed structures in the path of floodwaters. Runoff from future development is expected to cause an increase in flood volumes in the valley, resulting in longer durations of floodwater inundation and greater frequency of flooding, but only slightly greater flood depths.

  Residential development in May Valley, with the establishment of homes and properties in the valley's wetland and floodplain complex, has resulted in occasional damage to private structures and frequent flooding of pastureland. It is estimated that at least seven homes and one business are located within the 100-year floodplain. Peak flows have increased moderately in the valley, on the order of 15 to 20% greater than the predevelopment conditions for the 2-, 25-, and 100-year events. Flooding, however, is not solely determined by the size of peak flows; it is also a function of floodwater volumes and flow durations. High groundwater levels in winter are likely a factor as well. Several local properties experience pasture flooding and ponding of long duration (sometimes over several months). The valley floor becomes saturated, and the low gradients of the floodplain overbanks do not permit drainage to occur efficiently. Similarly, when major storm-related flooding occurs, the floodwaters recede very slowly. It is this frequency and duration of even low-depth flooding, rather than the size of flood peaks, that has increased substantially over the years as development of upland areas has occurred.

  While May Valley is the site of the most extensive flooding in the basin, less severe drainage problems occur in other parts of the basin. Localized drainage problems in the basin are mainly related to past alteration of natural stream channels, filling natural detention areas, undersized conveyance systems, development with inadequate mitigation, or improper installation of drainage measures, which results in increased runoff to downslope properties. Of the current localized drainage problems, the majority are concentrated in urbanized portions of the basin.

- Sediment deposition has occurred from natural erosion but has been accelerated by increased storm flows from development and changes in local land cover. Sediment deposition has been a problem in two important locations within the basin. First, sediment eroded from streams in the Highlands and East Renton Plateau is gradually reducing the capacity of the May Creek channel in May Valley. This sediment accumulation has contributed to worsening flood problems and degradation of fish habitat. Secondly, increased flows have resulted in erosion of the May Creek Canyon and lower basin tributaries, and this sediment is interfering with commercial business operations on Lake Washington where the sediments are deposited. An average of approximately 2,000 cubic yards per year are dredged from the mouth of May Creek on Lake Washington.

  Stream flows are expected to increase as development expands throughout the basin, especially in the Highlands and East Renton Plateau Subareas. This will increase erosion and downcutting of stream channels, leading to increased sedimentation. In addition, loss of stream-side vegetation, poor construction practices, and quarry runoff also contribute to erosion and sedimentation within the basin.

- Nonpoint pollution is another concern within the basin. Major sources of nonpoint pollution include runoff from roads, quarries, developing sites, and commercial operations; animal-keeping practices and grazing in riparian areas; and failing septic systems. Urbanization of the basin is expected to increase nonpoint pollution concentrations, thereby affecting water quality and aquatic habitat values.

  High concentrations of fecal coliforms and total phosphorus are of particular concern to water quality. Improper livestock management practices and failing septic systems are the primary causes of fecal coliform problems. Consistently high fecal coliform levels were found in the May Valley and upper basin areas, as well as at the mouths of Honey and China Creeks. As well as impacting instream habitat, high levels of fecal coliforms can threaten recreational uses such as swimming and wading. Fecal coliforms also could contaminate groundwater, a cause for concern as this area is within the City of Renton's aquifer protection zone. Stormwater phosphorus loading has resulted in concentrations within May Creek well above U.S. Environmental Protection Agency guidelines for streams that discharge to lakes. The concentrations are sufficiently high to potentially threaten aquatic life. Phosphorus levels are expected to increase as further development in the basin occurs.

- Development activities within the basin have historically degraded stream and wetland habitats. Filling of wetlands, increased stormwater runoff and peak stream flows, addition of sediment and pollutants to the water, and removal of coniferous forest cover have contributed to the degradation of local habitat in the basin.

  The lack of adequate quantities of large woody debris (LWD) within basin streams limits habitat complexity and results in a relative scarcity of pools, an important component of stream habitat. For woody debris to be effective, it must be of sufficient size to alter instream hydraulics and durable enough to remain in place for many years. The lack of high quality LWD accelerates downcutting in stream channels and the build up of sediment at the mouth of May Creek.

  Wetlands within the basin also have been threatened by development. Almost every one of the basin's nearly 80 identified wetlands has been disturbed by deforestation, filling, draining, agricultural practices, or buffer removal, with much of this disturbance occurring after the wetlands were first inventoried in 1983. Without proper land use controls, stream, wetland, and lake habitats will continue to be damaged by existing uses and future development.

Subsequent to identification of existing conditions and areas of concern in the *Current and Future Conditions Report*, project consultant Foster Wheeler Environmental Corporation issued two reports for review by King County and the City of Renton analyzing possible solutions. The *May Creek Basin Phase 1 Solutions Analysis* was issued in November 1995, followed by the *May Creek Basin Phase 2 Solutions Analysis* in May 1996. Both of these reports include assessments of the main problems within the basin. The *Phase 1 Solutions Analysis* combined problems into five categories: May Valley flooding, Lower May Creek sediment erosion and deposition, major site erosion, May Valley habitat problems, and May Creek basin habitat restoration and enhancement. Preliminary recommendations were included within the Phase 1

Analysis, which led to the considerations made within the Phase 2 Analysis for a set of comprehensive approaches to address basin problems.

2.5 POTENTIAL SOLUTIONS

The solutions recommended in this plan were developed to help basin jurisdictions meet the primary goals noted on page 2-1. These solutions use the results of the solutions analysis and the key findings in the Conditions Report and recognize that measures taken to resolve the identified problems must occur in the context of existing land uses in the May Creek basin. In the case of peak flood flows, it is acknowledged that much of the basin has already been either developed or platted and is therefore vested as far as future locally mandated drainage requirements are concerned. In some instances, future development is expected to occur at densities below the threshold at which local stormwater management standards would be triggered and mitigation measures would be implemented. Thus, new approaches to resolving future flow-related problems that are reliant on stricter development standards would have limited utility. This plan can effectively influence stormwater impacts from the small areas of higher density development through the specification of appropriate retention/detention standards as contained in the SWDM.

Given the financial limitations associated with implementation of this Basin Action Plan or plans like it, all of the flooding problems in May Valley cannot be solved at once. Goals for reducing flooding under this plan are, in order of priority, as follows: (1) to eliminate significant public safety hazards; (2) to alleviate frequent flooding of homes and sole access roads; (3) to reduce flooding of septic systems and wells; and (4) to reduce the financial and social burden of pasture flooding. Key limitations in addressing flooding concerns are that these goals must be met without causing downstream impacts or impacts that substantially affect species protected by the ESA, as well as meeting all other relevant permitting requirements.

Increases in erosion resulting from increasing stream flows are difficult to resolve; however, an array of instream measures can be effective at reducing the rate of downstream sediment transport while also increasing habitat area. Resolving erosion problems near their source is the most cost-effective way of addressing such problems, but the discussion above regarding limitations in mitigation for future development has implications for sediment as well. Beyond this recommendation, it will be important for regulating agencies to recognize that sediment deposition is a problem in portions of May Creek as they consider permits for future basin activities.

Nonpoint pollution sources in the May Creek basin include the following:

- failing septic systems;
- roadways;
- livestock; and
- commercial/industrial areas.

All of these sources are present and problematic in other areas of the County as well. As the sources are reflective of the impacts of many widespread land use actions, capital facilities are generally not an effective tool to address these problems. Instead, Countywide programs have been developed to address them. These programs emphasize education, technical assistance, and

other measures that help address the nonpoint pollution problem. In addition, the City of Renton has developed programs to protect groundwater and drinking water supplies. Rather than address such issues individually through this plan, these Countywide and Citywide programs represent a comprehensive approach to dealing with these problems. Several of this plan's recommendations encourage local agencies to target specific portions of May Creek when implementing development guidelines or land use practices under existing programs.

Many of the projects included in the Basin Action Plan's recommendations would improve water quality by addressing pollution from businesses and agricultural activities, runoff from local roads, and residential septic tank failures. Recommendations that correct these problems also will protect underground drinking water supplies. A number of the recommended actions would result in the retention of open space and natural areas that are important in providing adequate land for groundwater recharge.

Although habitat degradation is widespread throughout the basin, this plan recommends public funding of only the most cost-effective solutions to the most significant problems. While local restoration of certain habitat areas has merit, perhaps more important is the need to restore stream and watershed processes and functions so that existing and restored habitat structure can be more self-sustaining in the future. Thus, actions such as reforestation of important reaches of the stream corridor are high priorities, along with measures that will provide more immediate benefits, such as installation of site-specific habitat-protection structures. Overall, this plan reflects an action-oriented agenda for eliminating or reducing the impacts of a variety of problems reviewed in previous studies of the basin. In addition to the potential solutions identified here, Chapter 3 also contains a brief discussion of other solutions considered but determined infeasible. These alternative approaches are summarized in Appendix A.

2.6 AGENCIES WITH ROLES IN MAY CREEK BASIN MANAGEMENT

Planning within the May Creek basin has been undertaken to determine cost-effective approaches for protecting environmental quality and reducing flood damages. The May Creek Basin Action Plan is the result of efforts by several agencies and many concerned citizens, including a Citizens Advisory Committee, and input from the May Valley Environmental Council, to implement measures focused on correcting existing problems and maintaining the integrity of natural resources. The primary agencies involved in development of this plan have been WLR and the Surface Water Utility of the City of Renton, which have shared costs in plan development. Along with the King County Department of Development and Environmental Services and the City of Newcastle, these agencies are responsible for administering development regulations for a variety of activities within the basin. The three jurisdictions have coordinated closely on plan recommendations.

Newcastle, since incorporation, is responsible for approximately 20% of the land area in the basin. Renton is responsible for approximately 12% of the basin, and King County is responsible for the remaining 68% of the area. The land area of the two cities will increase as they annex lands within the Urban Growth Boundary. As part of its watershed management responsibilities, King County has been preparing Basin Action Plans for urbanizing areas of the County over the past decade. This plan identifies surface-water problems within the basin and proposes near- and long-term strategies to address these issues.

Several additional agencies at the regional, state, or federal level are responsible for various activities affecting resource management in the May Creek basin. The regional agencies include the King County Wastewater Treatment Division (formerly Metro), King Conservation District, Washington State University Cooperative Extension Service, and the Seattle-King County Department of Public Health. King County Sewer and Water District 107 provides sewer and water service, and King County Water District 90 provides water service within the area.

The state agencies involved include the Department of Ecology, Department of Health, Department of Agriculture, Department of Natural Resources, Department of Fish and Wildlife, and the Department of Transportation, as well as the Puget Sound Water Quality Action Team. Federal agencies include the Army Corps of Engineers, Environmental Protection Agency, U.S. Fish and Wildlife Service, National Marine Fisheries Service, Federal Emergency Management Administration, U.S. Geological Survey, and the Natural Resources Conservation Service.

In addition, the Muckleshoot Indian Tribe co-manages fishery resources in the basin, as the entire May Creek basin lies within the tribe's Usual and Accustomed fishing grounds.

3. RECOMMENDATIONS

3.1 SUMMARY OF PRIMARY RECOMMENDATIONS

Potential solutions to problems in the May Creek basin have been categorized as **primary recommendations** or **secondary recommendations**. Primary recommendations are either policy decisions that do not require additional public funding, or programs and projects that are anticipated to be implemented within the next three to five years, based on the availability of funding and their relative importance. Secondary recommendations, while considered important, involve projects for which funding is not ensured, and for which the time frame for implementation may extend beyond the three- to five-year interval after adoption of the plan. Concurrent with the development of this plan, basin jurisdictions have undertaken a range of activities that support the broad long-term goal of improving basin conditions. While many of these actions did not directly overlap with discrete, project-oriented recommendations proposed during plan development, several of these actions did do so. These recommendations, as they have largely been acted upon, have been removed from the list of primary recommendations and presented in Appendix G with a description of their current status.

Primary recommendations are summarized below. More specific details about the recommendations follow the summary. A map showing the locations of the projects identified in the primary recommendations is provided in Figure 3-1. Secondary recommendations are presented in prioritized order in Table 3.3 at the end of this chapter.

<u>Basinwide Recommendations</u>

1. Establish and Enforce Requirements for Runoff Retention/Detention, Forest Retention, and Water Quality Facilities for Site Development
2. Develop Basin Stewardship and Community Coordination and Participation through the Creation of a May Creek Basin Steward
3. Establish a Monitoring Program to Determine the Effectiveness of Implemented Plan Actions

<u>May Valley Subarea</u>

4. Provide Cost-Sharing and Technical Assistance for Flood Protection in May Valley
5. Remove Flow Obstructions from the Channel of May Creek in May Valley
6. Restore Flows Diverted from Tributary 0294 back into Tibbetts Creek
7. Enlarge the Culvert under S.E. May Valley Road at the East Fork of May Creek
8. Protect Habitat at the Confluence of May Creek and Its Tributary Streams

<u>Lower Basin Subarea</u>

9. Work Cooperatively to Protect the City of Renton Drinking Water Supply
10. Facilitate Permitting for May Creek Delta Dredging
11. Stabilize the Slopes at the Most Significant Erosion Sites in May Creek Canyon Related to Surface Runoff Discharges
12. Place Large Woody Debris in May Creek in May Creek Canyon
13. Plant Conifers Throughout the Riparian Area in May Creek Canyon

14. Improve Lake Boren Water Quality
15. Improve Boren Creek Fish Passage at S.E. 89th Place
16. Improve the Newcastle Railroad Embankment Outlet

East Renton Plateau and Highlands Subareas

17. Require Full Mitigation for Future Increases in Zoning Density in Areas Draining to May Valley

May Valley and Highlands Subareas

18. Reduce the Potential for Negative Water Quality Impacts Originating at the Basin's Quarry Sites

Figure 3-1: Primary Recommendations Map

Figure 3-1: Primary Recommendations Map (blank backside)

3.2 DETAILED PRIMARY RECOMMENDATIONS

The following section provides a detailed discussion of the recommendations listed above. Basinwide recommendations are presented in Section 3.2.1 followed by recommendations for projects presented by subarea. Recommendations were developed to deal with a variety of conditions in the basin as discussed in Section 2.4. These primary recommendations are not necessarily identified in priority order. They were developed as a package to provide the overall greatest benefits to the basin within the anticipated funding limit.

3.2.1 Basinwide Recommendations

1. Establish and Enforce Requirements for Runoff Retention/Detention, Forest Retention, and Water Quality Facilities for Site Development.

Implementing Agencies: King County Water and Land Resources Division and Department of Development and Environmental Services, City of Renton, City of Newcastle.

Cost: No direct public cost.

Recommendations:

Retention/Detention: Maintain appropriate standards for retention and detention (R/D) for all new development within the May Creek basin (Figure 3-2). Most of the basin should is governed by a Level 2 (Stream Protection) standard, which is intended to limit future increase in runoff into May Creek. Areas draining to Lake Boren should continue to be governed by a Level 3 (Lake Protection) standard, which is intended to limit future increases in Lakeshore flooding for all events through the 100-year flood. Active or inactive quarry operations should continue to be governed by a Level 4 standard, which requires the completion of Master Drainage Plans for large, complex sites, including mineral areas. The Renton drainages to May Creek downstream of Honey Creek are governed by a Level 1 (Conveyance) standard, which is intended to ensure adequate culvert capacity and prevent the overtopping of roads. These sub-basin specific standards have been incorporated into the Surface Water Design Manual (SWDM) by King County and Renton's and Newcastle's drainage codes which are the substantial equivalent.

Forest Retention: Restore the 65% forest retention requirement (35% clearing limit) of the former May Creek Critical Drainage Area in addition to the R/D standards described in the above requirement in all rurally zoned lands which drain to the May Valley sub-basin.

Water Quality: Maintain standards at least equivalent to the minimum requirement of the SWDM throughout the basin.

Discussion: The SWDM contains standards for retention/detention (R/D) and water quality for King County. It establishes four levels of R/D for site development as described in the above recommendation. The standards for any given area are based on downstream areas that are affected by development; areas with higher resource values or greater flooding problems warrant more upstream protection through higher standards. The manual also allows for a combination of retention of forest cover on a parcel and construction of retention/detention facilities for large, rural lot development to ensure that downstream areas are

adequately protected. Clearing limits are set in the King County Clearing and Grading Code 16.82. Presently, development is held to either a 65% forest retention standard without R/D, or a 40% forest retention standard with stormwater facilities consistent with the SWDM Level 2 R/D required for rurally-zoned areas in the basin.

Many standards in the SWDM were originally set for specific areas of the County through the adoption of Basin Action Plans. In May Creek, a Critical Drainage Area (CDA) public rule was enacted in 1993 that required all development in unincorporated portions of the basin to adhere to essentially a Level 2 R/D standard. In addition, the CDA required rural lot developments to maintain 65% of the developed land in pre-development vegetation, which is similar to requirements adopted for the Issaquah and Bear Creek basins. Within Renton and Newcastle, the current standards are equivalent to a Level 1 R/D requirement.

Upon adoption of the Revised Surface Water Design Manual in September 1998, the CDA standards were replaced by the SWDM. Newcastle R/D standards have also been replaced in the basin through that city's adoption of the 1998 King County Manual.

This recommendation sets appropriate standards for each sub-basin (Figure 3-2) within the May Creek basin because it is expected that the Cities of Renton and Newcastle have adopted standards consistent with those in the SWDM. These recommended standards are included in Table 3.1 below. In most of the basin, new development would be required to control both peak flows and flow durations. In the sub-basins draining to Lake Boren, new development also would be required to ensure that lake flooding is not worsened. Portions of the lower basin within the City of Renton, where much development already has occurred, are recommended for a peak flow standard (Level 1) only (Figure 3-3). A Level 3 R/D standard was considered for the area draining to Lake Kathleen; this area has been given a Level 2 R/D standard based on the limited opportunity for additional development to occur in that drainage area. Primarily this is because application of such a standard in that area would not produce greater benefits than those gained from applying a Level 2 R/D standard.

