



CHAPTER 1: THE PLANNING PROCESS

1.1 PLAN OBJECTIVES

The recommendations contained in this basin plan are intended to lessen and, whenever possible, prevent future flooding impacts in Salmon Creek Basin. The information and guidance contained in the plan are also meant to guide future actions and planning efforts within Salmon Creek Basin.

Early in the basin planning process, the Salmon Creek Basin Stakeholders Committee agreed that the recommendations should:

- ❑ Focus on alleviating existing drainage problems for basin residents and businesses, rather than making the entire basin safe for new development.
- ❑ Strive to reduce floodwaters on the surface of the land to protect homes and roads. The committee agreed upon this “level of service” after the Phase I study revealed it would be virtually impossible to drain floodwaters down far enough to spare septic systems from flooding.
- ❑ Help ensure that any new development does not experience flooding, or worsen flooding problems for existing properties.

The Washington State Department of Ecology provided a state grant to fund this basin plan, in recognition that the plan would document the needs, costs, and benefits for constructing capital facilities (conveyance alternatives), buying properties, and/or amending land-use regulations to alleviate basin flooding. Grant funding came from the Flood Control Assistance Account Program (FCAAP).

1.2 THE ROLE OF THE SALMON CREEK BASIN STAKEHOLDERS COMMITTEE

In 1999, the Thurston County Board of Commissioners appointed a 19-member Salmon Creek Drainage Basin Stakeholders Committee to explore ways to reduce flooding impacts in Salmon Creek Drainage Basin. To recruit volunteers for the committee, Thurston County mailed applications to all property owners within Salmon Creek Basin, inviting them to apply to serve on the Salmon Creek Basin Stakeholders Committee. Among other things, the mailing asked applicants about their personal experience, expertise, and ability to commit to a multi-year term on the panel. The applications, combined with interviews and recommendations, formed the basis of the Commissioners' appointments in August 1999.

Nineteen people served on the Stakeholders Committee. Members represented a range of residential, commercial/industrial and agricultural interests, as well as government agencies. Many of the members lived within the drainage basin and had personal experience with flooding. For a list of members, please see the "Acknowledgements" section earlier in this publication.

1.3 STAKEHOLDERS COMMITTEE TASKS

The Stakeholders Committee was charged with two tasks:

Task 1: Craft a short-term "Emergency Preparedness and Response Plan" (completed in 1999)

The committee was asked to publish a plan to recommend ways that individuals, community groups, and Thurston County can best prepare for and respond to flooding. The plan was meant to offer a coordinated response to possible flooding events that might occur while the long-term basin plan was being developed (Task 2).



Interim measures

Recognizing that it would take several years before long-term solutions were recommended in a basin plan, Thurston County:

- Hired URS Corporation and Pacific Groundwater Group to create a "Depth to Water" map that shows the distance between the surface of the land and the height of the water table during the 1999 flood events. This map complements a second map, created in 1999, called the "High Ground Water Flood Hazard Areas Resource Map." The map shows which properties are prone to groundwater flooding, based on infrared and radar-enhanced photographs, topography maps, and staff surveys. County staff now consult both maps when issuing permits for development within the basin.
- Approved a policy to restrict development in high-groundwater areas of Salmon Creek Basin (an amendment to the Critical Areas Ordinance). The county also imposed stricter drainage requirements for new development (an amendment to the 1994 Drainage Design and Erosion Control Manual). Both policies are described further in Chapter 2.
- Installed additional piezometers (devices that measure upper groundwater levels) throughout Salmon Creek Basin.

Task 2: Prepare a long-term basin plan

The second task was to prepare a long-term basin plan that would evaluate ways to alleviate flooding and its impacts. Whereas the Emergency Preparedness and Response Plan focused on how to respond to flooding, the basin plan was expected to be more solution-oriented. The goal was to explore, and provide recommendations on, a wide array of approaches – from policy changes that could help protect people from building in flood-prone areas, to engineering fixes to lower floodwaters on existing properties. This basin plan, The Salmon Creek Comprehensive Drainage Basin Plan, Phase II: Alternatives Analysis and Recommendations, represents the completion of the second task. (For brevity's sake, this plan will most often be referred to as the “Salmon Creek Basin Plan.”)

1.4 THE PROCESS FOR DEVELOPING THE PLAN AND RECOMMENDATIONS

The Salmon Creek Basin Plan was written in two distinct phases.

In Phase I, Thurston County hired private consulting firms, URS Griener Woodward Clyde (now called URS Corporation) and Pacific Groundwater Group, to create a computer model to simulate factors influencing groundwater and surface-water flow in Salmon Creek Basin. The results were published in the June 2001 report, “Salmon Creek Drainage Basin Conceptual Hydrologic Model.” The model found that four elements caused flooding in Salmon Creek Basin: (1) back-to-back years of above-average rainfall, (2) limited natural drainage, (3) human alterations to the landscape, and (4) saturation of the shallow upper aquifer (URS Corp. 2001b). (See Chapter 4 of this report for a basin characterization.)

**Service level discussion**

Based on the Phase I study, the consultants and Thurston County staff were able to calculate the volume of water a project would have to remove in order to protect homes, wellheads, roads, and septic systems from flooding (see Figure 4-6, Appendix E). To help people visualize the volume of water involved in the spring 1999 flood, consultants and Thurston County staff calculated water volume in terms of “football fields covered with four feet of water.” (This is easier to visualize than 1,346,493 gallons of water.) According to these calculations:

- ❑ To lower 1999 flood levels to the surface of the ground in the west basin (west of I-5), a project would have to remove a volume of water equaling 554 football fields covered in four feet of water (17,125 acre feet). To lower water below septic drain fields, the project would need to remove a volume of water equal to 833 football fields covered in four feet of water (25,750 acre feet).

(continued next page)

- ❑ To lower 1999 flood levels to the surface of the ground in the east basin (east of I-5), a project would have to remove a volume of water equaling 49 football fields covered in four feet of water (1,514 acre feet). To lower water below septic drain fields, the project would need to remove a volume of water equal to 94 football fields covered in four feet of water (2,905 acre feet).

By estimating the volume of water to be moved, the Phase I modeling enabled committee members to discuss which “level of service” the group would try to achieve in its recommendations. Committee members agreed that it would be virtually impossible, from an engineering and financial perspective, to remove enough water to lower the water table below septic systems during flood events. Thus, the committee agreed to seek options that would at least help alleviate house and road flooding.

Pumping alternatives were ruled out due to their probable high capital and operation/ maintenance (O&M) costs. “Pre-emptive” dewatering via passive drainage was also screened out because the computer modeling needed would be very expensive, thus limiting the grant funding to evaluation of fewer alternatives. In addition, permitting would be difficult since dewatering could affect base flows in streams and wetlands.

Based on the service-level discussion, the Stakeholders Committee developed the following range of ideas.

Non-conveyance ideas

- Install a sewer system in the basin.
- Preserve tree cover.
- Flood-proof properties.
- Buy out properties.
- Raise roads.

Conveyance ideas (See Appendix E, Fig. 4-4)

In SC 9:

- Convey water from old Hickman Ditch south along Jones Road to Salmon Creek.
- Convey water from Hickman Drainage Improvement Project, west along 93rd, then south down Littlerock Road to Salmon Creek.
- Convey water west along the Williams Gas Pipeline easement, across Littlerock Road and into Fish Trap Creek.
- Convey water south down Littlerock Road to Salmon Creek, beginning at roughly the intersection of 83rd Avenue

In SC 10:

- Convey water from Rhondo Pond area directly across Blomberg (proposed in conjunction with other projects).
- Convey water into the old Hickman Ditch from an area west of Rhondo Pond.
- Convey water from an area west of Rhondo Pond to Littlerock Road and Salmon Creek (proposed in conjunction with other projects).

In SC 11:

- Convey water from an area east of Blomberg Street, traveling south along Blomberg and west along 93rd Avenue to Salmon Creek.

In SC 13:

- Convey water from roughly the Walter Court area to an area near Kimmie Street to connect to Hopkins Ditch.
- Convey water from roughly the Walter Court area, north along Case Road, then east along 88th Avenue S.E. to infiltration basins.

continued



The Stakeholder Committee used a matrix to rank conveyance and non-conveyance ideas, based on technical, economic, and regulatory issues.



Based on the matrix results, the Stakeholders Committee directed the consultants to evaluate the following alternatives:

Non-conveyance alternatives to be evaluated:

- Install a sewer system in the basin in lieu of septic systems.
- Preserve and increase tree canopy.
- Buy out or flood-proof property.
- Raise road surfaces above predicted flood stages.

Conveyance alternatives to be evaluated (many of these options represented a blend of the ideas discussed earlier in the process):

In the West Basin, convey water from:

- Rhondo Pond through DNR ditch, along the Williams Pipeline right-of-way and across Littlerock Road S.W. to Fish Trap Creek. (Rhondo Pond to Fishtrap Creek)
- Rhondo Pond through DNR ditch, west along the Williams Pipeline right-of-way, and south along Littlerock Road to Salmon Creek (Rhondo Pond to Littlerock Road 1)
- Rhondo Pond, north along Rhondo, west along 83rd Ave S.W., and south along Littlerock Road to Salmon Creek. (Rhondo Pond to Littlerock Road 2)
- Rhondo Pond through DNR ditch, south to the old Hickman Ditch, and south along Jones Road S.W. to Salmon Creek. (Rhondo Pond to Jones Road)
- Old Hickman Ditch south down Jones Road S.W. to Salmon Creek. (93rd to Jones Road)

In the East Basin, convey water from:

- Roughly the Walter Court area, south along Case Road to Hopkins Ditch (East Basin Alternative)

continued

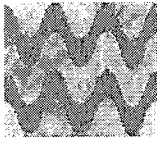


Phase II: Evaluation of alternatives

In Phase II, the consultants used the model created in Phase I to evaluate the conveyance and non-conveyance alternatives identified by the Stakeholders Committee.



End product: The information yielded from Phase I and Phase II laid the foundation for the recommendations found within this basin plan. The plan provides information and guidance for all future actions and future planning efforts regarding Salmon Creek Basin.



CHAPTER 2: USE AND AUTHORITY OF THE PLAN

The Salmon Creek Comprehensive Drainage Basin Plan, Phase II: Alternative Analysis and Recommendations (PLAN) was developed by the Stakeholders Committee, consultants, and County staff, with input from basin property owners and the general public during a public adoption process. This in-depth process yielded a number of recommendations which seek to lessen existing flooding problems and avoid or reduce future flooding impacts in the basin. The PLAN thus provides information and guidance for all future planning efforts regarding Salmon Creek Basin -- efforts which will need to comply with existing regulations and be consistent with existing plans and programs.

The following sections outline how the PLAN is expected to be used; which regulations authorize the PLAN; how the PLAN is consistent with other plans, regulations and programs; and what sources of funding are available for implementing PLAN recommendations.