King County Code 16.82 presently allows the choice of either 65% forest retention or construction of R/D for rurally-zoned developments combined with 40% forest retention. The standards associated with the former CDA designation were stricter, however, and required that both 65% of existing forest be maintained and Level 2 R/D be constructed.

The Level 2 R/D requirement in the SWDM is quite effective at limiting future increases in both tributary flooding and erosion which mainly result from the extreme quantities of peak stormflows, but it does not address the overall stormwater runoff volumes. While constructed infiltration facilities are ineffective due to poorly percolating soil types in most areas of the basin. Analysis has shown that maintaining portions of a developed site in existing vegetation is also an effective means of controlling stormwater volumes–the forest lands that are retained store rainfall within the forest canopy and the forest duff layer, allowing significant evaporation and natural infiltration into the groundwater system. On rurally zoned lands, lot sizes are large enough that a forest retention standard is both practical and beneficial in reducing stormwater volumes. The combined approach of both forest retention and Level 2 R/D upstream is very important for reducing future flood-flow increases in May Valley.

Hydrologic analysis suggests that even 40% forest cover combined with Level 2 R/D can be effective in limiting future increases in flooding and erosion. This was the basis for using that

standard in the current Surface Water Design Manual. While a 40% forest retention standard may be virtually equivalent to the former standard of 65%, the flooding volumes and associated impacts to the community are sufficient that the stricter 65% standard should be applied to all development of rural lands draining to May Valley.

As of January 2001, King County along with other jurisdictions are presently negotiating a new set of countywide surface water design standards as an element of the forthcoming Endangered Species Act 4(d) Rule regarding threatened chinook salmon. Currently these new design standards are proposed to mandate both King County-wide 65% forest retention/10% maximum impervious cover limit in all rural areas, in addition to a new two-pronged approach to retention/detention. This approach will give property developers a choice between the construction of the current SWDM facilities (Level 2 R/D), and a new best-management-practice called "full dispersion". Full dispersion will require that all surface water runoff be dispersed over a flat, 100-foot long flow-path through native vegetation. This option is being offered because hydrologic models show it to be as effective as Level-2 R/D for limiting downstream flow-rates.

These changes to the drainage code are anticipated in the near term (2001), because stricter standards are expected to be adopted through the 4(d) rule process. If the expected code changes are not implemented by King County through the 4(d) process, then the stricter requirements described above should be codified separately for the May Creek basin.

For water quality protection, the SWDM presents several levels of treatment standards dependent on the project location and its effect on downstream resources. For each standard, specific measures could be selected from a variety of options to ensure that new development projects adequately meet the performance objectives for treatment of stormwater runoff. These measures tend to benefit groundwater resources as well. In particular, phosphorus-sensitive lakes often merit higher treatment standards for development in upstream areas. The necessary analysis to determine whether a lake (e.g., Lake Boren) is phosphorus-sensitive (and whether stricter standards would be an effective method of improving lake conditions) is beyond the scope of this Basin Action Plan and the basinwide conditions analysis that preceded it.

For now, the water quality protection standards in the SWDM should be maintained for all areas of the basin. The Cities of Renton and Newcastle have adopted the SWDM or equivalent standards for water quality treatment. In the future, a Lake Management Plan should be considered for Lake Boren, as discussed in Basin Action Plan Recommendation 14. Such a plan would assess whether a higher level of required water quality treatment would significantly improve the health of the lake.

Table 3-1: Recommended R/D Standards for New Development

Subbasin and Subcatchments*	Jurisdiction	Recommendation	Justification	Comments
Highlands: NFK, EFK, CAC, COU, LMC	King County, Newcastle	Stream Protection Standard (Level 2): Match post-development flow durations to existing flow durations for all flows between 50% of the 2-year and the 50-year flood peaks	Streams have potential for extreme erosion problems because of steep gradients; need for over-detention to reduce flow and sediment inputs to May Valley	This standard is currently required by the adopted Storm Water Design Manual in King County. The City of Newcastle has also adopted the King County Manual
East Renton Plateau: LKA, LKC, PSC, RHC	King County, Renton	Stream Protection Standard (Level 2): Match post-development flow durations to existing flow durations for all flows between 50% of the 2-year and the 50-year flood peaks	Need for over-detention to reduce flow and sediment inputs to May Valley	This standard is currently required by the adopted Storm Water Design Manual in King County. The standard would continue to apply regardless of future annexations
May Valley: CFD, MVM, MVL	King County	Stream Protection Standard (Level 2): Match post-development flow durations to existing flow durations for all flows between 50% of the 2-year and the 50-year flood peaks	Need for over-detention to reduce local flow and sediment inputs to May Valley	This standard is currently required by the adopted Storm Water Design Manual in King County
Highlands, May Valley: NFK, EFK, CFD	King County	Special R/D Requirements (Level 4): Master Drainage Plan required for any subdivision of previously surface-mined land	Water quality and quantity severely impacted by mined areas; future subdivision provides opportunity for restoration	Requirement applies only to land within boundaries of current and former quarry operations
Lower Basin: WT4, LBU	Newcastle, King County	Lake Protection Standard (Level 3): Match post-development flow durations to existing flow durations for all flows between 50% of the 2-year and the 50-year flood peaks; and match the post-developed 100-year peak discharge rate to the existing 100-year rate	Lake Boren exhibits flooding at outlet; sediment accumulation problems at inlet	
Lower Basin: CN3, CN4, CN5, GYP, NH3, LBL, CCP	Newcastle, Renton, King County	Stream Protection Standard (Level 2): Match post-development flow durations to existing flow durations for 50% of the 2- and 50-year flood peaks	Streams have potential for extreme erosion problems because of steep gradients	This standard is currently required by the adopted Storm Water Design Manual in King County, and as also adopted by Newcastle
Lower Basin: BNB, CN1, CN2, HCL, HCM, HCU	Renton, King County	Conveyance Standard (Level 1): Match the post-developed peak discharge rates to the existing 2- and 10-year peaks	Area is mostly built out, with previous development occurring with little or no mitigation	

* see Figure 3-2 for location of specific subbasins and subcatchments.

Figure 3-2: Subcatchment Boundaries Map

Figure 3-2: Subcatchment Boundaries Map (blank backside)

Figure 3-3: R/D Standards Map

Figure 3-3: R/D Standards Map (blank backside)

2. Develop Basin Stewardship and Community Coordination and Participation through the Creation of a May Creek Basin Steward

Implementing Agencies: King County Water and Land Resources Division, City of Renton, City of Newcastle

Cost: Approximately $60,000 per year, basinwide

Recommendation: Establish a May Creek Basin Steward to work cooperatively with residents and businesses in May Valley and with King County permitting and technical staff in the implementation of Basin Action Plan recommendations, to coordinate volunteer and educational activities in the basin for all three jurisdictions, and to be an ongoing, single point of contact for the county to work with residents, businesses, the three jurisdictions, and other key stakeholders active in the basin.

Discussion: King County values working with a community to take care of a place, and has established a very successful Basin Steward program in basins across the County. The program often works through cost-sharing arrangements with cities in the basins, who pay for services provided in their areas. This provides the advantage of having a dedicated staffperson familiar with the entire drainage basin and how its water resource issues interrelate. The Basin Steward develops specialized skills and knowledge by working with residents, businesses, and the different government agencies active in the basin. The successful implementation of many of this plan's recommended actions depends on King County having a Basin Steward to work closely with individual property owners in May Valley.

Work program activities to be performed by the basin steward primarily will include:

- working with permit agencies, King County Parks, and property owners currently pursuing reclamation of the former Sunset Quarry site as described in Recommendation #6 (Restore Flows Diverted from Tributary 0294 back into Tibbetts Creek);
- acting as a liaison between King County technical staff pursuing implementation of basin plan capital projects and the communities in which they are to be implemented;
- working with basin residents to expedite information requests, permitting efforts, and technical assistance to guide volunteer-based efforts;
- working with landowners to inform them when an observed activity on private property could potentially constitute a violation of land use regulations. The basin steward does not have enforcement authority for King County Sensitive Areas Ordinance or other regulations, but will act as a source of information, coordination, or assistance as requested by landowners who wish to remedy potential or cited code violations on their property;
- responding to citizen concerns about basin activities or conditions that may be affecting private property or aquatic resources in the basin;
- providing information and application assistance to basin residents and organizations regarding potential sources of grant funding for community-led projects;
- working with property owners to encourage the development of Farm Management Plans and participation in incentive-based programs such as the Public Benefit Rating System.

Renton and Newcastle also have expressed some interest in the part-time services of a Basin Steward, particularly to coordinate volunteer activities, undertake public education regarding surface and groundwater protection and the connection between surface and groundwater, and oversee smaller capital projects in the basin. Educational activities would focus on citizen actions that can improve the water resources of the basin. Basin steward-led activities in the basin's cities would be provided as requested and city jurisdictions would fund the cost only for services provided.

3. Establish a Monitoring Program to Determine the Effectiveness of Implemented Plan Actions

Implementing Agencies: King County Water and Land Resources Division, City of Renton, City of Newcastle

Cost: Generally covered within existing budgets.

Recommendation: Develop and implement a monitoring program designed to help determine the effectiveness of recommendations in this plan.

Discussion: The overall goal of a monitoring program for the May Creek Basin Action Plan should be to evaluate the effectiveness of the plan in achieving its key goals: reducing the threat of flooding in the basin; protecting and enhancing fish and wildlife habitat and water quality; reducing erosion; and preventing existing problems from worsening in the future. Monitoring activities would generally cover both long-term conditions in the basin and the effectiveness of specific projects, as shown in Table 3-2. They would be coordinated with monitoring performed in the basin by others, including community organizations, the Washington Department of Fish and Wildlife, and the Muckleshoot Indian Tribe. Monitoring in the basin may support additional goals, such as a regional response to potential listings under the ESA. The data collected should satisfy all monitoring requirements included in project permits. Overall, monitoring data should be analyzed and reported every two years, and may provide the basis for modifying Basin Action Plan recommendations. The exact schedule for monitoring activity may be affected by a jurisdiction's responsibilities to respond to ESA listings. This may entail a shorter time frame before initiation of information gathering, analysis, and reporting. The three jurisdictions should develop and oversee the monitoring program together, though each may be responsible for different parts of it. Where appropriate, volunteers will be encouraged to participate in monitoring activities, and King County's activities will be coordinated with the activities of community organizations.

Table 3-2: Projected Monitoring Program Activities

Monitoring Activity	Questions, Data Addressed	2001	2002	2003	2004	2005
1. Land Use	Proportions of various land uses in basin, percent impervious surface, etc.			X		X
2. Hydrology	Baseflows; relation of flows to rainfall	X	X	X	X	X
3. Water Quality	Storm and ambient data	X	X	X	X	X
4. Channel Measurements/ Habitat Surveys	Channel scour and sediment deposition; pool/riffle ratios, canopy cover, substrate quality, etc.	X		X		X
5. Macroinvertebrate Sampling	Species presence, abundance, and diversity – key measures of biotic health			X		X
6. Fish Surveys	Spawners, juveniles	X		X		X
7. Small Lakes Monitoring	Water quality of Lake Kathleen, Boren	X	X	X	X	X
8. Project Monitoring	Effectiveness of capital projects	X	X	X	X	X
9. Analysis and Reporting	Summary bi-annual reports		X		X	

3.2.2 May Valley Subarea

4. Provide Cost-sharing and Technical Assistance for Flood Protection in May Valley

Implementing Agency: King County Department of Natural Resources

Cost: $600,000+

Recommendation: Provide funding and technical assistance to address flooding problems in May Valley, prioritizing homes that are most frequently flooded and, where possible, incorporating improvements to May Creek and the valley wetland. Explore opportunities to obtain federal and state funding to help implement flood protection projects.

Discussion: A great portion of May Valley lies in a natural floodplain, where flooding would occur with or without human development. Flooding has been worsened by increased runoff from development and associated clearing of surrounding forested upland areas; sedimentation of the stream channel; the growth of vegetation in the channel, reducing the creek's volume capacity and impeding its flow; and trampling of banks by livestock, which has aggravated sedimentation as well as water quality problems. Regulations have been developed to protect some of the important natural characteristics of wetlands and floodplains, placing controls on some land uses. These sensitive area regulations provide some flexibility to landowners, particularly for existing uses. A discussion of these regulations is provided in Appendix B of this document.

Goals for reducing flooding under this plan are, in order of priority: (1) to eliminate significant public safety hazards (e.g., culvert failure at the Newcastle railroad trestle embankment); (2) to

alleviate flooding of homes, businesses, sole access roads and foundations; (3) to reduce flooding of septic systems and wells; and (4) to reduce the financial and social burden of pasture and crop land flooding. These goals must be met without causing negative downstream impacts.

Modeling of flooding in May Valley conducted as part of the Conditions Report indicates that approximately seven homes and at least one business are within the 100-year floodplain. Additionally, extensive flooding of pastures occurs in May Valley during much of the year. Flood velocities and depths are generally low, so they do not threaten public safety in most places, but the flooding of wells and septic systems do pose a health concern for many residents.

Flooding in May Valley has disproportionately affected several landowners. This plan recommends a comprehensive approach that includes elements which: address surface water problems for May Valley residents; preserve the floodplain, wetland, and in-stream habitat of the valley; and protect downstream residents from flooding and ravine erosion. This recommendation calls for working with landowners to address flooding problems in May Valley, prioritizing homes that are most frequently flooded, and incorporating conveyance and habitat improvements to May Creek and the valley wetland where possible.

Components of this recommendation include: on-site drainage improvements, flood-proofing of homes, voluntary home buyouts, construction of off-channel flood storage ponds, removal of old fill in the floodplain, wetland and stream buffer restoration, and other actions developed in cooperation with landowners and regulators.

Previous analyses indicated that six remaining sites in May Valley are most affected by flooding. King County should work with these landowners first to determine specific needs and provide the appropriate assistance to solve flooding problems. An earlier version of this recommendation emphasized flood-proofing homes in the floodplain through home elevation. Recent investigations of the eight specific sites identified as most affected by flooding, as well as discussions with the landowners, have revealed that home elevation is not typically a workable solution. In some cases, the finished floor elevation is already above the 100-year flood elevation, though the land is not. Flooding remains a problem for these citizens; septic tanks are inundated each winter, access to dwellings is cut off, and outbuildings are flooded. In other cases, the flooded living space is below grade and the problem is the result of groundwater intrusion.

In situations where high-priority flooding problems cannot feasibly be resolved by site-specific measures, home buyout is an option. Property would be purchased only from willing sellers, and all acquisitions would be voluntary. On a project specific basis, relocation assistance may be available based on applicable state and federal laws and guidelines. Land acquired under this recommendation would be managed to minimize valley flooding and maximize conveyance and habitat. The acquired land would be maintained as open space in perpetuity.

Project selection would incorporate the input of landowners and would be based upon a number of criteria, including the severity of the problem, the likelihood of its being solved by the proposed action, the expected cost, and the value of related habitat and flood storage improvements. Project design, permitting, and construction would follow agreements with landowners.

The plan recommends that the County provide technical assistance for design, permitting and construction of projects to reduce flooding and/or enhance habitat elsewhere in the valley. Examples of such projects include removal of invasive plants and noxious weeds, maintenance of drainage ditches, and other actions developed in cooperation with property owners. This recommendation would be closely coordinated with:

- Recommendation 5 (Remove Flow Obstructions from the Channel of May Creek in May Valley)
- King County's Small Habitat Restoration Program
- King County's Neighborhood Drainage Assistance Program.

The $600,000 of current funding for this recommendation should result in an implementation program that reaches as many residents as possible to reduce flooding problems on their sites. Additional funding for some of these measures could be available through additional King County appropriations, and state and federal grant programs, including programs administered by FEMA.

5. Remove Flow Obstructions from the Channel of May Creek in May Valley

Implementing Entities: King County Water and Land Resources Division, valley residents, permitting agencies

Cost: Up to $350,000 for pilot projects. This cost does not include subsequent public or private costs to maintain the pilot project sites and to complete similar projects in the rest of May Valley.

Recommendation: Reduce flood durations in May Valley by removing flow obstructions from May Creek channel. Types of obstructions most frequently encountered are beaver dams, stream reaches choked with vegetation, and sediment deposits.

Discussion: May Valley was cleared and drained around the beginning of the last century, and has supported agricultural and residential uses ever since. Based on this history, valley residents have urged King County to acknowledge that the current alignment—indeed, the existence—of this "ditched" portion of the creek is artificial, created for the purpose of conveying both low flows and the waters of periodic flooding out of the valley. Until the 1990s, portions of the channel were maintained by landowners who removed sediment deposits and stands of choking vegetation.

The May Valley subarea supports pasture and low-intensity agricultural uses, small farms, and scattered single-family residences. Currently, 31 percent of the area is in single-family low-density uses. The subarea has several floodplain areas and annual and semi-annual wetlands, forming 39 percent of the subarea (Table 3-2, May Creek Basin Current and Future Conditions Report, KCSWM, 1995). Increased stormwater flows, periodic flooding and extended ponding of water, poor water quality, and impacts to fish are all well documented problems in the subarea. Analysis of past, existing, and forecast storm runoff and flooding conditions of the May Creek Basin indicate that flooding has increased significantly and will probably continue to increase as the basin is developed (KCSWM, 1995).

Local, state, and federal regulations have increasingly limited the ability of landowners to work in the stream, the adjacent wetland, and their buffers. The goal of this recommendation is to develop methods for channel clearing that would be allowable under these regulatory requirements, emphasizing those that could be implemented by valley residents in the future on a maintenance basis. This recommendation seeks to design and implement pilot channel-clearing projects, and to resolve and clarify permitting issues as they arise.