2.1 USE OF THE PLAN

Local government entities are expected to use the PLAN in the following ways:

- Include the PLAN's recommendations in programs and services that affect the basin;
- Review other plans and policies that affect the basin, for consistency with the PLAN;
- Coordinate with other governments and groups interested in Salmon Creek Basin;
- Incorporate PLAN recommendations into county and city capital improvement project lists and annual operation and maintenance budgets;
- Review development proposals in the basin for consistency with the PLAN; and
- Add PLAN recommendations to future public involvement and education opportunities in the basin.

Others interested in the PLAN or proposing new development in the basin are anticipated to use the PLAN in the following ways:

- Design projects to be consistent with the recommendations outlined in the PLAN; and
- Initiate projects and activities that protect or enhance Salmon Creek Basin's environmental and developed systems.

2.2 AUTHORITY OF THE PLAN

This section summarizes federal, state, and local plans and regulations that either authorize basin planning by local jurisdictions, or contain guidelines and regulations specific to the information and recommendations contained in the PLAN.

2.2.1 Authorizing Legislation

Flood Control Assistance Account Program (FCAAP)

According to RCW 86.26.050, counties and other municipal corporations may apply to the Washington Department of Ecology (WDOE) for financial assistance to prepare comprehensive flood-control management plans and for flood-control maintenance projects. The WDOE determines priorities and allocates funds from the Flood Control Assistance Account Program (FCAAP) among those counties who successfully compete for assistance. The department also adopts rules establishing the criteria by which those allocations must be made.

The WDOE funded this PLAN through FCAAP grant #G0200089. The grant provides for the calibrated hydrologic water model developed in Phase I to be used to evaluate various alternatives seeking to alleviate basin flooding. Following the alternative analysis, results from Phase I and II were to be compiled into a basin plan. The PLAN would document the need, costs, and benefits for constructing capital facilities, acquiring properties and/or amending land use regulations.

Growth Management Act

RCW 36.70A, the Growth Management Act (GMA), requires local governments to develop comprehensive land use plans for accommodating future population growth while minimizing environmental impacts. The GMA requires each jurisdiction in Washington to prepare a comprehensive plan to facilitate orderly development. Comprehensive plans must contain a land use element that, among other things, provides for:

- Review of drainage, flooding, and stormwater runoff in the area and nearby jurisdictions;
- Guidance for corrective actions to mitigate or cleanse discharges that pollute Puget Sound or the waters entering Puget Sound; and
- Protection of the quality and quantity of water used for public water supplies.

The GMA also requires each jurisdiction to adopt regulations to protect critical areas including wetlands, frequently flooded areas, aquifer recharge areas, and fish and wildlife habitat. The GMA allows key aspects of the comprehensive plan to be “amplified and augmented in scope by progressively including more completely planned areas consisting of distinctive geographic areas or other types of districts having unified interest within the total area of the County.” (RCW 30.70A.050)

The GMA focuses on the interjurisdictional character of natural resources. A number of the requirements placed upon jurisdictions by the GMA can be effectively met through the basin planning process. These requirements include, but are not limited to:

- Working cooperatively to achieve cohesive land use policies on issues such as stormwater that do not recognize jurisdictional boundaries;
- Identifying capital stormwater facilities and planning for future capital improvements; and
- Identifying innovative land use solutions for land management problems.

RCW 36.89

Thurston County Storm and Surface Water Utility was established under RCW 36.89 which authorizes counties to establish, acquire, develop, construct, and improve open space, park, recreation, and community facilities, public health and safety facilities, storm water control facilities, and highways. RCW 36.89 recognizes that “The storm water control facilities within such county provide protection from storm water damage for life and property throughout the county, generally require planning and development over the entire drainage basins, and affect the prosperity, interests and welfare of all the residents of such county.”

Puget Sound Water Quality Management Plan

The 2000 Puget Sound Water Quality Management Plan (PSWQMP) constitutes the official plan for Puget Sound under the Puget Sound Water Quality Act (RCW 90.70). RCW 90.70 requires local governments in the Puget Sound basin to “evaluate, and incorporate as applicable, subject to the availability of appropriated funds or other funding sources, the provisions of the plan.” The PSWQMP calls for local governments to participate in watershed or basin planning processes. The objective is to coordinate efforts, pool resources, ensure consistent methodologies and standards, maintain and restore watershed health, and protect and enhance natural hydrology and processes – including natural surface runoff, infiltration, and evapotranspiration. Although the PSWQMP does not apply to the geographic area of Salmon Creek Basin, it offers sound guidance for managing stormwater in all of Thurston County.

Thurston County Comprehensive Plan

The Thurston County Comprehensive Plan, revised annually, contains policies regarding the natural environment in general and stormwater management specifically. The County's Comprehensive Plan includes the following policies:

- The County should manage water resources by recognizing the hydrologic continuity between ground and surface water.
- The County should address water resource concerns by relevant geographic areas such as a watershed or sub-basin for surface waters and by aquifers for groundwaters.
- The County should use the watershed approach when addressing water resource concerns.
- The County should continue to support grass root solutions to local problems by undertaking groundwater, watershed, or stormwater basin plans, which include affected stakeholders.
- The County should support and strive to implement the county-adopted water resource plans addressing watersheds (and) stormwater. The County should include common elements, which can reduce the duplication of efforts in new watershed, groundwater or stormwater basin plans.
- The County should not allow uses and activities to degrade lakes, streams and commercial shellfish areas, recreational shellfish harvesting on public lands, or result in loss of the natural functions of water bodies, wetlands, and groundwater aquifers.
- Land use activities and septic tank effluent should not result in polluted stormwater runoff that causes degraded surface or groundwater.
- The quantity and quality of water entering wetlands, streams, and ponds should be maintained.
- The County should take steps to ensure that stormwater systems are adequately maintained in order to ensure high quality surface or groundwater.
- Education and technical assistance should be provided in a comprehensive, regional manner to promote understanding the connection between ground and surface waters, and the watershed boundary transcendence over jurisdictional boundaries.