Except for emergencies and certain routine maintenance activities, King County's Sensitive Areas Ordinance (SAO) generally prohibits alterations to sensitive areas like the valley channel reach of May Creek. Certain activities such as roadside and agricultural ditch maintenance and stream enhancement or restoration projects are *allowed alterations* within sensitive areas and can be permitted if they meet certain development standards. If an activity is not exempt from the SAO or an allowed alteration, it can be permitted only as an *exception* to the SAO. Public Agency and Utility Exceptions (PAUEs) and Reasonable Use Exceptions are two of the exception processes available.

King County Code 21A.24.050B describes the agricultural activities allowed in sensitive areas. To qualify under code, these activities must have been in existence before November 27, 1990, and repeated at least once every five years since. Salmon-bearing agricultural drainage ditches can be maintained by private property owners if sensitive area requirements (detailed in KCC 21A.24.370M and the associated public rules) regarding fish protection, construction timing and methods, and habitat enhancement are met.

Stream enhancement and restoration projects are regulated by County Code 21A.24.370 and 21A.24.380. The code requires that these projects be designed primarily to provide significant aquatic habitat elements such as channel meanders, buffer plantings and preservation, and in-channel structure in the form of woody debris. Although projects that meet these requirements may also include flood reduction features such as channel clearing if impacts are properly mitigated, flood reduction can not be the primary purpose of the project. It should still be possible under this recommendation to design small projects that meet stream enhancement or restoration standards, that also provide localized flood relief in May Valley, and that could be carried out by private property owners.

The exception processes of code allow some projects to occur within sensitive areas that might otherwise be prohibited, but such projects must meet certain guidelines before they can be permitted as exceptions. A PAUE, for example, can only be granted to a public agency or utility. As described in KCC 21A.24.070A and the associated public rules, a PAUE proposal must not only demonstrate minimal impact to sensitive areas, but also show that there is no practical alternative action that would have less impact. Alternatives must be compared on the basis of a number of factors including cost, effectiveness, and safety in addition to environmental impact. A proposal to reduce flood damage by working in the channel in May Valley would have to be compared to other methods of reducing damage such as elevating, relocating, or removing threatened structures. Mitigation for channel, wetland, or buffer impacts would vary with each design to reflect the type, duration, and significance of the impacts at each project location. Costs for similar types of projects could therefore also vary significantly from location to location.

Because a PAUE can be granted only to a public agency, pilot projects developed under such an exception would not meet this recommendation's goal of developing methods that could be duplicated by private property owners. Projects requiring a PAUE may not be acceptable on all parcels because some May Valley residents have expressed a strong wish to retain private responsibility for ongoing maintenance of their land.

In addition to all other local and state regulatory requirements, the U.S. Endangered Species Act mandates that any project undertaken in May Valley must be designed and constructed to prevent the loss of listed species and to protect or enhance their habitat.

Using a combination of the above approaches, Water and Land Resources Division engineers and ecologists will work with the May Creek Basin Steward, private landowners, and regional agencies to (1) identify problem sites, (2) design projects that improve the flow conveyance of the main thread of May Creek under normal conditions, (3) obtain all required permits and access easements, and (4) construct the pilot projects. The success of this recommendation will depend upon permit issuance, and will require cooperation and close coordination between landowners, county staff, and regulatory agencies.

The long-term intent of the project is to establish the design criteria, the regulatory requirements, and the costs of projects that address channel obstructions. Where applicable, this information and experience would then be made available to all landowners in May Valley to enable them to build and maintain similar projects on their land as needed. Cooperation between all streamside landowners in the valley will be required if a single thread of May Creek that flows freely through the entire valley is to be established and maintained.

These projects would differ from a comprehensive dredge of the May Creek channel in that: (1) obstructions would be addressed on a site by site basis, and (2) the overall stream channel dimensions would not be significantly enlarged. It is not expected that removing channel obstructions would significantly change the extent of the wetland or the floodplain in May Valley, nor the regulatory protection of those areas. See Appendix H for a discussion of the project elements and implications of large-scale dredging of the May Creek channel.

Specific actions to be pursued under this recommendation include:

1) selecting highest priority sites for pilot projects. Criteria would include severity of existing conditions, degree of improvement expected, landowner willingness, cost, and probability of project success;
2) creating agreements with landowners outlining mutual expectations. Documents that describe long-term county or landowner commitments may be legally recorded on property titles;
3) developing design plans and specifications;
4) notifying the downstream jurisdictions of Newcastle and Renton about designs and plans, and soliciting comment from them regarding potential downstream impacts;
5) obtaining easements where necessary;
6) obtaining all permits and preparing environmental studies as required by regulatory agencies;
7) implementing the pilot projects;
8) compiling results, including design criteria, best management practices, and any mitigation required to address channel obstructions;

9) providing information to individual landowners to enable them to undertake similar projects on their own land;
10) disseminating the information to the public and, through the basin steward, providing ongoing advice and support.

Removing these blockages is not expected to affect the extent of flooding during those times when storms cause May Creek to rise over its banks. As discussed above, minimizing and mitigating for adverse impacts to protected stream and wetland habitat would be required by permitting agencies to compensate for any adverse downstream impacts that result from this recommendation. One element of the pilot project work would be to analyze the extent of potential downstream erosion damage resulting from flood storage loss due to the removal of localized obstructions, and to implement the appropriate mitigation. Because the ultimate goal is to enable landowners to maintain their own properties, strong preference should be given to on-site compensation, rather than regional retention/detention.

This recommendation would include provisions for long-term maintenance and protection of riparian habitat and open space in May Valley through coordination with such tools as Farm Management Plans and participation in tax incentive programs, such as the King County Public Benefit Rating System.

6. Restore Flows Diverted from Tributary 0294 back into Tibbetts Creek

Implementing Agencies: King County Water and Land Resources Division, City of Issaquah, King County Parks Department

Cost: Undetermined

Recommendation: Redirect flows from upper Tributary 0294, east of SR-900, back into the Tibbetts Creek basin.

Discussion: According to anecdotal information from long-time May Valley residents and numerous U.S. Geological Services maps between late 1800's and 1965, at least a portion of Tributary 0294 which lies east of SR900 previously flowed into Tibbetts Creek basin to the north of the May Creek basin before approximately 1970.

This tributary reach, which currently flows through the site of the former Sunset Quarry, drains a catchment area referred to as “sub-catchment zero” in the 1979 May Creek Basin Plan Technical Appendix. That document stated that, "one corrective measure to reduce flooding in the middle reach of May Creek would be to return the flow of sub-catchment zero into its natural drainage basin, Tibbetts Creek." The topography of the contributing land makes an exact estimate difficult, but it appears that this area measures approximately 200 acres. All but about 45 acres of this total is currently forested, and would remain so should it be included in the Squak Mountain Park/Natural Area. The King County Parks Department presently owns a purchase option for this property pending its state-approved mine-site reclamation.

Based on the Unit Area Discharge analysis presented in the May Creek Current and Future Conditions Report, it is possible to estimate a 25-year discharge from this reach of about 40 CFS, or about 1/6 of the current total discharge from the North Fork subarea. As even this relatively modest discharge contributes to the total flow and resulting flooding in May Valley, rediverting all or a portion of this discharge back into Tibbetts Creek should help reduce flood depths and durations in May Valley.

As of early 2001, many legal and technical issues remain to be clarified before this recommendation can be successfully implemented. The current and/or past owners or operators of the Sunset Quarry are obligated to comply with permits issued by the King County Department of Development and Environmental Services and the Washington State Department of Natural Resources for the operation and reclamation of the site. Work under these permits has not been completed. Any restoration work performed at this site would have to be coordinated with the approved site reclamation plans. Since the site is privately owned, any restoration work would also have to be coordinated with the property owner.

Before design work can begin on this recommendation, more information must be gathered on the historical alignment of the channels under consideration, the hydrologic character of the contributing subbasin, and the quantity of flow that can safely be directed back into Tibbetts creek. Permitting will include King County grading and other "sensitive area" approvals, Hydraulic Permit Approval (HPA) from the Washington Department of Fish and Wildlife, and potentially other federally required permits related to the jurisdictions of the Army Corps of Engineers and/or the listing agencies for the Endangered Species Act.

7. Enlarge the Culvert under S.E. May Valley Road at the East Fork of May Creek

Implementing Agency: King County Department of Transportation

Cost: $50,000

Recommendation: Enlarge an existing culvert under S.E. May Valley Road at the East Fork of May Creek.

Discussion: The stream channel up and downstream of the site where S.E. May Valley Road crosses the East Fork of May Creek is at a very high gradient. During flood events, high gradient headwater streams in the basin transport a considerable amount of sediment. These conditions pose a risk of blockage to the existing culvert under S.E. May Valley Road. Blockage of the culvert would cause the channel to overflow, potentially causing road damage. The topography and steep slope of the stream entering this culvert are such that the potential blockage of flows through it will not reduce flows downstream. However, if the culvert were to become blocked and fail, stormflows would flow through an adjacent roadside conveyance ditch, probably causing severe erosion and downstream sediment deposition in May Valley.

Under this recommendation, the existing culvert would be replaced with a larger one, less likely to become blocked—improving fish passage and reducing the chance of overflow, soil erosion, and sediment deposition in May Valley.

8. Protect Habitat at the Confluence of May Creek and Its Tributary Streams

Implementing Agency: King County Water and Land Resources Division

Cost: $25,000+

Recommendation: Protect high quality spawning areas from siltation through the placement of large woody debris or rock stabilization structures upstream of these areas.

Discussion: Many tributaries to May Creek form deltas at their confluence with the creek. These areas represent the best remaining spawning grounds in the basin for returning coho salmon and cutthroat trout. This recommendation would protect these areas from increasing problems resulting from the delivery of fine sediments, which can reduce the quality of spawning habitats by silting instream gravels. Clean gravels are critical to successful salmon spawning. Tributary 0291A may represent a logical starting place for application of this approach. The channel of this tributary is downcutting and eroding and, without restoration, will continue to do so, thereby increasing sediment delivery downstream and into May Creek. The *Conditions Report* identified the mouth of Tributary 0291A as a Locally Significant Resource Area (LSRA). LSRAs have aquatic habitat value and provide important areas for plants and wildlife. The mouth of Tributary 0291A is known to be the site of cutthroat trout and coho salmon spawning. Data collection undertaken during development of the *Conditions Report* show that this confluence is one of the valley's most productive areas. This pilot project or another similar one will be selected for implementation through coordination with the Muckleshoot Indian Tribe and the WDFW for possible funding through King County's Small Habitat Restoration Program (SHRP). For the chosen stream, this recommendation would provide large woody debris, rock, and other onsite erosion-control measures above the delta to improve stream stability and habitat conditions. This approach will have the added benefit of reducing sediment delivery to the flood-prone May Valley. Measures such as this are needed elsewhere in the valley, and this approach could serve as a pilot project for similar efforts on other important tributaries in the future.

3.2.3 Lower Basin Subarea

9. Work Cooperatively to Protect the City of Renton Drinking Water Supply

Implementing Agencies: City of Renton, King County Water and Land Resources Division, City of Newcastle

Cost: No direct public cost

Recommendation: Work cooperatively to implement the City of Renton's Wellhead Protection Program in the May Creek basin.

Discussion: The City of Renton, as a purveyor of a public water supply, is required by the Washington State Department of Health (DOH) to develop a Wellhead Protection Program (WPP). In the process of developing a WPP, the City is required to identify pollutant sources within a Wellhead Protection Area (WPA) surrounding the production wells and implement, with

the cooperation of agencies and the private sector, a program to protect groundwater within the WPA. The WPA consists of the area described by the 10 year time-of-groundwater-travel zone surrounding production wells. It may also include a buffer zone extending to the groundwater divide and/or containing the source area of streams that contribute recharge to the groundwater system. The City operates wells for which the WPA includes a portion of the May Creek basin.

The City of Renton has been implementing aquifer protection measures for many years and plans to complete a WPP that meets DOH requirements in the near future. The cooperation of adjacent land use jurisdictions will be necessary to implement the WPP since aquifers and WPAs overlap jurisdictional boundaries.

10. Facilitate Permitting for May Creek Delta Dredging

Implementing Agencies: King County Water and Land Resources Division, City of Renton (in cooperation with U.S. Army Corps of Engineers, Washington State Department of Fish and Wildlife, U.S. Environmental Protection Agency, Washington Department of Ecology, National Marine Fisheries Service, and Muckleshoot Indian Tribe)

Cost: Negligible

Recommendation: Assist the property owner at the May Creek Delta in obtaining permits needed for future dredging of sediments from May Creek.

Discussion: The Barbee Mill Company is located on the May Creek Delta, where sediment deposition occurs naturally. Increases in erosive stormflows, associated with basin clearing and land development, have increased the need for dredging to allow the mill to continue its commercial operations. While the mill owner currently has an active permit for dredging, each permit cycle lasts only five years. Dredging will have to be undertaken more frequently in the future to maintain adequate access for the mill operation, particularly as a result of increased sediment transport as further development occurs in the basin. In the future, the mill may sell its property on the delta for a mixed-use waterfront development.

In the event that the mill property on the May Creek Delta redevelops in the future, opportunities to enhance May Creek habitat and reduce the need for maintenance dredging should be explored. Although a feasibility study of this option has not been undertaken, it is possible that modifying the May Creek channel could reduce the need for maintenance dredging and provide a unique opportunity to establish an improved habitat area within the lakeshore commercial area, allowing the realization of environmental and economic benefits. Any major redevelopment project also should consider opportunities for acquisition and restoration/preservation of riparian lands adjacent to the May Creek Park system. Until funding for such a project becomes available, continued dredging is the only viable alternative for maintaining commercial operations at the mill. Such dredging has no downstream impacts, and the impacts on channel habitat are localized and minimal. This recommendation recognizes the need for dredging to continue until a long-term solution can be identified and funded. Even a long-term solution likely will include some need for ongoing maintenance dredging. Therefore, this recommendation proposes that the City of Renton continue to expedite city permits for dredging activities, and that Renton and

King County provide technical assistance to the property owner for acquisition of other necessary permits as needed and as resources allow.

11. Stabilize the Slopes at the Most Significant Erosion Sites in May Creek Canyon Related to Surface Runoff Discharges

Implementing Agencies: City of Renton, King County Water and Land Resources Division

Cost: $550,000

Recommendation: Implement a program of erosion-control measures at the most important surface runoff-induced erosion sites in the lower basin. Given the high cost of stabilizing these sites and the significant changes in the canyon's ravine walls due to storms during the winter of 1996-97, prioritization among several identified candidate sites will be necessary before design of these measures is begun. The highest priority sites identified at this time include Honey Creek at River Mile 0.5, and May Creek at River Mile 1.2 and River Mile 1.9.

Discussion: Poorly functioning surface-water conveyance systems have caused large landslides and major localized erosion along May and Honey Creeks in several locations. This erosion has increased the amount of sediment entering these systems and reaching the May Creek Delta at Lake Washington. Because erosion at these sites is ongoing, conditions are expected to worsen unless stabilization is provided. Honey Creek is designated a LSRA from River Mile 0.0 to 0.35, and May Creek has a LSRA designation from River Mile 0.2 to 3.9. As defined by King County, LSRAs have significant aquatic habitat value and provide important areas for plants and wildlife. Both LSRAs could be affected by further erosion resulting from continuing destabilization of these sites. This recommendation would allocate funding to stabilize the two or three most important erosion problems in May and Honey Creek Canyons. After plan adoption, an interjurisdictional technical team representing King County and the City of Renton would identify the most appropriate sites for stabilization. Identification of these sites would be based upon their size, amount of contribution to the May and Honey Creek sediment problem, expected costs, feasibility of stabilization, and the cause of the erosion problem. Funds would be targeted for sites where the effects of stormwater are clearly the major contributor to ravine wall slope failure. Sites where large slides are occurring naturally would not be targeted.

Project design would begin once selected sites are identified. Designed solutions are most likely to involve measures to limit the impact of surface-water runoff on these slopes to prevent aggravation of existing problems. Examples of slope problems and possible solutions include the following:

- Active erosion of canyon walls at River Mile 1.2 of May Creek, where drainage and stormflow from an apartment complex have been concentrated. Chronic erosion and deposition of fine sediments into May Creek is occurring with resultant delivery of sediment to the May Creek LSRA and the mouth of May Creek. In addition, approximately 6 to 8 feet of fill is encroaching upon the edge of the canyon wall, and revegetation of the fill is inhibited by the steepness and looseness of the material.

A solution at this site could involve diverting the runoff, which currently flows over the valley wall, into storm drains. If diversion is not possible, directing flows into a new flexible plastic pipe down the valley wall could be attempted. A small energy dissipater and detention pond on the floodplain at the foot of the hill might be necessary as well. The slope itself could require installation of backfilled slope breakers across the face of the eroding slide, with subsequent revegetation.

- At River Mile 1.9 of May Creek, an 18-inch corrugated metal pipe has separated at the joint, resulting in two slope failures that deposit sediment into the May Creek LSRA and the delta. Repair work at this site could include measures such as installing plastic pipe down the slope; slope breaks to hold soil on the steep, eroded face; and revegetation. Measures such as these would prevent future erosion and avoid delivery of coarse sediment to the creek from additional slumps, thereby improving water quality and aquatic habitat.

Upon adoption of the plan, implementation will involve final selection of the most appropriate sites for stabilization, as well as design and construction of appropriate, cost-effective measures.

12. Place Large Woody Debris in May Creek in May Creek Canyon

Implementing Agencies: City of Renton, City of Newcastle, King County Department of Natural Resources

Cost: $200,000 - $300,000

Recommendation: Place large woody debris in key locations in May Creek Canyon to provide stream channel protection and aquatic habitat, and to reduce sediment delivery to the May Creek delta.

Discussion: Most creeks in the May Creek basin lack large woody debris, an important component of healthy stream systems. This is because vegetative cover in riparian areas has been depleted through the years, reducing recruitment sources of large woody debris for these waters. Large woody debris provides part of the structure that helps hold stream channels and banks together, and it creates pools and channel complexity, which are important components of aquatic habitat. In addition, large woody debris regulates sediment transport in streams, thus reducing the magnitude of sediment deposition downstream. Although large woody debris is needed throughout the basin, this recommendation recognizes placement within the May Creek Canyon as the main priority at this time, with similar placements recommended elsewhere as funding and implementation commitments are identified. Additional large woody debris would improve aquatic habitat, reduce sediment loading downstream, and protect LSRA habitat values. Because this portion of May Creek is located within a public park, increased habitat values also could present educational and interpretive opportunities.

13. Plant Conifers throughout the Riparian Area in May Creek Canyon

Implementing Agencies: City of Renton, City of Newcastle, King County Water and Land Resources Division

Cost: $25,000

Recommendation: Plant conifers along lower portions (below RM 3.9) of the creek and thin the existing deciduous understory vegetation in places to promote growth of new plantings.

Discussion: Additional conifers are needed to establish the desired mix of understory vegetation along the May Creek Canyon and, over the longer term, to establish a forest canopy that will provide ongoing recruitment of large woody debris for the stream. Currently, an abundance of deciduous trees, mostly alder, cottonwood, and vine maple, grow along the creek. Much of this canopy is nearing maturity, and the existing understory will not provide adequate habitat structure and organic inputs to the creek. Given the existing species composition in the understory, this inadequacy will extend into the future if unaddressed. In some places, existing understory vegetation is being overrun by weedy shrubs, such as holly and blackberry, and other areas have become entirely unvegetated. These conditions have increased erosion where trees are not present to hold banks together, especially during floods. Such conditions have degraded stream habitat by increasing downstream sediment accumulations.

Restoration of conifers adjacent to the creek would improve habitat conditions, stabilize streambanks, and improve the complexity and diversity of fish habitat within the creek. After they mature, the conifers would provide a source of large woody debris to the creek when washed into the water during storms or when downed by winds. Under this recommendation, conifers would be planted along the lower portion of May Creek within the Lower Basin Subarea, and protective measures would be taken to protect newly planted trees during their initial growing stages. This effort will include opportunities for volunteer involvement in the planting projects.

14. Improve Lake Boren Water Quality

Implementing Agencies: City of Newcastle, King County Water and Land Resources Division, Coal Creek Utility District

Cost: Up to $30,000

Recommendation: Expand the citizen-based water quality monitoring and stewardship program to continue collecting water quality data for the lake, improve public education regarding water quality, and begin small-scale improvement actions.

Discussion: Although Lake Boren and its associated wetlands are designated LSRAs, their water quality has decreased recently as a result of runoff from urbanization and construction activity in the China Creek catchment and in areas draining directly to the lake. Sediment carried to Lake Boren by China Creek has increased seasonal cloudiness in the lake during winter, and water quality data collected between 1988 and 1992 indicated consistently high levels of fecal coliform and nutrients being discharged into the lake by China Creek. As a result, the lake has had occasional high readings of fecal coliform, and high levels of phosphorus have led to regular algae blooms. Water quality monitoring data show that Lake Boren is more sensitive to lake-level fluctuations resulting from rainfall than most King County lakes. Statistics on nutrients in the lake characterize it as a “meso-eutrophic” lake, meaning that it borders on being eutrophic or “overly productive” of algae or other undesirable vegetative conditions that impair a lake’s

health. (See Appendix F for previously collected Lake Boren volunteer monitoring data.) As residential development continues to increase around the lake and in the China Creek basin, water quality conditions are expected to worsen, threatening such increasingly popular activities as fishing, swimming, and recreation in nearby Lake Boren Park.

Protective actions under this recommendation would continue the volunteer programs that have provided specific information on the lake's water quality through a citizen-based monitoring and stewardship program. The program would provide additional information on existing water quality standards as well as detailed information about stream flows and runoff entering the lake under base-flow and storm-flow conditions. This information will help form the basis for a possible lake management plan, which would require grant funding from state and local sources. The development of such a plan should receive consideration as a result of preliminary data, which suggest that a combination of in-lake and watershed actions could improve long-term prospects for the lake. A lake management plan would recommend appropriate standards for water quality treatment associated with new development. Any long-term plan for the lake also should promote sewer service to those lakeside residences still on septic systems, which have contributed to water quality problems in the lake, particularly when lake levels are elevated by stormflows. Lake Boren is within the Urban Growth Area; therefore, the provision of sewer service to this area would be consistent with regional planning policies. If necessary, grant funding should be sought to fund these improvements.

Along with citizen involvement in monitoring lake conditions, an education program would be implemented to inform citizens about the need for septic system maintenance and best management practices (BMPs) around the lake. The estimated cost for the lake monitoring and education program project is $30,000, based upon similar programs undertaken at other lakes in King County. The City of Newcastle is also considering construction of a sediment pond upstream of the lake, along China Creek, to reduce sediment delivery to the lake. Such a project could represent an early action of a lake management plan.

Subsequent long-term implementation of a lake management plan would probably best be undertaken through formation of a Lake Management District (LMD). An LMD is a special taxing district enacted by a vote of the residents living near the lake (typically its watershed). It would involve an annual fee for a set number of years to implement or partially fund implementation of a lake management plan.

15. Improve Boren Creek Fish Passage at S.E. 89th Place

Implementing Agency: City of Newcastle

Cost: $100,000-$150,000

Recommendation: Provide additional fish passage improvements at S.E. 89th Place to improve access to upstream areas of Boren Creek.

Discussion: Several culverts in Boren Creek prevent fish access to approximately 1.7 miles of upstream habitat. Lake Boren and its associated wetlands are designated LSRAs and are adjacent to the creek. The culvert under S.E. 89th Place is a potential fish barrier during high flows or

when debris collects at the intake. While such passage improvements are needed in at least two other upstream locations, funding has been identified only for improvements at the stream crossing at S.E. 89th Place in Newcastle. It is the farthest downstream of the blockages and therefore represents a logical starting point for implementation of this recommendation. Similar improvements at other locations on Boren Creek are included among this plan's secondary recommendations. Passage improvements are recommended for funding as part of the current City of Newcastle budget to upgrade the intersection of S.E. 89th Place with Coal Creek Parkway and, thus, could be accomplished relatively soon. The proposal would include an upgraded crossing of Boren Creek, probably with a bridge or open-bottom culvert. The total cost for the upgraded intersection is estimated to be $360,000. The cost of the crossing portion of the project would be approximately $100,000 to $150,000.

16. Improve the Newcastle Railroad Embankment Outlet

Implementing Agencies: City of Newcastle

Cost: $70,000

Recommendation: Improve the outlet structure at the railroad embankment where water now collects and poses a hazard should the current embankment fail. Monitor the pond level and establish an emergency action plan.

Discussion: The Newcastle embankment is an old railroad crossing constructed on a landfill trestle. Water collects and is impounded behind this embankment. This structure is located across Newport Hills Creek approximately 0.13 mile above the confluence with May Creek. Leaks have occurred in the outlet pipe, and seepage also takes place through the embankment fill. Although analysis of the structure has indicated that it is not in immediate danger of failure, the embankment/outlet structure poses a potential hazard under severe flood conditions that could result from outlet clogging and substantial water being backed up behind the embankment. Failure of this structure could damage a home approximately 400 feet east of the embankment as well as several homes downstream.

This approach would improve the outlet structure to prevent blockage of the outlet standpipe and reduce the potential of embankment failure. It would replace the existing standpipe with a new outlet structure, install pond-level monitoring devices at the outlet, and prepare an emergency action plan for evacuation in case of a breach in the embankment. The City of Newcastle has included this project as a high priority in its SWCP and would be responsible for installing the facilities, and monitoring and implementing an action plan in case of emergencies. These measures would provide the minimum action required to prevent the embankment from failing and endangering downstream homes and property and delivering substantial quantities of sediment to LSRA habitat areas of May Creek.

3.2.4 East Renton Plateau and Highlands Subareas

17. Require Full Mitigation for Future Increases in Zoning Density in Areas Draining to May Valley

Implementing Agencies: Metropolitan King County Council, Newcastle City Council, Renton City Council, County and City planning departments

Cost: No direct public cost

Recommendation: In areas of the basin draining to May Creek or any of its tributaries upstream of the Coal Creek Parkway bridge, existing zoning densities (including adopted pre-zoning for unincorporated areas to be annexed) should not be increased unless a qualified hydrologic analysis demonstrates that stormwater runoff peaks and volumes can be fully mitigated to pre-developed conditions. Density bonuses provided under development incentive programs should not be approved for these areas. The proposed Basin Steward (Recommendation 2) shall work cooperatively with each jurisdiction and, if requested by the jurisdiction, may coordinate the technical review of mitigation designs to address future flow-related impacts. Each jurisdiction will determine the consistency with local surface water management and development regulations and may consult the Basin Steward to assess overall impacts. Further, a proposed amendment to the 2000 update of the King County Comprehensive Plan proposes designating an area in the unincorporated King County portion of the May Creek basin as the May Valley Urban Separator. This area is in the Urban Growth Area and zoned R-1. The amendment changes the land use designation to Greenbelt/Urban Separator to recognize the sensitive features of the area. In accordance with Countywide Planning Policy LU-27, the Greenbelt/Urban Separator land use designation on this parcel, if adopted, cannot be changed to other urban uses or higher densities until the next 20-year planning cycle, which would begin in 2012. This provision applies even if the property is annexed to a city.

Discussion: Zoning in the May Creek basin is a complex issue. The basin contains three jurisdictions that have control over land use decisions in distinct areas of the basin, and within these jurisdictions, a range of zoning designations exist (Figure 3-4). In addition, the basin is bisected by the line demarking the Urban Growth Boundary, which approximately separates the upper part of the basin, draining to May Valley, from the lower basin. The Urban Growth Boundary was moved to its existing location during deliberations of the Growth Management Planning Council, in significant part to protect the rural character of May Valley and to reduce its flooding problems. There are, however, areas that drain to the valley within the Urban Growth Boundary, which either are part of Renton or Newcastle or are anticipated to be annexed by one of the Cities (Figure 3-5). Some of these areas are already built out, but portions of them remain undeveloped and subject to future building activity.

These circumstances contribute to a challenging environment for addressing the relationship between zoning and surface-water problems in the valley. The basin's jurisdictions make zoning decisions in response to a variety of circumstances, including the goals of their respective comprehensive planning processes, growth management requirements, equitable treatment of property owners, and surface-water conditions. Circumstances may become even more complex as the basin jurisdictions incorporate ESA response requirements into their zoning and land use regulations.

The primary surface-water problem in May Valley is extended periods of flooding. In addition, there is especially significant erosion at the upstream end of May Canyon, just above the Coal

Creek Parkway bridge. Future development in upland areas will increase flows to these areas and will aggravate these conditions to some degree, even assuming implementation of this plan's recommendations to protect individual property owners and aquatic resources in the valley. Enhanced requirements for drainage facilities in upland areas (see Recommendation 1) will be of some benefit but will not be of major significance in reducing flooding for a number of reasons, including the relatively impervious till soils in much of the upland area (which limits the possibility of groundwater infiltration), the fact that smaller developments will not trigger special drainage requirements, and that R/D standards focus primarily upon future development. Upland drainage requirements will reduce erosion and delay stormwater runoff from reaching the valley, but during significant floods upland runoff will still generally arrive in time to add to the valley's slow-draining floodwaters. The total volume of upland stormwater runoff, which primarily relates to the density of upland development, will largely determine how future development in the basin affects valley flooding.

Although the Basin Action Plan accepts existing zoning (including adopted pre-zoning for unincorporated areas to be annexed) in the areas draining to May Creek upstream of the Coal Creek Parkway bridge as a legitimate response to the variety of concerns affecting land use decisions, it recommends that densities in these areas be increased only if a qualified hydrologic analysis demonstrates that hydrologic impacts can be fully mitigated. This would include mitigating all flow-related impacts from development with regard to the entire range of peak flows, flow durations, storm water volumes and impacts on groundwater recharge. Properties draining to this area, whether in incorporated or unincorporated King County, should not be considered potential “receiving areas” for density bonuses, such as those that may be available through a Transfer of Density Rights program for rural forest or farmlands in King County or other possible incentive programs that may be developed in the region.

3.2.5 May Valley and Highlands Subareas

18. Reduce the Potential for Negative Water Quality Impacts Originating at the Basin's Quarry Sites

Implementing Agencies: King County Department of Development and Environmental Services, King County Water and Land Resources Division, Washington Department of Ecology, Washington Department of Natural Resources

Cost: Included within Recommendation 2 and current agency budgets

Recommendation: Ensure that the basin's closed quarry sites are reclaimed in a technically sound manner that protects resource quality and that any future quarrying activity is undertaken in compliance with existing water quality standards. If quarries remain open, develop a strategy to provide improved enforcement, technical assistance, and/or incentives to quarry operators to improve operating practices and reclamation techniques to minimize impacts on surface-water quantity and quality.

Figure 3-4: Recommended Zoning Map

Figure 3-4: Recommended Zoning Map (blank backside)

Discussion: Quarry operations in the May Creek basin, as elsewhere in the County, have historically had major effects on downstream stormwater flows and water quality. The many activities associated with quarrying operations, including earthmoving, gravel extraction, materials stockpiling, and truck traffic to and from quarry sites, can contribute to discharge of turbid, sediment-laden water. Operations at the various quarries in the basin have been less intense over the last few years, primarily because most of the material worth extracting already has been removed. Several of the quarries have changed ownership during this period. One quarry is now the site of an active composting operation, and a similar proposal has been considered at another of the closed quarry sites. As quarry operations have largely ended at these sites, the primary concern regarding the effects of quarry operations on surface-water conditions has changed, with the focus becoming adequate closure of sites rather than ongoing attention to stormwater management measures intended for active sites. Certain areas of concern remain on sites that have not been reclaimed. These areas should be the focus of efforts to provide technical assistance to reclamation efforts or, where necessary, the focus of enforcement of reclamation and water quality standards. Where practicable, purchase of quarry sites may also be considered as a way of ensuring long-term restoration of those sites, thereby minimizing impacts from them in downstream areas.

This recommendation is intended to achieve the following goals:

- Ensure that closed quarry operations are reclaimed in a technically sound and environmentally safe manner. To assist in reaching this goal, a strategy should be developed for monitoring the conditions at closed sites and the ownership of those sites, providing improved enforcement where problems arise, offering technical assistance in preparing reclamation plans, and providing incentives to quarry operators to initiate reclamation procedures.

- Ensure that any ongoing quarrying operations comply with appropriate water quality standards. The proposed Basin Steward should coordinate with quarry owners and county enforcement staff to provide improved enforcement, technical assistance, and/or incentives to quarry operators to improve management practices and minimize potential impacts on surface-water quantity and quality. Additionally, the Basin Steward should assist quarry operators in continuing current practices that help achieve this objective.

3.3 SECONDARY RECOMMENDATIONS

What follows is a prioritized listing of the secondary recommendations that were identified during plan development. Appendix D describes the methodology used to prioritize these recommendations. Implementation of these projects would be contingent upon willing property owner participation. Many of the smaller projects ideally would be implemented or assisted through volunteers who would be coordinated by the Basin Steward. The projects are presented in Table 3-3, which follows. The map letter designations in the table refer to the project locations in Figure 3-5.

Table 3-3: SECONDARY RECOMMENDATION PROJECTS

Map Letter	Project Name	Project Type (primary)*	Project Scale/ Estimated Cost**	Funding Sources (includes grants)***	Project Description
A	May Creek Park Forest Conversion and Stream Enhancement	HR	M	PM, R	Continue to restore mixed coniferous forest to improve stream reaches and riparian zones along May and Honey Creeks. Continue to introduce very large organic debris to creek channels, as is included in primary recommendation.
B	Purchase Reclaimed Quarry Area at Pacific Topsoils Site	HP	L	OS, R	Complete the purchase of the closed quarry operation at the Pacific Topsoils site on the ridge dividing the May and Tibbetts Creek basins.
C	Preservation of May Valley Wetland #5	HP	L	OS, R	Purchase private property in the wetland for preservation when interest is expressed by willing sellers. Manage acquired parcels to protect agricultural uses on adjacent properties. Includes removal of fill placed in the wetland and enhancement activities as desirable and as may be permitted.
D	N.E. 31st Street Private Road Culvert Improvements	FR	M	PM	Private road at end of N.E. 31st Street has been overtopped by previous flooding, cutting off access to several residences. Any future development using the access bridge should be required to upgrade to 100-year flood capacity.
E	May Creek Park Expansion Acquisitions	HP	Multiple S to M	RNT, NCT, R	Continue to purchase lands along the May Creek Canyon.
F	Boren Creek Residential Access Improvements	FR	S	PM	Upgrade the bridge along the access road to reduce the effects of flooding. Condition any future construction permits on properties affected by Lake Boren access road flooding to require bridge upgrades.
H	Gypsy Creek Drainage Improvements	FR	S to M	NCT, PM	Removal of old road fill and culvert followed by revegetation. Excavation of fill and culvert could use hand labor. Tightline road runoff downslope to creek.

* Project Type: HP = Habitat Preservation; HR = Habitat Restoration; FR = Flood Reduction.

** Project Scale/Estimated Cost: VS = Very Small (less than $50,000); S = Small (between $50,000 and $200,000); M = Medium (between $200,000 and $500,000); L = Large (more than $500,000).