2.2.2 Related Plans, Regulations, and Programs

Clean Water Act

The Clean Water Act authorizes the federal government to regulate stormwater discharges and protect the beneficial uses of streams, lakes and wetlands. Under the Clean Water Act, the United States Environmental Protection Agency (EPA) developed the National Pollutant Discharge Elimination System Permit – Phase II (NPDES). This federal permitting system requires certain local governments to take measures to reduce the amount of pollution in

stormwater runoff in order to protect water quality. Urbanized areas of Thurston County and the City of Tumwater must abide by this requirement, and therefore are required to develop stormwater management plans that address six “Minimum Control Measures” described in the stormwater regulations:

- Public education;
- Public involvement;
- Illicit discharge and detection;
- Post-construction stormwater management;
- Construction site runoff; and
- Pollution prevention/good housekeeping

While the PLAN’s emphasis is on solving flooding problems, it does include a recommendation regarding post construction stormwater management. Specifically, it recommends maintaining the interim standards for stormwater management in Salmon Creek Basin.

National Flood Insurance Act

In response to increasing losses from flood hazards nationwide, the U.S. Congress passed the National Flood Insurance Act of 1968 which established the National Flood Insurance Program (NFIP). The 1968 Act made flood insurance available to communities that were willing to adopt floodplain management programs to mitigate future flood losses. The act also required all floodplain areas within the U.S. to be identified, and flood-risk zones to be established within those areas.

The responsibility for administration of the NFIP falls with the Federal Insurance Administration of the Federal Emergency Management Agency (FEMA). FEMA publishes a Flood Insurance Rate Map (FIRM) and distributes it to a wide range of users: private citizens, community officials, insurance agents and brokers, lending institutions, and other federal agencies. The FIRM is the basis for floodplain management, mitigation, and insurance activities of the NFIP.

Currently, the areas in Salmon Creek Basin that experienced flooding in 1999 are mapped on the FIRM as Zone C, “Areas of Minimal Flooding.” This may hinder the ability of Thurston County and citizens to qualify for federal assistance for flood-related activities because Zone C is not a high priority designation for receiving mitigation funding.

The PLAN recommends that high groundwater areas in Salmon Creek Basin be recognized as “special flood hazard areas” under the Flood Insurance Rate Map Program.

Endangered Species Act

The Federal Endangered Species Act (ESA) requires the federal government to prevent the extinction of species, recover species to stable populations, and protect the ecosystems on which species depend. Generally, the U.S. Fish and Wildlife Service (USFWS) coordinates ESA activities for terrestrial and freshwater species, while NOAA Fisheries (National Oceanic and Atmospheric Administration) is responsible for marine and anadromous species.

Section 9 of the ESA makes it illegal to “take” a threatened or endangered species of fish or wildlife, or its habitat. In addition, Section 7 of the ESA requires all Federal agencies to use their authorities to conduct conservation programs and to consult with NMFS (or USFWS) concerning the potential effects of their actions on any species listed under the ESA.

Consultations occur with Federal action agencies under Section 7 of the Act to avoid, minimize or mitigate the impacts of their activities on listed species. NMFS also reviews non-Federal activities which may affect species listed under the ESA and issues permits under Section 10 for the incidental take of those species and for scientific research and enhancement purposes.

If, in the future, a species (such as Coho) is listed under the ESA in the Chehalis Watershed, then any project/action recommended by the PLAN, involving a Federal nexus, would require a consultation with NOAA Fisheries and/or USFWS.

Washington State Hydraulic Code

The State Legislature has given the Department of Fish and Wildlife the responsibility of preserving, protecting, and perpetuating all fish and shellfish resources of the state. To help achieve that goal, the state Legislature in 1949 passed a state law now known as the "Hydraulic Code" (RCW 77.55.0102.370). Although the law has been amended occasionally since it was originally enacted, the basic authority has been retained.

The law requires that any person, organization, or government agency wishing to conduct any construction activity in or near state waters must do so under the terms of a permit called the Hydraulic Project Approval (HPA) issued by the Washington State Department of Fish and Wildlife. State waters include all marine waters and fresh waters of the state.

Any construction-related project recommended by the PLAN that would take place in or near state waters would be required to obtain an HPA. Further, recommendations in the PLAN are consistent with the State Hydraulic Code as they protect fish resources as future development may occur.

Thurston County Flood Hazard Management Plan

The goals of the Thurston County Flood Hazard Management Plan include protecting the public from natural hazards, minimizing the need for emergency services, minimizing the cost of replacing public facilities, protecting the unique and vulnerable parts of the environment, and alerting the public to these critical areas.

The PLAN is consistent with the goals of the County's Flood Hazard Management Plan.

Thurston County Comprehensive Emergency Management Plan

This plan guides Thurston County's organizational response before, during and after a disaster. It develops and describes a comprehensive program that defines who does what, when, where, and how in order to mitigate, prepare for, respond to, and recover from the effects of natural, technological and human-caused hazards.

Emergency Preparedness and Response Plan (EPRP) for the Salmon Creek Drainage Basin

Published in 1999, the Emergency Preparedness and Response Plan for the Salmon Creek Drainage Basin recommends ways that individuals, community groups, and Thurston County can best prepare for and respond to flooding. Devising the plan was the first task undertaken by the Salmon Creek Basin Stakeholders Committee.