*** Funding Sources: WLR = King County Water and Land Resources; KCR = King County Roads Division; RNT = City of Renton; NCT = City of Newcastle; PM = Project Mitigation; OS = King County Office of Open Space; R = Regional Funding Source.

Table 3-3: SECONDARY RECOMMENDATION PROJECTS (continued)

Map Letter	Project Name	Project Type (primary)*	Project Scale/ Estimated Cost**	Funding Sources (includes grants)***	Project Description
I	148th Avenue S.E. Bridge and Approach Improvements	FR	L	KCR	Improve this frequently flooded road's flood protection by replacing bridge to provide increased flood conveyance and decreased backwater flooding to immediate upstream properties. Design bridge for100-year flood flow conveyance capacity.
J	Coal Creek Parkway Trestle Improvements	FR	S	NCT	Bridge piers supporting the Coal Creek Parkway crossing of May Creek have been designated "scour critical." Inspect and monitor after major storms, and install channel backwatering or other protective scour counter-measures as appropriate.
K	N.E. 31st Street Bridge Improvements	FR	M	RNT	Replace bridge to provide 100-year capacity and reduce risk of structural failure from stream erosion. Renton has applied for federal assistance.
L	N.E. 31st Street Culvert Improvements	FR	M	RNT	Upgrade undersized culvert along N.E. 31st Street to ensure 100-year flood capacity for future conditions. Reduce the risk of structural undermining from erosion.
M	Basinwide Conifer Reforestation	HR	M	WLR, R	Aggressive tree-retention and planting program to plant high levels of coniferous forest vegetation throughout the basin for maturity in 50- to 100-year time frames.
N	May Creek Delta Restoration	HR/HP	L	RNT, PM	Preserve and restore main body of original May Creek Delta. Relocate channel to improve sediment transport. Lower delta by removing deposited fill, and replant delta and buffer to restore tree- and shrub-dominated habitats.
O	Lake Boren Wetland (Wetland #8) Habitat Enhancement	HR	M	NCT, PM	Restore woody plant vegetation, relocate China Creek to a new natural channel, and incorporate gravel complexes and large woody debris in new channel.
P	Forest Conversion of Wetland #28	HR	M	NCT, PM	Thinning of woody vegetation and understory planting with native conifers. Replanting buffers with native conifers. Consider purchase for preservation.

* Project Type: HP = Habitat Preservation; HR = Habitat Restoration; FR = Flood Reduction.

** Project Scale/Estimated Cost: VS = Very Small (less than $50,000); S = Small (between $50,000 and $200,000); M = Medium (between $200,000 and $500,000); L = Large (more than $500,000).

*** Funding Sources: WLR = King County Water and Land Resources; KCR = King County Roads Division; RNT = City of Renton; NCT = City of Newcastle; PM = Project Mitigation; OS = King County Office of Open Space; R = Regional Funding Source.

Table 3-3: SECONDARY RECOMMENDATION PROJECTS (continued)

Map Letter	Project Name	Project Type (primary)*	Project Scale/ Estimated Cost**	Funding Sources (includes grants)***	Project Description
Q	164th Avenue S.E. Bridge and Approach Improvements	FR	L	KCR	Improve this frequently flooded road's flood protection by replacing bridge to provide increased flood conveyance and decreased backwater flooding to immediate upstream properties. Design bridge for100-year flood flow conveyance capacity.
R	North Fork Realignment	HR	L	PM	Relocate portions of the creek to near original locations, or realign to restore meanders and channel diversity. Large woody debris would be added to relocated stream reaches, and banks would be graded to reduce slopes.
S	North Fork Corridor Habitat Conservation and Enhancement	HR	L	PM	Reduce sedimentation within stream channel, add large woody debris, and restore filled wetland areas in riparian corridor.
T	Boren Creek Fish Passage Improvements	HR	M	NCT, PM	Provide passable fish culverts at S.E. 84th Way and upgrade or remove private driveway to improve fish passage.
U	Enhancement and Restoration of Wetland #2	HR	M	WLR, PM	Cleanup of existing trash piles, replanting of native vegetation, and restoration of filled wetland areas.
V	North Fork Confluence Restoration	HR	M	PM	Remove shallow layers of fill and replant disturbed area with native forest vegetation. Added opportunity to relocate North Fork, provide gravel substrate, and restore large woody debris to channel.
W	North Fork Wetland #75 Enhancements (southeast end)	HR/FR	S	WLR, PM	Several acres of fill at the southeast end of this wetland would be removed and restored with native plantings to help reduce flooding on adjacent properties.
X	Restoration of Outlet at Lake Kathleen	HR	S	PM	Remove fill and plant native trees and shrubs in wetland area at north end of lake.
Y	Wetland #50 Restoration	HR	S	PM	Remove illegal fill to enlarge wetland, plant native vegetation in buffers and disturbed wetland areas, remove trash and spoil piles, may consider fencing.

* Project Type: HP = Habitat Preservation; HR = Habitat Restoration; FR = Flood Reduction.

** Project Scale/Estimated Cost: VS = Very Small (less than $50,000); S = Small (between $50,000 and $200,000); M = Medium (between $200,000 and $500,000); L = Large (more than $500,000).

*** Funding Sources: WLR = King County Water and Land Resources; KCR = King County Roads Division; RNT = City of Renton; NCT = City of Newcastle; PM = Project Mitigation; OS = King County Office of Open Space; R = Regional Funding Source.

Table 3-3: SECONDARY RECOMMENDATION PROJECTS (continued)

Map Letter	Project Name	Project Type (primary)*	Project Scale/ Estimated Cost**	Funding Sources (includes grants)***	Project Description
Z	Preservation of Lake Kathleen Headwaters	HP	M	OS	Purchase wetland and large upland buffer for preservation.
AA	Preservation of Wetland #7	HP/HR	M	OS, PM	Purchase wetland and buffers for preservation. Portions of buffer may benefit from tree plantings, and opportunities for instream enhancement of Boren Creek are also present.
BB	Preservation of Wetland #36	HP/HR	M	RNT, PM	Purchase wetland and surrounding buffers (may include developed land) for preservation. Enlarge wetland by demolishing existing structures, removing fill, and restoring native woody vegetation.
CC	Preservation of Wetland #47	HP/HR	S	OS, PM	Purchase wetland and sizable buffer to timbered steep slopes for preservation. Alter deciduous forest and understory to encourage recruitment of conifers.
DD	Preservation of Wetland #41 Corridor	HP/HR	S	NCT, PM	Purchase ravine for preservation and recreation purposes. Reestablish conifers on walls of preserve. Active management of recreation activities is needed.
EE	Enhancement of Wetland #3	HR	S (Wetland portion VS)	WLR, PM	Fence/bridge tributary, plant wetland/riparian area with native plants, and place large woody debris in channel in wetland area.
FF	North Fork Wetland #75 Enhancement (north end)	HR	VS	PM	Disturbed areas and adjacent agricultural lands would be planted with native woody and forest vegetation with landowner permission. May be linked to potential North Fork realignment described above. Any restoration work would be designed to protect adjacent property uses from any impacts from the restoration, including flooding.
GG	Restoration of Wetland #34	HR	S	NCT, PM	Remove fill areas, plant native woody vegetation in disturbed wetland and buffer areas, and remove ditches to restore wetland hydrology.

* Project Type: HP = Habitat Preservation; HR = Habitat Restoration; FR = Flood Reduction.

** Project Scale/Estimated Cost: VS = Very Small (less than $50,000); S = Small (between $50,000 and $200,000); M = Medium (between $200,000 and $500,000); L = Large (more than $500,000).

*** Funding Sources: WLR = King County Water and Land Resources; KCR = King County Roads Division; RNT = City of Renton; NCT = City of Newcastle; PM = Project Mitigation; OS = King County Office of Open Space; R = Regional Funding Source.

Table 3-3: SECONDARY RECOMMENDATION PROJECTS (continued)

Map Letter	Project Name	Project Type (primary)*	Project Scale/ Estimated Cost**	Funding Sources (includes grants)***	Project Description
HH	Honey Creek Fish Passage Improvements	HR	S	RNT	Replace or remove culvert if existing culvert is a fish passage barrier and a Department of Fish and Wildlife permit is required as part of the Devil's Elbow lift station improvements.
II	Improvements to Honey Creek, River Miles 1.35 to 1.72	HR	L	PM	Return portions of creek to natural channel with abundant woody debris and gravel beds, restore wetland habitats and buffers associated with the channel and plant native vegetation. Direct parking lot stormwater away from stream.

* Project Type: HP = Habitat Preservation; HR = Habitat Restoration; FR = Flood Reduction.

** Project Scale/Estimated Cost: VS = Very Small (less than $50,000); S = Small (between $50,000 and $200,000); M = Medium (between $200,000 and $500,000); L = Large (more than $500,000).

*** Funding Sources: WLR = King County Water and Land Resources; KCR = King County Roads Division; RNT = City of Renton; NCT = City of Newcastle; PM = Project Mitigation; OS = King County Office of Open Space; R = Regional Funding Source.

Figure 3-5: Secondary Recommendation Projects Location Map

Figure 3-5: Secondary Recommendation Projects Location Map (blank backside)

4. MANAGEMENT PROGRAM EXPECTATIONS

A number of goals are associated with each of the Recommended Actions contained in Chapter 3. This chapter describes the benefits and changes that are expected to accrue as a result of pursuing the recommendations presented in the preceding chapters.

4.1 NEAR-TERM IMPROVEMENTS

This discussion focuses on improvements expected to result from the measures presented as primary recommendations in the preceding chapter.

A guiding principle in the development of this plan has been to focus on a set of issues of primary importance in the basin, recommend actions to address those issues, and, most importantly, identify reliable sources of funds to support undertaking those actions. As a result of this focus, at the end of the three-to-five-year implementation time frame identified for this Basin Action Plan, all of the primary recommendations should have been implemented. It is possible that several of the secondary recommendations could be in place at that time as well, depending upon the schedule for a number of major projects in the basin and the success of basin agencies in obtaining funds for these improvements. The response of federal, state, and local agencies and private interests to the listing of salmonid species under the ESA may make additional funds available for implementing a number of the actions suggested in the recommendations. Given the long-term outlook and strategy necessary to achieve species recovery, funding is reasonably likely to become available for basin priorities identified in the secondary recommendations in addition to new priorities identified for implementation beyond the five-year term that is the focus of this plan. Identification of, and coordination with, potential funding sources would be a responsibility of the Basin Steward. In considering the expected benefits of these recommendations, the near-term improvements are those most likely to be achieved through implementation of the primary recommendations. Although these measures will not resolve all the problems basin residents associate with May Creek, all the concerns identified in the *Conditions Report*, or all the problems likely to come to light through enforcement of the ESA, meaningful improvements are expected to occur in several significant areas, including the following:

- Reduction in the frequency and duration of flooding in several areas, especially in May Valley.Residents would have an avenue for technical support and assistance for locally based flood reduction/habitat improvement projects. In addition, properties prone to chronic flooding may be acquired for permanent flood relief to inhabitants. Quicker drawdown of flooding in May Valley will lessen health concerns and nuisances caused by private flooding.

- Reduction of contributions from the May Creek basin to the factors for decline of wild native salmon stocks in the Lake Washington watershed, particularly those salmon stocks listed under the ESA. In addressing the degradation of salmon habitat resulting from activities taking place in the basin, requirements from the Clean Water Act will be addressed as well, reducing the likelihood that additional substantive regulatory action would be necessary to address water quality impacts that affect listed salmonids. Although historically the integration of water quality and ESA-related species protection concerns has not occurred, responses to species listings in Puget Sound will include such integration. Such integration

should help streamline local efforts that support salmon recovery and respond to federal regulatory action.

- Elimination of a potential safety hazard in the basin through improvements to the Newcastle railroad embankment outlet. Although the *Conditions Report* concluded that failure of the embankment is not imminent and that the potential threat to downstream homes and property is not great, the current condition of the outlet is unacceptable. This remedial action, along with implementation of the recommended monitoring plan, would prevent potential blockages of the outlet, removing the threat of failure.

- Improvement in May Creek Delta conditions through a localized reduction in erosion from several discrete sites and a reduced rate of increase in sediment delivery to the mouth of May Creek. Although this reduction is an expected near-term benefit of improvement measures, the advantage over current conditions and the ability to moderate future sediment contributions will ultimately be determined by the timing of future development buildout. The acknowledgment by all permitting agencies that dredging of the delta is reasonable, through the recommended facilitation of permit acquisition, will allow dredging to continue. Prospects of proposed land use changes at May Creek Delta could create the opportunity for initiation of a major habitat restoration project at the delta. The success of such a project would largely depend on the effectiveness of proposed improvements in the upper basin.

- Improved local habitat in May Creek Canyon and on at least one tributary to May Valley. Improvements to the riparian corridor will begin to ensure that habitat can remain stable over longer periods of time in the future. Critical fish passage problems would be eliminated with the result of improved upstream access to spawning and rearing habitat for a variety of fish species.

- Development and implementation of Farm Management Plans for many properties in May Valley, resulting in cooperative efforts between agencies and landowners, and a reduction of nonpoint pollution. Farm Management Plans have been or are currently being prepared for some properties in the Valley. This Basin Action Plan recommends that one focus of the Basin Steward be to inform landowners about the availability of technical assistance to develop Farm Management Plans and to assist with proper implementation of measures in the Farm Management Plans. Establishment of improved stream buffers through this approach would be of significant benefit to water quality. Increased farm production would be a secondary benefit of this approach given the dual focus of Farm Management Plans: water quality protection and farm productivity. This could significantly improve water quality conditions in the basin, particularly with regard to fecal coliforms and high stream temperatures, which now present nearly lethal conditions for salmon.

- Financial incentives resulting in opportunities for property owners to retain their land as open space or in small agricultural uses. The results of such efforts are expected to help achieve and maintain a low-density, rural atmosphere in many parts of the May Creek basin, particularly along the upper basin areas of May Creek and its tributaries.

- An increased awareness by basin residents that their actions have impacts on all water resources, including streams, wetlands, and groundwater (and the species dependent upon them), within the basin. Through this awareness, opportunities for residents to participate in habitat improvements and monitoring should increase. Contributions of volunteers interested in improving local conditions and enhancing the future quality of life within the May Creek basin are an integral part of plan goals and objectives. Educated and active residents, working with the proposed Basin Steward, are expected to play an important role in taking advantage of many opportunities for both near-term and long-term improvements and protective measures for basin resources. Educational information and programs will provide residents with an increased understanding of the connections between all water resources, aquifers, and groundwater protection.

Along with citizen awareness and participation in improvement programs, enforcement of existing regulations intended to protect local resources continues to be important. The Basin Steward will work with landowners to inform them when an observed activity on private property could potentially constitute a violation of land use regulations. The basin steward does not have enforcement authority for King County Sensitive Areas Ordinance or other regulations, but will act as a source of information, coordination, or assistance as requested by landowners who wish to remedy potential or cited code violations on their property;
. The Basin Steward will be in a position to organize educational opportunities for residents and, through ongoing contact with residents, will also be able to disseminate information about the basin's resources in less formal ways.

The Cities of Renton and Newcastle will have primary responsibility for regulatory enforcement efforts in areas of the basin within their jurisdictions. The Basin Steward will act as a conduit of information to the Cities about issues in the basin, and will be available to provide educational and technical assistance under contract to the Cities at their request.

4.2 LONG-TERM IMPROVEMENTS

In addition to the improvements that accrue from implementation of primary recommendations over the three-to-five year period following plan adoption, improvements will accrue over the long term as a result of implementation of both the primary and secondary recommendations. Given the uncertainty of the funding mechanisms for the secondary recommendations, realizing the improvements from those projects is less certain than with the primary recommendations. Secondary recommendations are likely to be implemented concurrently with the basin development that is expected to occur under existing zoning designations. The timeline for these secondary improvements may be as long as 15 to 30 years.

Through mitigation measures associated with future development, and through direct interaction between basin residents and governmental agencies (including the May Creek Basin Steward), significant changes in the character of the basin are expected to be achieved as this plan is implemented. Hazardous flooding problems in the basin will be significantly reduced, and all public and sole residential access roads will be improved to be passable under at least 25-year flow conditions. A continuous riparian corridor along the entire mainstem of May Creek will be created. Development of this riparian corridor would rely upon the use of primarily native plant species. Riparian plantings in combination with fencing, where appropriate and necessary,

would control livestock access to the riparian zone. These actions are expected to increase the diversity and number of fish and wildlife associated with riparian areas.

Additionally, the amount of coniferous vegetation throughout the basin will increase significantly, resulting in improved habitat for both native and non-native wildlife species. An increase in coniferous vegetation would also reduce the expected post-development increase in basinwide surface-water runoff. May Creek will have measurably lower stream temperatures and higher dissolved oxygen levels in the May Valley reach, improving habitat for salmon, trout, and other aquatic species. Finally, the May Creek Delta on Lake Washington will see improved habitat values and reduced sediment accumulation.

Ultimately, through Farm Management Plans and programs that make conservation measures attractive to landowners, this plan presents a movement away from regulatory management and toward an incentive-based approach for protecting basin resources. It represents a cooperative effort between local government and property owners in determining how to alter practices that may lead to flooding of downstream or adjacent property. At the same time, it provides for collaboration between government and residents on restoration and protective measures for the natural resources of the basin. In this sense, one of the most important long-term benefits this plan may achieve is acknowledgment of the significant role of natural resources within the watershed and the need for a locally based, cooperative response to conserving, protecting, and monitoring the integrity of the May Creek basin to benefit present and future generations.

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APPENDICES

Appendix A

Alternative Solutions Considered for May Valley Flooding

Appendix A: Alternative Solutions Considered for May Valley Flooding

Alternative Solutions

In addition to the primary and secondary recommendations presented in this plan, a number of alternative approaches to solving basin problems were reviewed during preparation of the *Phase 1 and Phase 2 Solutions Reports* (Table A-1) in 1995 and 1996. Given the importance of May Valley flooding to residents, additional alternatives are presented in this appendix. As identified in the table that follows, these potential solutions were considered but rejected because of the limitations identified.

Table A-1: ALTERNATIVE APPROACHES CONSIDERED FOR MAY VALLEY FLOODING

Alternative	Description	Minimum Cost	Benefits	Limitations
Floodproofing	A. Floodproof 7-9 homes	$400,000	Eliminates flooding of most homes; very feasible; little or no habitat impacts; least expensive	Does not address pasture flooding; does not fully address flooding of outbuildings or septic systems and wells; limited reach of basinwide funding resources
	B. Buyout of 7-9 homes	$3 million	Eliminates flooding of most homes; very feasible; little or no habitat impacts	Does not address pasture flooding, outbuildings, or septic systems and wells; expensive; limited reach of basinwide funding resources
Dredging	A. Simple channel (enlargement of existing channel)	$1.3 million	Reduces nearly all pasture flooding; protects most homes	Low permitting feasibility because of habitat impacts; does not protect all flooded homes and businesses; significant downstream erosion and sediment impacts; expensive; would require maintenance dredging
	B. Complex channel (low flow with flood overflow bench)	$2.5 million	Reduces majority of pasture flooding; protects most homes	Moderate permitting feasibility; requires too much space (avg. width 70-80 feet); does not protect all flooded homes and businesses; moderate downstream impacts; expensive; would require maintenance dredging
Retention/ Detention to Protect Valley	A. R/D on May Creek (460 acre-feet)	$2.2 million	Major improvement in flows in downstream canyon; minor improvement in flows and volumes in May Valley	Does not address May Valley flooding volumes; does not protect all flooded homes and businesses; low feasibility because of number of sites involved and habitat concerns; expensive
	B. R/D on May Creek and tributaries (600 acre-feet)	$13 million	Improvement in flows in May Valley and downstream canyon; eliminates most flooding of homes and businesses	Does not address May Valley flooding volumes; does not protect all flooded homes and businesses; low feasibility because of number of sites involved and habitat concerns; extremely expensive
Bypass Pipeline	Nine-foot-diameter pipeline to bypass flows to Coal Creek Parkway	$22 million	Eliminates all valley flooding problems	Huge impact on downstream canyon unless pipe is extended to Lake Washington; low permitting feasibility due to habitat concerns; extremely expensive

Appendix B

Sensitive Areas Regulations

Appendix B: Sensitive Areas Regulations

Among a number of regulations that govern land use in May Valley, those applying to sensitive areas and floodplains have become increasingly important as development occurs there. The King County Sensitive Areas Ordinance (SAO) includes wetland classifications that apply to much of the land in May Valley. Because the valley is a natural floodplain, regulations pertaining to floodplain development also guide development there. These regulations include limitations on new land uses in the valley and are intended to protect important natural resources while also protecting residences from flooding that may occur as a result of new construction. Given the overlapping nature of these requirements, this appendix is intended to clarify these regulations and their application to May Creek. The Cities of Renton and Newcastle have adopted similar ordinances to protect sensitive areas. For the purposes of this appendix, however, the King County regulations are discussed because much of the public concern regarding buffers and provisions under these regulations has been in regard to May Valley, which lies within unincorporated King County.

Wetlands

The SAO defines wetlands according to the presence of appropriate hydrology, soils, and vegetation. Three types of wetlands are defined according to functional values: Class 1 are generally large (greater than 10 acres in size) and complex, with endangered or threatened species, or unique plant associations; Class 2 wetlands are of medium size (between 1 and 10 acres) and less diverse than Class 1, but may include unusual wildlife habitat; and Class 3 wetlands are generally small (less than 1 acre) with less diversity than the other two classifications, and frequently include vegetation monocultures.

The ordinance requires buffers around wetlands. Generally, Class 1 wetlands require a 100-foot buffer; Class 2 wetlands require a 50-foot buffer; and Class 3 wetlands require a 25-foot buffer. Much of the May Valley area has been classified as Class 1 wetlands, primarily because of the size of the wetland area there. This classification places strong restrictions on land uses in these areas.

Despite the limitations placed on development by the need for buffer areas, many current uses are not affected by these regulations. Under the present regulations, exemptions are given to existing agricultural uses where such use predates the SAO adoption in 1990, or where continuous agricultural use has occurred since then. These exemptions apply to both wetland and buffer areas. Thus, grazing within buffer areas is allowed under the agricultural use exemption. Only when new development is proposed, or a change in land use is considered, are these restrictions applied. If, for example, property under agricultural use is subdivided for the purpose of constructing homes (a new use), then that use is subject to the wetland regulations. As long as the property remains in agricultural use, the current exemption continues.

Streams

Streams are another sensitive area with a classification system and set of restrictions similar to those described for wetlands. Three classes of streams, Classes I through III, have been defined based on size and average flows. Two subclasses of Class II, moderate-sized streams, have been created to differentiate between those in which salmon or trout have been observed and those in which they have not. Buffer widths for streams vary from 100 feet for streams designated Class I and Class II with salmonids to 25 feet for Class III streams. Restricted activities within these stream buffers are similar to those for wetlands, and uses existing at the time of SAO adoption are "grandfathered," that is, allowed to continue.

In areas such as May Valley, where riparian wetlands are located adjacent to streams, restrictions for new development are governed by whichever buffer is more expansive. In May Valley, this is typically the wetland buffer because each buffer width is 100 feet.

For streams surrounded by extensive agricultural use, such as that which occurs in May Valley, there is an important exception to this current use exemption. The Livestock Management Ordinance, adopted in 1993, requires a number of measures, including limiting livestock access within a portion of the defined buffer of streams or wetlands. Since December 1998, properties with livestock have been required to limit livestock access within a 50-foot buffer of Class I streams or wetlands, and replant the area with native vegetation. This required stream buffer can be reduced to 25 feet when a Farm Management Plan has been implemented. The wetland portion of this livestock buffer requirement, however, does not apply for wetlands considered to be grazed wet meadows. Therefore, in May Valley, the 50-foot buffer applies from the edge of May Creek rather than from the delineated edge of the valley wetland.

Floodplains

Floodplain regulations are applied in a similar manner. There are three different regulated floodplain areas, which are associated with rivers, streams, and other waterbodies:

- **the Federal Emergency Management Agency (FEMA) floodway**, which includes the waterbody itself and adjacent areas with fast or deep water during 100-year flows. No new structures are allowed in this area, with the possible exception of fences or corrals that do not impede flows or take up flood storage space;
- **the zero-rise floodway**, which extends farther from the waterbody and where new development must demonstrate that it would not raise the existing 100-year flood elevation. New residences in this area must have a building footprint of less than 2,000 square feet and cannot impede floodwaters; the footprint of existing buildings cannot be increased; any development must also meet the requirements applied to the flood fringe; and
- **the flood fringe**, which includes the remainder of the floodplain for 100-year flows. New development in the flood fringe must provide compensatory flood storage; all new living structures must be constructed at least 1 foot above 100-year flood levels and must meet flow-through requirements.

Subdivision of land in the zero-rise floodway (including the FEMA floodway) is allowed only if 5,000 square feet of buildable area outside the floodplain would result for each lot.

As with wetland regulations, existing land uses are allowed to continue. Floodplain development criteria are only applied where new development is proposed. These regulations are intended to control the types of new development allowed in order to protect existing landowners whose uses have been allowed under "grandfather" provisions in the regulations.

If you have questions about how sensitive areas regulations may apply to property in unincorporated King County, please contact the Department of Development and Environmental Services at 296-6655.

Summary

In many areas along May Creek, these wetland, stream, and floodplain regulations overlap and properties proposed for development are required to meet all of them. In most cases, existing uses are "grandfathered" so that they are allowed to continue as long as they remain active. For example, grazing within a wetland is

allowable regardless of wetland class if the grazing is an existing use that was taking place before adoption of the SAO. The major exception to this existing use exemption pertains to uses within the immediate stream buffer, where the Livestock Management Ordinance requires that by the end of 1998 all farm animals' access to streams be limited, with (in the case of May Creek) a 50-foot vegetated buffer. Fencing is recommended to ensure buffer maintenance. Note that this buffer requirement can be reduced to 25 feet through a Farm Management Plan. This reduction is recommended for all properties within May Valley. These buffer improvements required under the Livestock Management Ordinance can be undertaken with financial assistance from several agencies, including the King Conservation District and the King County Department of Natural Resources. Further cost-sharing assistance is proposed under this plan.

The requirements in the King County Sensitive Areas Ordinance described above are current as of March 2001. Discussions regarding the implementation of additional or revised regulations under the SAO are presently underway in light of King County's obligations to meet the requirements of the federally issued 4(d) rule under the Endangered Species Act. These discussions will probably result in changes to the regulations discussed in this section. For the most current information regarding the requirements of the Sensitive Areas Ordinance, please contact the King County Department of Development and Environmental Services at 206-296-6655.

Appendix C

Public Participation

Appendix C: Public Participation

Coordination with May Creek Citizens Advisory Committee

The May Creek Basin Citizens Advisory Committee (CAC) was formed to provide input from local residents and concerned citizens on problems and possible solutions in the basin. The CAC consists of nine members and two alternates and includes residents and stakeholders from areas throughout the May Creek basin, including Renton, Newcastle, and unincorporated King County. The CAC was formed specifically to participate in the May Creek basin planning process and to help develop solutions to issues of concern in cooperation with the agencies preparing this plan. The group has met throughout the planning process during the last few years, and has provided important information regarding conditions in the basin and prioritization of basin problems. The CAC discussed several of the preliminary recommendations in this plan in draft form and provided comments on the proposed approach to solving basin problems. Issues of concern identified during the development of the first draft of the plan included the following:

- A major issue with local residents regarding solutions proposed for May Creek basin problems has to do with the amount of development occurring in upland areas that contribute runoff to May Valley. Residents are concerned that the density proposed for urbanizing areas is too high and that newly incorporated and annexed areas were being allowed to increase development density through zoning changes without regard to local flooding impacts. In questioning the level of development taking place, the CAC members expressed concern about the ability of the proposed May Creek Basin Action Plan to address the problems associated with growth in upland areas.

- Although they support the stricter retention/detention standards proposed in this plan, members are concerned that increases in impervious surfaces created by past development and changes in zoning related to new development are causing a considerable amount of the flood problems residents are experiencing. Some mentioned that local jurisdictions were not paying for or requiring the infrastructure improvements needed to support greater levels of development. It generally was believed that many of the proposed projects in this plan would be beneficial, but would not result in overall improvement to the basin unless problems associated with upland growth rates also were resolved.

- The original valley flooding recommendation, as shown at the top of Table A-1 in Part A of this Appendix, focused exclusively on floodproofing existing homes and, as a result, was questioned by some CAC members. At issue was whether the proposed floodproofing measures would benefit basin functions or provide relief to only a few individuals. The cost of this approach, given the condition and assessed value of the homes likely to be aided, was thought to be too high if the measures were applied to only seven or nine homes. It was suggested that consideration be given to whether this money might be better spent on another problem in the basin where a greater, basinwide benefit could result. Another proposal was that floodproofing be accomplished through cost-sharing with affected basin residents to allow the funds to go further. With a cost-sharing requirement, participants in this proposal would be more willing to make a commitment to maintaining their homes.

- Concern was expressed about existing quarry operations and the need to better regulate associated runoff. Existing provisions for inspections and fines may not have been adequate to reduce detrimental effects of surface-water runoff from quarry operations. Penalties for violations may not be strong enough, and fines may be too low to deter quarry operators from following practices with negative impacts.

- The amount of money devoted to the May Creek basin was considered too low when compared to other King County basins. Questions were raised about the allocation of funds from local property fees and how that money was being spent within the basin.

Coordination with May Valley Environmental Council

Following the plan's transmittal to the King County Council in 1998, a number of concerns were raised by members of the May Valley community, regarding the proposed recommendations in that sub-area. In 2000 the citizens of that community formed the non-profit organization, May Valley Environmental Council (MVEC) to provide a formal organized community voice to work with King County in addressing concerns about the proposed plan text and recommendations. King County staff met with MVEC and citizens in May Valley in two formal public meetings and several other informal gatherings from November 2000 through April 2001, to solicit community input for plan revisions and refinements.

The community provided helpful guidance and feedback related to the text and overall tone of the plan. Numerous edits and clarifications were made to the introductory chapters of the plan as a result. MVEC also requested specific revisions to the plan recommendations which related to the May Valley sub-area. These included providing additional detail to the basin steward recommendation (#2), the monitoring program (#3), and the culvert replacement on the East Fork of May Creek (#7). As a result of coordination with MVEC, several major revisions were also made to the plan recommendations as follows:

- Recommendation #1 initially required forest retention and stormwater retention/detention standards in areas draining to May Valley as governed by the 1998 King County Surface Water Design Manual. The recommendation now calls for a more stringent standard, making it the strictest rural development standard in King County related to stormwater discharge.
- Recommendation #4 which initially focused on elevating the worst-flooded homes in the May Valley sub-area, was expanded to include home/property buyout as a method to resolve flooding issues for Valley residents. Additional funding for this recommendation was appropriated by the King County Council in 2000, and the increased funds for this project were also updated in the plan recommendation.
- Recommendation #5 which previously focused on habitat buffer improvements in May Valley was re-written to create a pilot project for low-flow channel clearing of beaver dams, sediment deposits, and reed canary grass blockages. This revised recommendation emphasizes that there are probable major permitting hurdles to implementation.
- Recommendations #6 which previously recommended removal of beavers and their dams in May Valley has been incorporated in the updated Recommendation #5. Recommendation #6 has been reformulated to create a project to pursue the relocation of flows from Sunset Quarry area back into Tibbetts Creek, where they may have drained historically.

King County staff will continue to coordinate closely with MVEC and the citizens of May Valley during efforts to implement elements of this plan that are to take place within that sub-area.

Public Review of Draft Plan Documents

The May Creek Basin Action Plan was prepared with the cooperation of local residents and has included public review during the planning process. The Draft Plan received review and input from the CAC throughout the process, and two public meetings and an open house were held to discuss the Draft Plan. These efforts have resulted in a number of clarifications in the Proposed Plan, which includes information

prepared in response to questions obtained though the public meetings and written comments received on the Draft Plan.

A summary of issues identified through public review is presented below, along with the location in the text where these issues are addressed in the Proposed Plan.

Basin Steward's Role

Issues: Need to identify the Basin Steward role more clearly; duties should be expanded; creation of Basin Steward should be a higher priority.

Location of Text Discussion: The Basin Steward's role is the subject of Recommendation #2 in Chapter 3.

Critical Drainage Area Designation

Issues: Proposed retention/detention standards in the May Creek Basin Action Plan should at least be equal to the regulations presently identified for Critical Drainage Areas.

Location of Text Discussion: The retention and detention standards have been revised and are identified in Recommendation #1 Chapter 3.

Drinking Water Quality

Issues: The May Creek Basin Action Plan should include a recommendation to protect King County, Renton, and Newcastle drinking water supplies.

Location of Text Discussion: Proposed actions regarding drinking water quality are described in Recommendation #9 in Chapter 3.

Education

Issues: A public education program should be developed to educate basin residents about watershed characteristics and the measures local residents can take to improve current basin conditions.

Location of Text Discussion: Education will largely be a function of the proposed Basin Steward, as is discussed in recommendation #2 in Chapter 3.

Enforcement

Issues: How regulatory plan recommendations will be enforced after implementation; permit requirements are not being met by some basin development projects.

Location of Text Discussion: Certain aspects of the enforcement issue are discussed in two primary recommendations. A monitoring plan that will involve data gathering in support of the evaluation of implemented plan actions is discussed in Recommendation #3 in Chapter 3. The proposed Basin Steward would also play a role in the enforcement of resource protection standards, as is discussed in Recommendation #2.

Erosion and Sedimentation

Issues: Many of the erosion and sedimentation problems in the basin are closely related to the total volume of runoff occurring in the basin.

Location of Text Discussion: The plan includes a number of recommendations for improvements that would reduce specific sources of current erosion and sedimentation problems and would reduce the likelihood of such problems developing in the future. These are identified in both the Primary and Secondary Recommendation sections of Chapter 3. Specific recommendations contain suggestions for actions addressing zoning densities, R/D standards for new development, slope stabilization, and dredging at the delta, among other suggestions. In particular, this plan includes a land use recommendation that would retain existing zoning densities in May Valley. Combined with strict stormwater control standards for new development and a requirement to retain forestland as development occurs, this measure would limit future increases in runoff volumes.

Flooding

Issues: Erosion and sedimentation problems are contributing to flooding associated with land clearing and development in upland areas; the Basin Plan needs to emphasize a system-wide approach to adequately deal with flooding problems.

Location of Text Discussion: Recommendation #1 referred to above in regard to erosion and sedimentation issues, is intended to address flooding related to runoff volumes in a more comprehensive manner than individual recommendations intended to deal with area-specific problems. Area specific effects of flooding, in May Valley in particular, are addressed in Recommendation #4, #5, and #6 in Chapter 3.

Plan Follow-through

Issues: An administrative infrastructure needs to be established in the Basin Plan to carry out the proposed recommendations.

Location of Text Discussion: The program would be administered by City and County divisions responsible for surface-water quality and controls. Each of the Primary Recommendations in Chapter 3 includes the name of the implementing agency or agencies responsible for that measure. The proposed Basin Steward would work with basin residents and jurisdictions to help implement plan recommendations. An interlocal agreement between King County, Renton, and Newcastle should establish their mutual responsibilities to implement the basin plan.

Forest Retention Incentives

Issues: How effective will forest retention incentives be and what are the results of using similar incentives in other basins in the County; the Basin Action Plan must include a forest retention recommendation; if increased density is allowed in the basin, it will result in the loss of forest cover.