The PLAN recommends incorporating the Salmon Creek Preparedness and Emergency Response Plan as an appendix to the Office of Emergency Management's Comprehensive Emergency Management Plan. It also recommends Thurston County continue to monitor groundwater levels to alert citizens of possible flooding.

Natural Hazard Mitigation Plan for the Thurston Region

In 2000, the federal government approved the Disaster Mitigation Act. For all disasters declared on or after Nov. 1, 2004, the Act requires local and tribal applicants for disaster mitigation funds to have an approved local mitigation plan. The Natural Hazard Mitigation Plan for the Thurston Region, an interjurisdictional plan, contains proposals to mitigate the region's vulnerabilities to the effects of hazards such as storms, landslides, earthquakes or flooding. These proposed mitigation initiatives range from placing flood gages in rivers to removing, relocating, and elevating structures within 100-year flood plains.

Implementing PLAN recommendations would protect against future losses resulting from flooding in the basin; for example, recommendations include elevating roads and structures.

Tumwater/Thurston County Joint Plan (1995)

The 1995 Tumwater/Thurston County Joint Plan (Joint Plan) establishes the Urban Growth Boundary for the City of Tumwater and land-use designations within the boundary. The Urban Growth Boundary encompasses roughly the western half of Salmon Creek Basin and the entire 93rd Avenue corridor. (Zoning of the unincorporated growth area to implement the plan took place in 1996.)

The Southern Subarea of the Joint Plan includes the area roughly south of 83rd Avenue to the edge of the Urban Growth Area. The Joint Plan recognizes flooding problems in Salmon Creek Basin (page 3-62):

Stormwater management concerns and actions for high groundwater areas were also addressed in the Joint Plan.

3.5.4.1 Introduction to Southern Subarea: “The City of Tumwater and Thurston County should jointly determine appropriate methods for managing stormwater in this subarea in advance of urban development. Consideration should be given to ...special development standards...in areas where soil investigations demonstrate the presence of extremely poor-draining soils that may preclude effective function of a stormwater infiltration system.” (Page 3-62)

Implementation Chapter 1, action item 9, for Thurston County and the City of Tumwater: “Determine appropriate methods for stormwater management in advance of development in areas where existing soils may make drainage difficult, particularly in the area south of 70th Avenue and west of Interstate 5.

The PLAN recommends that Thurston County and the City of Tumwater maintain higher protection standards for stormwater management in Salmon Creek Basin. (These standards are specified in an amendment to the joint 1994 Drainage Design and Erosion Control Manual.) The PLAN also recommends that Thurston County and the City of Tumwater re-evaluate the Joint Plan’s land-use and zoning designations in light of the restrictions that already exist for development in high-groundwater areas.

Critical Areas Ordinance

Thurston County and the City of Tumwater have enacted Critical Areas Ordinances to regulate land use activities in sensitive environments, including wetlands, streams, flood plains, high groundwater hazards, and aquifer recharge areas, as mandated by the state Growth Management Act. Among other things, the Thurston County ordinance prohibits development in areas that have experienced flooding in the past. For developments near flooding areas, the ordinance requires certain setbacks and building standards, and limits timber harvesting

The PLAN provides a recommendation for maintaining the Thurston County Critical Areas Ordinance for high groundwater hazard and high groundwater buffer areas in Salmon Creek Basin. It also recommends the City of Tumwater maintain or adopt regulations that are equivalent to Thurston County's.

Stormwater Comprehensive Plan for Tumwater and Tumwater's Urban Growth Area

- City of Tumwater Stormwater Comprehensive Plan Update (April 1995) identifies Salmon Creek Basin as a lower priority for planning by the City, because it is mostly outside city limits; however, the Plan recommends that “prioritization should be reconsidered as additional information and needs arise.” P. 3-28 and Table 3-3.
- City of Tumwater Comprehensive Stormwater Implementation Program Final Report. (March 2003) Sec. 2.050 acknowledges the Salmon Creek Basin planning effort and the City's ongoing work “with the County and other interested parties to develop management strategies for the basin.”

Drainage Design and Erosion Control Manual, Thurston Region, Washington, 1994 (DDECM)

The DDECM requires development applicants to assess stormwater impacts created by new and redevelopment. The manual sets standards for the design, construction, and maintenance of drainage facilities and for temporary and permanent erosion and sediment control. It also provides standard procedures for estimating flow from developed property and establishes runoff criteria. In addition, the DDECM provides design standards and specifications for construction of stormwater conveyance, detention, retention, and infiltration facilities in Thurston County. The DDECM authorizes basin plans to set higher design standards; basin plan recommendations addressing stormwater management requirements supersede the regulations included in the drainage manual.

In 2000, Thurston County amended the drainage manual to include “interim standards” for Salmon Creek Basin. The amendment requires developers to ensure that there is at least six feet of separation from the bottom of an infiltration facility to the highest level of flooding in 1999. The goal is to ensure that infiltration facilities will function properly if similar flooding events were to occur again. At the time this publication went to press, the standards contained in the amendment applied only to properties within Thurston County because the amendment had not yet been approved by the cities of Tumwater, Olympia, and Lacey as part of the broader, jointly approved Drainage Design and Erosion Control Manual.

The PLAN recommends permanently adopting the interim standards.

Flood Plain Building Standards

“Flood plain” refers to low areas along rivers and streams which potentially may flood during periods of heavy rainfall. Thurston County regulates flood plain development to promote public health and to minimize flood losses. To accomplish this, building may not occur within the 100-year floodplain, with very narrow exceptions. Regulations also control filling, tree cutting, grading and other development activities which may increase flood damage. The flood plain building standards also apply to designated High Groundwater Hazard Areas.