Location of Text Discussion: The plan includes forest retention recommendations within the discussion of R/D standards in Recommendation #1 in Chapter 3.

Funding

Issues: The Basin Action Plan needs to include a long-term funding source; funding for the plan is too minimal and will not result in significant improvements to the basin; the budget seems low compared to that for other basins.

Location of Text Discussion: Funding for the plan is discussed in Chapter 2.

Stormwater Infiltration

Issues: Infiltration of stormwater in the basin should be required.

Location of Text Discussion: Infiltration, where possible, is addressed in the discussion of proposed R/D standards in Recommendation #1 in Chapter 3.

Plan Leadership and Guidance

Issues: Without recommendations for zoning and future development densities, the Basin Action Plan will not offer sufficient guidance to address flooding problems in the basin.

Location of Text Discussion: Maintaining existing zoning densities is stressed in Recommendation #17 in Chapter 3. Recommendation #3, regarding the monitoring plan, and Recommendation #2, regarding the Basin Steward, also support the concept of ongoing action to address flooding problems in the basin.

Basin Land Uses

Issues: Controlling land uses in the basin is the key to addressing flooding problems and the only way to address runoff volumes; need to minimize the potential for land conversions that increase density; existing development densities in the basin, as recommended by the King County Comprehensive Plan, should be maintained.

Location of Text Discussion: Maintaining existing zoning densities is stressed in Recommendation #17 in Chapter 3.

Scope of the Plan

Issues: The scope of the Basin Plan is limited to solutions for the magnitude of problems as they now exist.

Location of Text Discussion: Chapter 4 presents an overview of the expected benefits of proposed plan recommendations, both for near-term improvements (Section 4.1) and long-term improvements (Section 4.2). The Primary and Secondary Recommendations are also intended to prevent existing problems from worsening in the future, and together are intended to provide a comprehensive approach to addressing problems in the basin.

Water Quality

Issues: Water quality problems are primarily the result of upland development and cannot be resolved only by establishing stream buffers.

Location of Text Discussion: The plan contains a number of area-specific improvements that would increase local water quality. These measures are discussed in Chapter 3. Maintaining existing zoning densities, as

stressed in Recommendation #17, would also help limit water quality degradation resulting from future development. Recommendation #1, in regard to R/D standards in the basin, also contains measures that will help maintain or improve water quality in the basin.

Mitigation Standards

Issues: Mitigation measures for proposed development projects are inadequate. Regulations or standards that require mitigation will not guarantee resource protection, given that some permit violations in the basin have gone unpunished in the past.

Location of Text Discussion: The proposed Basin Steward, as discussed in Recommendation #2 in Chapter 3, would serve as a point of contact for local residents when permit violations occur.

Potable Water

Issues: The Basin Plan has limited mention of the potential for potable water problems and needs to be more specific about programs in place to protect potable water sources.

Location of Text Discussion: A number of the plan recommendations in Chapter 3 would improve local water quality, including Recommendation #1, which describes new retention/detention standards, and Recommendation #17, which stresses maintaining existing densities. This chapter also includes a recommendation to protect drinking water supplies, Recommendation #9.

Recognition of Plan Preparers

Issues: The Basin Plan should clearly identify Renton and King County contributors as authors of the plan and explain that Newcastle was not a full partner in providing money for the plan.

Location of Text Discussion: This relationship has been clarified in Chapter 2, Section 2.1 of the plan introduction.

Quarries

Issues: The Basin Plan should include a recommendation to hire monitoring and enforcement staff for potential quarry operation permit violations; fees for quarry violations should be raised.

Location of Text Discussion: Specific actions addressing concerns about quarry operations in the basin are included in Recommendation #18 in Chapter 3.

Retention/Detention Standards

Issues: The retention/detention standards should not be less restrictive in Renton than elsewhere in the basin; will Level 2 standards in Renton be maintained after annexation; need to provide greater enforcement of retention/detention standards with higher monetary penalties for violations; four standards in the basin may be too complicated and allow loopholes for avoiding the most restrictive standards; the Basin Plan should recommend design standards for retention/detention, rather than relying upon changes in the updated SWDM.

Location of Text Discussion: Basin R/D standards are discussed in Recommendation #1 in Chapter 3.

Septic Systems

Issues: The inability of the Basin Plan to adequately address stormwater volume problems jeopardizes septic systems in the Valley; it is not realistic to propose connecting existing homes on septic systems to the Metro sewer line as it would not be feasible to provide the necessary pumping stations.

Location of Text Discussion: These comments reflect that the septic system issue has two important aspects: development in the Valley and the contribution of stormflows from the upper basin. Stormflows in the Valley are in part dependent upon the density of development in the uplands that drain to the Valley. The zoning density in the areas draining to May Valley is addressed in Recommendation #17 in Chapter 3.

Volunteer Activities

Issues: A structured method for volunteer involvement in basin projects should be established in the Basin Action Plan.

Location of Text Discussion: The proposed Basin Steward, as discussed in Recommendation #2 in Chapter 3, would serve as a point of contact for local residents interested in dedicating time to improving conditions in the basin.

Appendix D

Ranking the Secondary Recommendations

Appendix D: Ranking the Secondary Recommendations

Figure 3-3 describes this plan's Secondary Recommendations. In the table the projects are shown in the order of their priority for implementation, as determined on a basinwide basis. This appendix describes the methodology used in that prioritization process.

Criteria Description

More than two-thirds of the possible points in this prioritization methodology are available in two major criteria: the importance of the problem addressed and the overall effectiveness of the proposed project in addressing that problem.

- **Importance** –(1 – 10 scale): How important is the problem that the project addresses? The determination of the significance of the problems addressed is generally guided by the Solutions Analysis and information presented in the Conditions Report.

- **Effectiveness** – (1 – 6 scale): How effective is the project as a solution to the problem? The determination of effectiveness can be affected by the size and complexity of the problem: a well-conceived and planned project can get a low Effectiveness score if it addresses only one aspect of a large, complex problem.

A little less than one-third of the possible points in this methodology are available in three minor criteria that cover less critical, but important, aspects of the projects.

- **Feasibility** – (1 – 3 scale): How hard will it be to undertake the project and complete it effectively? This criterion primarily accounts for the ease or difficulty of meeting permitting requirements.

- **Offsite/Multiple Benefits**: (-3 – +3 scale): What effect(s) – *positive and/or negative* – will this project have on surrounding areas and the system as a whole?

- **Public/Local Support** – (-1 – +1): If the community is aware of this project, has the response been positive or negative?

The maximum point total a project can receive using this methodology is 23 points.

Table D-1: RANKING THE SECONDARY RECOMMENDATIONS

Map Letter	Project Name	Project Description	Importance (1-10)	Effectiveness (1-6)	Feasibility (1-3)	Offsite/ Multiple Benefits (+/-3)	Public/ Local Support (+/-1)	TOTAL
A	May Creek Park Forest Conversion and Stream Enhancement	Continue to restore mixed coniferous forest to improve stream reaches and riparian zones along May and Honey Creeks. Continue to introduce very large organic debris to creek channels, as is included in primary recommendation.	8	6	3	3	1	21
B	Purchase Reclaimed Quarry Area at Pacific Topsoils Site	Complete the purchase of the closed quarry operation at the Pacific Topsoils site on the ridge dividing the May and Tibbetts Creek basins.	8	2	3	3	1	17
C	Preservation of Eastern Extent of May Valley Wetland #5	Purchase wetland and a substantial buffer for preservation. Removal of fill placed in the wetland and enhancement activities.	7	5	2	3	0	17
D	N.E. 31st Street Private Road Culvert Improvements	Private road at end of N.E. 31st Street has been overtopped by previous flooding, cutting off access to several residences. Any future development using the access bridge should be required to upgrade to 100-year flood capacity.	8	6	2	0	0	16
E	May Creek Park Expansion Acquisitions	Continue to purchase lands along May Creek Canyon.	7	4	2	2	1	16
F	Boren Creek Residential Access Improvements	Upgrade the bridge along the access road to reduce the effects of flooding. Condition any future construction permits on properties affected by Lake Boren access-road flooding to require bridge upgrades.	8	6	2	-1	0	15
G	Preservation of Western Extent of May Valley Wetland #5 and Associated Buffers	Public acquisition program to obtain and consolidate large portions of Wetland #5 for long-term preservation. Would include replanting program and channel and habitat improvement projects.	8	3	1	3	0	15
H	Gypsy Creek Drainage Improvements	Removal of old road fill and culvert followed by revegetation. Excavation of fill and culvert could use hand labor. Tightline road runoff downslope to creek.	6	6	3	0	0	15
I	148th Avenue S.E. Bridge and Approach Improvements	Improve this more frequently flooded road's flood protection by raising its surface and replacing bridge to provide 100-year flood capacity.	8	6	2	-2	0	14
J	Coal Creek Parkway Trestle Improvements	Bridge piers supporting the Coal Creek Parkway crossing of May Creek have been designated "scour critical." Inspect and monitor after major storm events, and install protective channel backwatering measures as appropriate.	8	4	3	-1	0	14
K	N.E. 31st Street Bridge Improvements	Replace bridge to provide 100-year capacity and reduce risk of structural failure from stream erosion. Renton has applied for federal assistance.	7	6	2	-1	0	14
L	N.E. 31st Street Culvert Improvements	Upgrade undersized culvert along N.E. 31st Street to ensure 100-year flood capacity for future conditions. Reduce the risk of structural undermining from erosion.	7	6	2	-1	0	14
M	Basinwide Conifer Reforestation	Aggressive tree-retention and planting program to plant high levels of coniferous forest vegetation throughout the basin for maturity in 50- to 100-year time frames.	5	4	3	1	1	14
N	May Creek Delta Restoration	Preserve and restore main body of original May Creek Delta. Relocate channel to improve sediment transport. Lower delta by removing deposited fill, and replant delta and buffer to restore tree- and shrub-dominated habitats.	7	2	1	2	1	13
O	Lake Boren Wetland (Wetland #8) Habitat Enhancement	Restore woody plant vegetation, relocate China Creek to a new natural channel, and incorporate gravel complexes and large woody debris in new channel.	5	3	1	3	1	13
P	Forest Conversion of Wetland #28	Thinning of woody vegetation and understory planting with native conifers. Replanting buffers with native conifers. Consider purchase for preservation.	5	4	3	1	0	13
Q	164th Avenue S.E. Bridge and Approach Improvements	Improve this road's flood protection by raising roadway surface and replacing bridge to provide 100-year flood capacity.	6	6	2	-2	0	12
R	North Fork Realignment	Relocate portions of the creek to near original locations, or realign to restore meanders and channel diversity. Large woody debris would be added to relocated stream reaches, and banks would be graded to reduce slopes.	5	4	1	2	0	12
S	North Fork Corridor Habitat Conservation and Enhancement	Reduce sedimentation within stream channel, add large woody debris, and restore filled wetland areas in riparian corridor.	5	4	1	2	0	12

Table D-1: RANKING THE SECONDARY RECOMMENDATIONS (cont'd)

Map Letter	Project Name	Project Description	Importance (1-10)	Effectiveness (1-6)	Feasibility (1-3)	Offsite/ Multiple Benefits (+/-3)	Public/ Local Support (+/-1)	TOTAL
T	Boren Creek Fish Passage Improvements	Provide passable fish culverts at S.E. 84th Way and upgrade or remove private driveway to improve fish passage.	5	4	2	0	1	12
U	Enhancement and Restoration of Wetland #2	Cleanup of existing trash piles, replanting of native vegetation, and restoration of filled wetland areas.	4	4	2	2	0	12
V	North Fork Confluence Restoration	Remove shallow layers of fill and replant disturbed area with native forest vegetation. Added opportunity to relocate North Fork, provide gravel substrate, and restore large woody debris to channel.	5	2	2	2	0	11
W	North Fork Wetland #75 Enhancements (southeast end)	Several acres of fill at the southeast end of this wetland would be removed and restored with native plantings to help reduce flooding on adjacent properties.	4	2	2	3	0	11
X	Restoration of Outlet at Lake Kathleen	Removal of fill and planting native trees and shrubs in wetland area at north end of the lake.	4	4	2	0	1	11
Y	Wetland #50 Restoration	Remove illegal fill to enlarge wetland, plant native vegetation in buffers and disturbed wetland areas, remove trash and spoil piles, may consider fencing.	3	4	2	2	0	11
Z	Preservation of Lake Kathleen Headwaters	Purchase wetland and large upland buffer for preservation.	4	4	2	0	0	10
AA	Preservation of Wetland #7	Purchase wetland and buffers for preservation. Portions of buffer may benefit from tree plantings, and opportunities for instream enhancement of Boren Creek are also present.	3	4	2	1	0	10
BB	Preservation of Wetland #36	Purchase wetland and surrounding buffers (may include developed land) for preservation. Enlarge wetland by demolishing existing structures, removing fill, and restoring native woody vegetation.	3	4	1	2	0	10
CC	Preservation of Wetland #47	Purchase wetland and sizable buffer to timbered steep slopes for preservation. Alter deciduous forest and understory to encourage recruitment of conifers.	3	4	2	1	0	10
DD	Preservation of Wetland #41 Corridor	Purchase ravine for preservation and recreation purposes. Reestablish conifers on walls of preserve. Active management of recreation activities is needed.	3	4	2	1	0	10
EE	Enhancement of Wetland #3	Fence/bridge tributary, plant wetland/riparian area with native plants, and place large woody debris in channel in wetland area.	4	2	2	1	0	9
FF	North Fork Wetland #75 Enhancement (north end)	Disturbed areas and adjacent agricultural lands would be planted with native woody and forest vegetation. May be linked to potential North Fork realignment described above.	4	2	2	1	0	9
GG	Restoration of Wetland #34	Remove fill areas, plant native woody vegetation in disturbed wetland and buffer areas, and remove ditches to restore wetland hydrology.	3	4	1	1	0	9
HH	Honey Creek Fish Passage Improvements	Replace or remove culvert if determined to be a fish passage barrier, and a Department of Fish and Wildlife permit is required as part of the Devil's Elbow lift station improvements.	2	4	2	-2	1	7
II	Improvements to Honey Creek, River Miles 1.35 to 1.72	Return portions of creek to natural channel with abundant woody debris and gravel beds, restore wetland habitats and buffers associated with the channel, and plant native vegetation. Direct parking lot stormwater away from stream.	1	2	1	1	0	5

Appendix E

Basin Conditions - Significant Resource Areas

The *Conditions Report* notes areas of high-quality habitat, and separates them into two categories: Regionally Significant Resource Areas (RSRAs) and Locally Significant Resource Areas (LSRAs). These areas will be given official status and receive protection through their inclusion in the adoption ordinance for this plan passed by the respective basin jurisdictions.

Regionally Significant Resource Areas (RSRAs) contribute to the resource base of the entire southern Puget Sound region by virtue of exceptional species and habitat diversity and abundance, compared with aquatic and terrestrial systems of similar size and structure elsewhere in the region. RSRAs may also support rare or endangered species or communities. Although typically found together, any of the following criteria are sufficient to recognize RSRAs in the watersheds of King County:

1. watershed functions are not appreciably altered from predevelopment conditions, as measured by corridor integrity, hydrologic regime, sediment movement, and water quality, or

2. the diversity and abundance of aquatic or terrestrial habitats are of consistently high quality and are well dispersed throughout the system, or

3. aquatic and terrestrial life, particularly salmonids, exhibit abundance and diversity consistent with undisturbed habitats and make a significant contribution to the regional resources of Puget Sound.

Only one wetland within the May Creek basin currently qualifies as a Regionally Significant Resource Area:

- *Wetland 11 in the Long Marsh Creek (WRIA # 08.0289) basin*: This Class 2 wetland meets criteria 1 and 2 of the RSRA definition.

No stream reaches in the May Creek basin currently meet the criteria for RSRA categorization.

Locally Significant Resource Areas (LSRAs) also contribute to the resource base of the region, but at a lesser level of both abundance and diversity compared with RSRAs. LSRAs are, however, significant within a particular basin, providing habitat that is important for plants and animals. Because aquatic systems require adequate functioning of all elements to contribute significantly to system productivity, all of the following criteria are necessary to recognize LSRAs in the watersheds of King County:

1. watershed functions have been altered by clearing and filling, but corridor integrity, hydrologic regime, sediment movement, and water quality are adequate for spawning and rearing of salmonids or for maintenance of other plant and animal species, and

2. the diversity and abundance of aquatic and riparian habitats are good but not exceptional; instability, damage, and stream alterations are evident but confined to localized sites, and

3. aquatic and terrestrial life, particularly salmonids, are supported at one or more species and life stages at population levels that may be low but are sustainable.

The May Creek basin contains some of the best remaining habitat among the smaller Lake Washington tributary systems, and within this habitat is one RSRA as identified in the *Conditions Report*. The basin also contains numerous areas that have been categorized as LSRAs and contains other areas that may be categorized as such in the future.

Several stream reaches and wetlands within the May Creek basin currently qualify as Locally Significant Resource Areas:

Stream Reach LSRAs:

- *May Creek Mainstem (WRIA # 08.0282):* River Mile (RM) 0.2 to 3.9
- *Honey Creek (WRIA # 08.0285):* RM 0.0 to 0.4
- *Boren Creek (WRIA # 08.0287):* RM 0.0 to 0.48
- *Unnamed Tributary (WRIA # 08.0291A):* RM 0.09 to 0.14
- *Country Creek (WRIA # 08.0292):* RM 0.09 to 0.14
- *North Fork May Creek (WRIA # 08.294):* 0.4 to 1.0

Wetland LSRAs:

- *Wetland 5 in the Mainstem May Creek and South Fork May Creek (WRIA # 08.0282) basin*: A Class 1 wetland comprising a 20- to 30-acre conifer forest remnant east of SR-900 and south of SE May Valley Road only
- *Wetlands 38,39, and 40 in the Honey Creek (WRIA # 08.0285) and the May Creek Mainstem (WRIA # 08.0282) basins*
- *Wetland 1 in the Lake Kathleen basin:* A Class 1 wetland
- *Wetland 9 in the Gypsy Creek (WRIA # 08.0284) basin*
- *Wetland 8 in the China/Boren Creek (WRIA # 08.0287) basin*: A Class 1 wetland
- *Wetland 4 in the China/Boren Creek (WRIA # 08.0287) basin*
- *Wetland 2 in the unnamed tributary (WRIA # 08.0291A) basin:* A Class 1 wetland
- *Wetland 13 in the North Fork May Creek (WRIA # 08.0294) basin:* A Class 1 wetland

Figures E-1 through E-4 provide graphic illustration of important conditions in the May Creek basin, in particular the location of the basin's RSRA and LSRAs and specific problem areas.

Figure E-1: Lower Basin Conditions

Figure E-2: May Valley Conditions

Figure E-3: East Renton Plateau Conditions

Figure E-4: Highlands Conditions

Appendix F

Lake Boren Monitoring Data –1996 through 1999 Reports

Appendix F: Lake Boren Monitoring Data –1996 & 1997 Reports

The following pages contain data pertaining to Lake Boren conditions. These data were collected and summarized for the respective 1996 through 1999 Lake Monitoring Reports as part of the Volunteer Monitoring Program administered by King County WLR.

Appendix G

Recommended Actions Undertaken During Plan Development

Appendix G: Recommended Actions Undertaken During Plan Development

Several actions that were recommended during the development of the Basin Action Plan were implemented before the drafting of this document. These actions are presented below along with a description of their current status. In addition to these actions, the basin jurisdictions have undertaken a range of other actions that comprise at least a portion of other recommendations or that are complementary to the overall goal of improving basin conditions.

Recommendation: Improve the Olympic Pipeline Crossing on May Creek and Rehabilitate the Associated Fish Ladder

Current Status: This project was implemented during the instream construction window in the summer of 1998. The project is being monitored for effectiveness, including its effectiveness in allowing fish to pass.

Implementing Agency: Olympic Pipeline Company

Cost: To be determined by Olympic Pipeline Company

Recommendation: Protect exposed pipeline and improve fish passage at River Mile 3.0 of May Creek.

Discussion: In the past, a fish ladder was constructed at this site as mitigation for a pipeline crossing under the streambed. When not functioning properly, the ladder caused a fish barrier in May Creek. During the winter of 1996, flooding eroded the streambed, partially exposing the pipeline so that it was in danger of failing should high flows create further erosion and turbulence. Such a failure could have released petroleum products directly to May Creek and Lake Washington. The Olympic Pipeline Company began a project during the fall of 1996 to restore the stability of the crossing. This project also ensured fish access to the upper reaches of May Creek. The Olympic Pipeline Company was scheduled to return to the site in summer 1997 to install a permanent instream structure to protect the pipeline from erosion and turbulence. Because of the early return of spawning salmon to and above the subject reach, this permitted work was postponed until summer 1998. It is essential that the implemented permanent solution ensure fish passage to areas above the project site. The estimated cost of protecting the pipeline and ensuring adequate fish passage is unknown and is dependent upon the final design solution chosen by Olympic Pipeline. This design will be subject to permit review by the City of Newcastle, the Washington State Department of Fish and Wildlife, and other agencies.

Recommendation: Rehabilitate the Lake Kathleen Outlet at S.E. 134th

Current Status: This project was implemented during the instream construction window in the summer of 1997. Customary post-project monitoring for project effectiveness is under way.

Implementing Agency: King County Department of Transportation

Cost: $60,000

Recommendation: Replace the existing culvert with a new outlet to improve downstream conveyance.

Discussion: Flooding is occurring at the north end outlet of Lake Kathleen and is expected to continue as runoff increases because of future urban development. Road overtopping occurs at approximately the five-year flow, resulting in difficult access for several homes. This recommendation would replace existing

culverts with an outlet that would retain most of the current retention/detention value while also preventing overtopping of the road. It also may require raising the roadway surface. If raising the roadway surface is required, the cost of the project will increase, possibly resulting in a re-prioritization of the project based upon the increased funding need.

A higher retention/detention standard for Lake Kathleen was considered to prevent worsening of the problem as additional development occurs in the basin. Given the lack of new development anticipated there, it was concluded that such a standard would be ineffective.

Appendix H

Dredging May Creek: Technical Summary of Alternatives Analysis

Appendix H: Dredging May Creek: Technical Summary of Alternatives Analysis

During development of the May Creek Basin Plan, a number of alternatives for solving flooding in May Valley were analyzed. See Appendix A for a summary of the alternative solutions that were reviewed. This appendix presents a more detailed summary of the alternative analysis for dredging May Creek, updated as of October 2000. The conceptual scope outlined here is based on the HSPF hydrologic model developed for the *May Creek Current and Future Conditions Report* (King County and City of Renton, 1995) and on subsequent *Solutions Analysis* reports completed by a consultant for King County (Foster Wheeler, 1995 and 1996).

Analysis of past, current and probable future storm runoff and flooding conditions of the May Creek Basin indicate that flood flows have increased significantly and will likely continue to increase as the basin is developed. Dredging of a simple trapezoidal channel would result in significant degradation of aquatic and wetland habitat. If a more natural compound channel were excavated, significant aquatic and riparian damage could be minimized and some improvements to aquatic and riparian habitat could be made. Therefore, compound dredge alternatives that include habitat benefits and mitigate downstream impacts are analyzed in greater detail below.

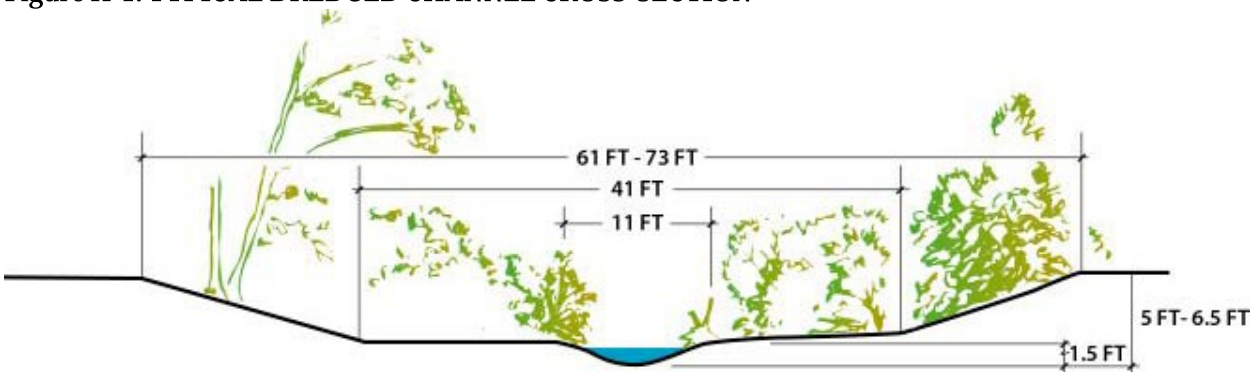
Table H-1: MAY CREEK PEAK FLOWS NEAR 164th AVE. SE

	Flow (cfs)	
	Current	Future Mitigated
Frequency		
2-year	170	193
10-year	285	348
25-year	350	439
100-year	461	590

The average annual flow in May Creek, as measured at 148th Ave SE, is 8.6 cubic feet per second (cfs). A summary of May Creek flow data from the HSPF model is shown above in Table H-1.

A dredged channel sized to convey a 10-year recurrence interval event under future mitigated conditions would require a normal flow channel 1.5 feet deep by 11 feet wide to convey typical flows, embedded in a 3.5 foot deep 61 foot wide overbank floodway to convey storm flows. The floodplain bench would be vegetated. The total average channel size would be 61 feet wide and 5 feet deep. To convey the 100-year flow, (590 cfs) the floodway would need to be 1.5 feet deeper, increasing the channel width to 73 feet. All channel sizes are averages. The actual channel design would be somewhat smaller at the upper end of the valley and larger at the downstream end.

Figure H-1: TYPICAL DREDGED CHANNEL CROSS-SECTION



To improve aquatic habitat, the compound channel must provide habitat complexity and incorporate native vegetation, large woody debris, and backwater rearing channels. These features would increase the required channel size and therefore the land required for the project. Maintenance needs also significantly influence the design of the channelization proposal. The channel would need to be redredged and disturbed areas on the floodplain bench revegetated approximately every 20 years.

The existing channel slope averages 0.14% in May Valley. Increasing the stream gradient in order to minimize sediment deposition and maintenance significantly increases the channel excavation required at the downstream end of the valley. The extra depth required ranges from 9 feet to 32 feet as the stream gradient is increased to 0.2% through 0.5%.

Either size of compound channel would compromise existing road bridges at 148th Ave. SE and 164th Ave. SE. Replacement of these bridges is currently a secondary recommendation in the Basin Plan, and would be necessary elements of a channelization project.

Insofar as a dredging project moves water more quickly out of May Valley, it will increase peak flows in the downstream reaches of May Creek, significantly aggravating an existing erosion problem in May Creek canyon. To address this problem, retention/detention (R/D) facilities must be included in the project design. Several options were explored, providing varying levels of protection. Decentralized approaches, which involve multiple ponds located on the tributaries and on the mainstem of May Creek downstream of SR-900 and at 148th Ave. SE would require a total of 459 acre-feet of flood storage. These ponds are designed to reduce the 25-year future mitigated peak flows to the 10-year current peak flows.

A centralized R/D approach, designed specifically to protect May Creek downstream of the valley, would reduce the 100-year future mitigated flow (590 cfs) to the 2-year current peak flow (170 cfs). This level of protection would require siting 600 acre-feet of storage in the vicinity of 148th Ave. SE. The Stream Protection Standard is the current applicable standard, and would require even larger storage area. Whether the R/D volume required for the final design is 459 acre-feet, 600 acre-feet or more, the feasibility of siting the ponds is poor. The valley floor between SR-900, SE May Valley Road, and 148th Ave SE is about 330 acres, and averages 1000 feet wide. A 100 acre-ft pond 4.35 feet deep would measure 1000 feet on a side and cover about 23 acres. Six such ponds on the valley floor would preclude all other land uses and eliminate wetland and riparian habitat in about one third of the valley, severely compromising the primary goals of the project. See Figure H-2 for a conceptual layout indicating the scale of R/D facilities required.

Irrespective of the siting of the ponds, dredging the creek to control flooding would severely impact May Creek Wetland 5. As identified in the 1990 King County Wetlands inventory, May

Creek Wetland 5 is rated 1(a) and covers 142 acres. It is likely that at least 100 acres of wetland would be drained by constructing the dredged channel. Wetland mitigation requirements are likely to range from 200 to 400 acres of enhanced or created wetland, preferably in the May Creek basin. Finding suitable property would be extremely difficult, and the costs of acquiring the land and finishing the wetland mitigation project would be substantial.

Obtaining the required project permits from local, state, and federal agencies will be difficult and time consuming. Even though the project is designed to provide in-stream habitat benefits and to mitigate downstream impacts, unavoidable short-term impacts and wetland impacts remain.

Table H-2: PERMITS REQUIRED

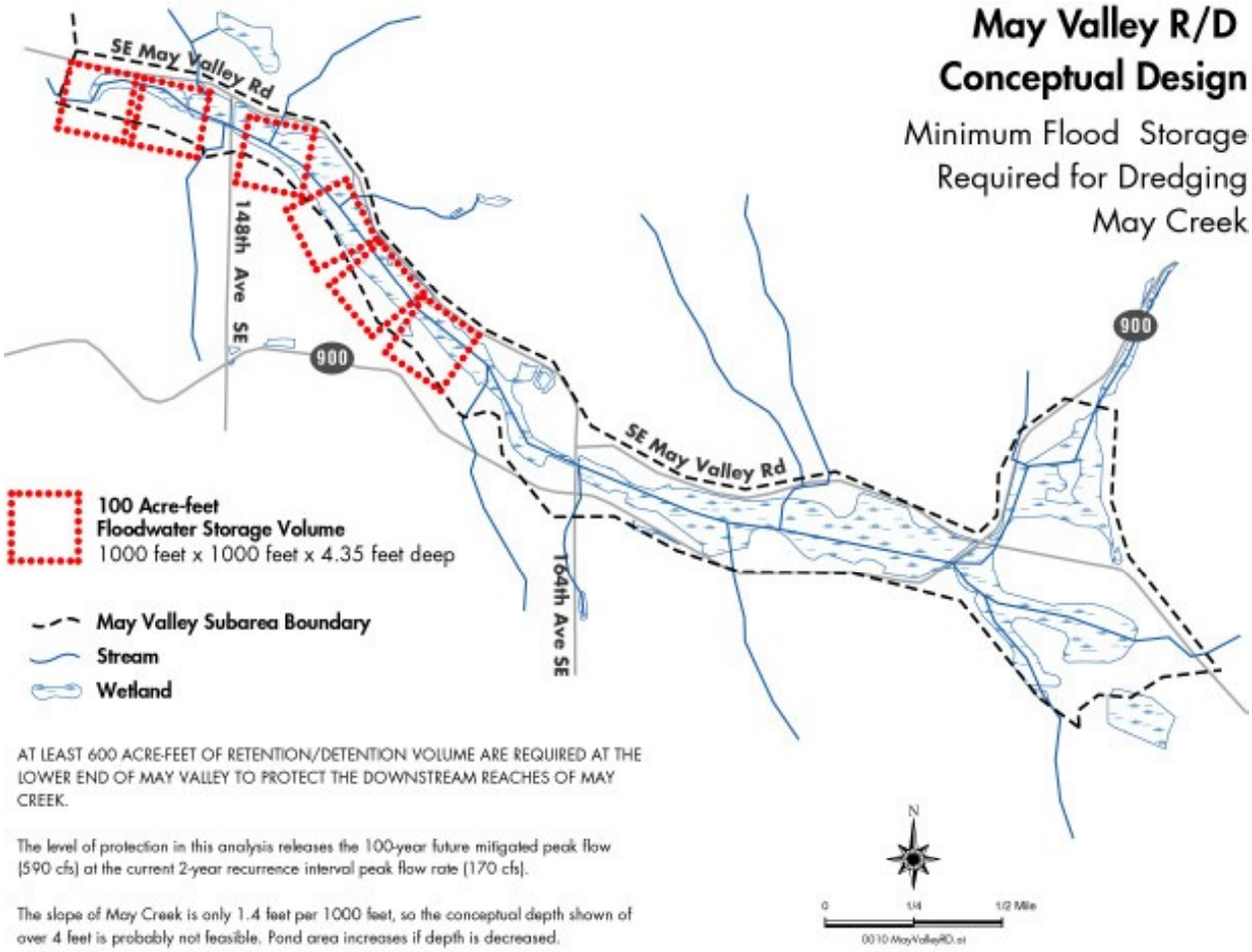
	Agency	**Permit required**	**Intent**
County	DDES	SEPA, with EIS	Public input and alternative analysis.
	DDES	Clearing and Grading	Protects the public from poorly planned development, and protects sensitive areas.
	DDES	Public Agency and Utility Exemption	Requires review of project alternatives, impact minimization and mitigation.
State	WDFW	Hydraulic Project Approval	Protects fish and aquatic habitat.
	DOE	401 Water Quality Certification review	Protects water quality.
Federal	USACOE	Individual 404 Permit Possible federal EIS	Protects integrity of waters of the US, including wetlands.
	NMFS	Concurrence with 404 Permit	Protects chinook salmon and other threatened or endangered marine species.
	USFWS	Concurrence with 404 Permit	Protects bull trout, eagles, and other threatened or endangered freshwater and terrestrial species.
Public	Public comments, permit appeals and potential third party lawsuits	Input on Local and State permits and approvals	Any group or individual may appeal or file a lawsuit if they disagree with the outcome of the process or feel that the agencies failed to adequately enforce the laws.

In 1996, costs of dredging the channel to control the 10-year flow, upgrading the two bridges, and constructing a 600 acre-ft retention/detention pond were estimated at $6 million or 30 million, depending on the design approach for the ponds. Maintenance of the channel was estimated at $2.8 million dollars every 20 years. Cost estimates done in 2000 that include wetland mitigation costs and updated costs for construction, permitting, and land acquisition total over $50 million, not including maintenance of the channel and R/D facilities. The project also entails risks for which costs are difficult to quantify. These risks include mitigation

negotiation, studies that may be required to complete the permitting processes, potential third-party lawsuits, and non-monetary costs of habitat damage and downstream damage in case the proposed mitigation should prove insufficient.

In summary, the overall feasibility of dredging May Creek is poor, even when significant habitat features and measures to protect downstream resources and residents are incorporated into the design. The most significant barriers can be summarized as follows:

1) Low technical feasibility of siting regional retention/detention ponds required to mitigate negative impacts to downstream residents and stream habitat,
2) Significant wetland damage and associated mitigation requirements,
3) Low possibility of obtaining permits required by federal, state and local agencies,
4) Cost of capital improvements, land acquisition, and maintenance.



AT LEAST 600 ACRE-FEET OF RETENTION/DETENTION VOLUME ARE REQUIRED AT THE LOWER END OF MAY VALLEY TO PROTECT THE DOWNSTREAM REACHES OF MAY CREEK.

The level of protection in this analysis releases the 100-year future mitigated peak flow (590 cfs) at the current 2-year recurrence interval peak flow rate (170 cfs).

The slope of May Creek is only 1.4 feet per 1000 feet, so the conceptual depth shown of over 4 feet is probably not feasible. Pond area increases if depth is decreased.