The PLAN recommends Thurston County continue to ensure that these standards remain in place for the flood plain along Salmon Creek and Hopkins Ditch and for the high groundwater hazard area.

2.3 FUNDING PROGRAMS FOR FUTURE EFFORTS

Various grant and loan programs require or encourage the completion of a basin plan or flood management plan before a jurisdiction is eligible for funding assistance, such as:

- WDOE Flood Control Assistance Account Program (FCAAP);
- WDOE Water Quality Financial Assistance Program; and
- Washington Department of Community Development (WDCD) Public Works Trust Fund.

The PLAN will enable Thurston County or other entities to pursue funding from these and other outside sources.



CHAPTER 3: OVERVIEW OF HISTORICAL MAPS, CONVEYANCES, AND STUDIES SINCE 1878

The first recorded map of Salmon Creek Basin in 1883 indicated extensive wetlands in the areas that, in modern times, experience the greatest flooding. Since the first non-native settlers arrived, people have attempted to ditch and drain wet areas in the basin to accommodate human land uses. These areas have consistently continued to flood when patterns of above-average rainfall prevailed. Many attempts over past decades have been made to solve flooding problems in the basin, few of which have been successful. This chapter provides a brief overview of historic maps and the history of flood control efforts, studies, and anecdotal data in Salmon Creek Basin.

3.1 HISTORICAL MAPS

Map records show a relatively flat basin, with little natural surface drainage, bounded by basalt outcroppings in the east and wetlands in the south and west. Maps from all time periods indicate extensive wetlands in the basin, and also indicate that natural drainage features in and around the basin, such as streams and wetlands, have been altered.

3.1.1 General Land Office (GLO) Map, 1883

The Department of the Interior's Bureau Land Office created one of the earliest maps of the region in 1883. (See Appendix E, Figure 3-1a.) This early map shows a sparsely settled basin with large swamplands along the south and west boundaries of the basin. Surveyor's notes on the map state that lands in the southwest section of the basin were "Unsurveyed Land unfit for settlement or cultivation." Text in the central and northeast portion of the basin state the soil is "2nd rate." This map also shows a stream whose headwaters begin north of present day 93rd Avenue and east of present day Littlerock Road. This stream is recorded on maps as late as 1937, after which, it is not shown on any maps.

3.1.2 General Land Office (GLO) Map, 1884

The Department of Interior, Bureau Land Office, created a second map in 1884 that covered the area not originally mapped in 1883. (See Appendix E, Figure 3-1b.) These maps show what we know today as Salmon Creek being named "Salmon River." The name is changed on later maps.

3.1.3 Cram's Superior Map of Washington, 1909

This map produced by the Cram Map Depot shows railroads, populations, and cities and villages with populations over 100. What is striking on this map is that the largest wet feature on the map is the area south of Black Lake in the present day area of Salmon Creek Basin.

3.1.4 Washington Chehalis Quadrangle, Edition 1916, United State Department of the Interior Geological Survey

The significant change from the 1883/84 maps is the renaming of Salmon River to Salmon Creek, and the addition of Hopkins Ditch to Salmon Creek. On this map, Salmon Creek is extended from its original headwaters just east of Littlerock Road further east and north to the small community of South Union. This change does not reflect the expansion of Salmon Creek, but the construction of Hopkins Ditch. Hopkins Ditch is not named on the map, but at this point has been operating since the late 1890s.

3.1.5 Metsker Map, Township 17N, Range 2W, Thurston County Washington, 1937

Metskers shows the headwaters of a stream that begins just east of Littlerock Road and north of 93rd that drains northwest to Black Lake as still being intact. This stream is known today as Michelle Creek. Map references from this point forward show the stream's headwater beginning in a wetland just west of Littlerock Road and north of present day 88th Street.

3.1.6 Washington Tenino Quadrangle, Edition of 1944, United States Department of the Interior Geological Survey

The 1944 Tenino quadrangle shows a stream known today as Fishtap Creek starting at three small springs just west of Littlerock Road and south of Fairview (88th). This map shows the stream draining south and eventually outletting into the Black River just north of Salmon Creek's outlet to the Black River. Later maps show this stream being diverted northwest to the Black River.

Maps currently used for permitting by Thurston County

- The "High Ground Water Flood Hazard Areas Resource Map" identifies properties that are prone to flooding. The map is based on infrared and radar-enhanced photographs, topography maps, and staff surveys.
- The "Depth to Water" map was created by Pacific Groundwater Group. The map shows the distance between the surface of the land and the height of the water table during the 1999 flood events.

3.2 DITCHES/CONVEYANCES

Early pioneers settling in Salmon Creek Basin attempted to ditch and drain many of the existing wet areas to establish farmlands and lessen the duration of flooding. Most of these ditches were never documented or recorded and, over time, they became segmented and overgrown as land was subdivided and further developed. Much of the development occurred during a period of low to normal rainfall, between the first documented flood event in 1972 and the 1996-97 event. Following is a summary of the main ditching efforts undertaken in Salmon Creek Basin.

3.2.1 Morgan Ditch (1878)

The first officially recognized ditch in Salmon Creek Basin was Morgan Ditch. On August 5, 1878, H. H. Morgan submitted an application to the County Commissioners to locate a ditch “commencing at or near the north east corner of the south west quarter of section 23.” Morgan Ditch is described in greater detail in the November 1878 Session of the County Commissioners. According to the Record of Ditches Subsequent to November 1877, VOL. 1., Morgan Ditch is “...located on and through the Union Swamp in marshlands through Section 20, 21, 22, 23 & 27 of 17N. R2W in Thurston County WA.” The outlet of the ditch was Salmon Creek. This first ditch was later improved and renamed Hopkins Ditch.

3.2.2 Hopkins Ditch (1901)

On July 9, 1892, George S. Hopkins and other local residents petitioned the Board of County Commissioners:

“To the Board of County Commissioners of Thurston County Washington. Gentlemen, We the undersigned residents of Thurston County and the owners of the land to be drained thereby petition your honorable body to locate a ditch having the following beginning, course and termination, to-wit:- Beginning on the boundary line between sections twenty and twenty-one in township 17, north, range two west and south across section twenty to Salmon Creek and there to terminate, said section twenty being school land and the property of the state of Washington. The said ditch to follow the line of the ditch known as the “Morgan ditch”; the same being necessary to drain the land lying above it which is annually overflowed by the incapacity of the ditch in its present condition to carry off the surplus water during the rainy season, thus damaging the crops of the owners of the land along the said Morgan’s ditch above the line of the ditch petitioned for.” (Hopkins 1892)


On July 30, 1892, the Board recommended the County surveyor survey the ditch and proposed ditch line and estimate the cubic yards of earth and cost per cubic yard. On September 19, 1892, D.S.B. Henry, surveyor, submitted his map showing the ditch line, profile and cubic yards of soils to be excavated to construct Hopkins Ditch. On February 18, 1893, the Board of County Commissioners found that:

“After an examination of the plat, profile and report of the survey the Board found that the apportionment made by the surveyor is unequal for the reason that all lands to be benefited by the improvement have not been assessed with their just proportion of the costs and expenses of such improvement in that the east half of section 20, township 17 northern, range 2 west, has not been assessed with any of the costs and expenses.”

The Board went on to reapportion the costs appropriately. While the Board authorized reapportioning the ditch in 1893, the County did not officially recognize Hopkins Ditch until July 24, 1901, when the Board adopted the report and profile of survey, dated September 19, 1892. (See Appendix E, Figure 3-2, for a map of Hopkins Ditch.) An active ditch district maintains Hopkins Ditch to this day.

The Hopkins Ditch District has been active since 1901. The District Commissioners are responsible under State law to maintain and amend the District boundary, develop the criteria for the rates and charges and to ensure that they are uniformly applied.

Related recommendation

 The Hopkins Ditch District should continue to maintain Hopkins Ditch and assess corresponding rates.

See Chapter 7 for details.

3.2.3 Works Project Administration Ditches (circa 1935)

In the late 1930s, the Federal Works Project Administration (WPA) constructed a number of ditches throughout Thurston County (WPA 1937). These ditches were to protect roads constructed as part of the Farm to Market Program designed to benefit Depression era agriculture and create jobs. The program operated in two distinct phases; the first phase was the construction or reconstitution of a road, followed by the second phase that was to create drainages to protect the roads from flooding. There are anecdotal data suggesting the WPA did construct a ditch in Salmon Creek Basin (Urban, 1961), (KCM, 1972). This WPA ditch ran under Blomberg Road, overland to Lathrop Road, and eventually discharged to Salmon Creek. Unfortunately, this ditch and perhaps other WPA ditches were not documented with maps, easements, and/or other legal documentation; therefore, maintenance responsibilities and funding mechanisms for maintaining these ditches in perpetuity was never established. As a result, many of these Depression-era ditches have been filled or have fallen into disrepair.

3.2.4 Unnamed Ditch Township 17, R.2W, Section 17 (Pederson Place) (1971/72)

County crews and contractors constructed this ditch as an emergency flood relief effort during the 1971/72 winter flood events (Russell, 2003). Crews used backhoes, dynamite and bulldozers (Lawrence, 2003) to create a ditch to relieve flooding in the Pederson Place subdivision. An easement was never perfected, and in later years, County crews closed this ditch to prevent encumbrances on downstream property owners.

3.2.5 Unnamed Ditch Extension, Township 17, R.2W, Sections 15 and 22 (Unknown date)

The origins of this unnamed ditch section could not be determined. The ditch extends north from an authorized section of Hopkins Ditch in the vicinity of Bent Arrow Road, across Case Road and terminates south of Armstrong Court. When active, this ditch would have drained the area just south of present day Armstrong Court. No record could be located authorizing this ditch's construction, operation, or maintenance. This ditch is now abandoned, however, portions of the ditch network remain.

3.2.6 Hickman Sub-Area Drainage Improvement Project (1999)

Following the flooding that occurred in March 1997, area residents asked Thurston County for assistance to alleviate flooding. Woodward-Clyde, of Seattle, Washington (engineering consultant), was contracted to analyze possible drainage routes and recommended re-constructing an older, abandoned ditch system. In September 1999, Thurston County constructed a ditch that crosses the 80-acre parcel west of the Washington State Department of Natural Resources (DNR) nursery on Blomberg Road. SW. At the time, Thurston County secured a temporary easement from private property owners so the County could access remnants of the old "Hickman Ditch." The easement is set to expire in June 2004. (See Appendix H for Resolution 12019 approving the Hickman Sub-Area project and establishing special benefit charges.)

The project includes re-opened ditches which convey flow from the remnants of the old Hickman Ditch to a county right-of-way at 93rd Avenue SW. The flow is then piped to the existing culverts located at 93rd Avenue SW near Salmon Creek. (Fig. 3-1 in Appendix E shows the Hickman Sub-Area Drainage Improvement Project as "Hickman Ditch" for brevity's sake.)

Related recommendation

☞ Thurston County should seek to acquire an easement for the Hickman Sub-Area Drainage Improvement Project and maintain the project in perpetuity. See Chapter 7 for details.

3.3 GOVERNMENT FLOOD CONTROL STUDIES

In some cases, Salmon Creek Basin residents, often farmers, constructed ditches on their own. In other cases, residents appealed to local agencies to help alleviate periodic flooding in the basin. As described above, some ditches were constructed through the work of government agencies, however, periodic flooding continued to be a problem. Citizens continued to engage government entities in solving Salmon Creek Basin flooding problems, and several government studies were conducted to assess the feasibility of various alternatives. Following is a summary of those studies, all of which concluded that the feasibility of solving the basin's flooding problems was low due to the extensive volume of flood water involved, the basin's limiting topography and geology, and the high costs associated with any potential project. (*Emphasis in the following text is provided in italics to illustrate these conclusions.*)

3.3.1 Salmon Creek Drainage Group & Black River Flood Control District (1956-1960)

Following the floods of 1955, citizens began a concerted, sustained effort to mitigate flooding in the Salmon Creek and Black River drainage basins. This effort began in March 1956, with citizens requesting assistance from the Thurston County Soil Conservation District (Urquarht, 1956), and ended in the early 1960s with a petition to the federal and state governments, with no apparent result.

In June 1956, in response to the request for assistance, the Conservation District (CD) prepared a Preliminary Survey Outline to “outline the engineering surveys and other requirements needed for the preparation of a preliminary report.” In the outline, the CD defines the problem as:

“...extreme winter flooding and inadequate summer drainage. The soils in the area are glacial outwash and the topography is very flat and full of depressional areas. The only natural drainage outlet is Salmon Creek, and all of the depressional areas must be drained to it with man-made drainage ditches. The present drainage system was done piece-meal by individual farmers and is now inadequate. A complete reorganization and enlarging of the system is needed.”

The report went on to state:

“From reconnaissance of the area, improved drainage and flood control appear physically feasible, but it is felt that further investigation should be made to determine economic feasibility. The land is low capability (class IV and VI soils), has difficult internal drainage problems and only a small part of the total area is under cultivation.”
(Urquarht 1956)

Local CD staff forwarded the Outline to the Conservation District Office in Chehalis where District staff questioned spending \$1,300 for surveys of predominantly Class IV and VI lands. From this point, no additional documents could be found pertaining to this specific request for assistance. While this effort appears to have stopped, citizens developed a larger effort shortly thereafter.

In November 1957, Thurston County residents met at Littlerock Grange Hall with the members of Thurston County Soil Conservation District to discuss ways of approaching flood control on the Black River. During that meeting the District provided three options for the assembled group:

1. The group could raise the money and undertake the entire job with their own funds with engineering assistance from the Soil Conservation District.
2. The group could request State assistance, and if approved, the State would match up to 40 percent.

3. The group could apply for a Small Watershed Project, and if approved, the federal government would bear the major costs of the flood control works installation. (Cooper 1957)

During the meeting, CD staff explained:

"...should the group opt for a Small Watershed Project, they would need to form a legal organization, that they should not expect a Watershed program to be approved, as many applications are being received all over the United States, with only a certain amount of money available to handle the requests. If the application is approved, there is a long waiting period with many steps to take and possibilities of the plan being discarded along the line, as a number of agencies, the state, and the Congress having to approve the plan. Conservation District staff went on to state that a small watershed project must also show a favorable cost benefit ratio and must not be a program of reclamation. Additionally, as the group is not a legal organization, an application would have to be sponsored by a legal organization, such as the Soil Conservation District or the County. The application is submitted to the state for approval and then goes to the soil conservation service for investigation and approval. There will be a waiting period before surveys can be undertaken and a plan prepared. The plan must be approved by the Washington State Office of the Soil Conservation Service and the Army Engineers, and the Congress. The whole procedure is slow and a group would be lucky to see establishment of Flood Control works within three years after an application is submitted." (Cooper 1957)

After hearing the District's presentation, the assembled group elected officers and made a motion to seek sponsors for an application for a Small Watershed Project. In July 1960, the group submitted a petition to the State's Department of Conservation citing:

"We feel our collective efforts as members of an established Flood Control District, we could do certain work in Black River that would be beneficial to the lands lying within the said proposed flood control district. Extreme flooding every year has caused the abandoning of many cares (sic) of once good agricultural land in the Black River Valley in Thurston County. Each year additional siltation of the river channel reduces the flow and causes a larger area of flooding and crop loss within the bounds of the proposed district." (Bartholomew, et. al. 1960)

The group mentioned in their petition that:

"Thurston County Soil Conservation District and the Thurston County Commissioners have submitted a petition, in behalf of the Black River property owners, the U.S.D.A. Soil Conservation Service praying for participation in the Federal program of small watershed projects..."

No records could be found that indicated any of these efforts were successful.

3.3.2 Drainage Recon, March 31, 1961 (SCS, 1961)

In March 1961, Soil Conservation Service (SCS) personnel noted the following:

“Went out with M.E. Walters regarding drainage problems on homes and lands along Prine Road west of U.S. 99. Some of the homes are completely surrounded by water for the last 1-1/2 months. From evidence found it appears that years ago a drain ditch was dug from Salmon Creek across west end of Lathrop road then up toward Prine Road. In places ditch has been filled in, grown up with trees or just plain disappeared. The whole area is so flooded with water it was impossible to locate the entire ditch at this date.

SCS personnel returned a week later and made the following report: Invest area in sec 16 & 17 T17NR2W. “Area has been logged and re-logged that very little evidence of drain ditch could be found.” (Urban 1967)

3.3.3 Report of Preliminary Investigation: Prine Road to Lathrop Road Drainage Thurston County, Washington (SCS 1967)

In 1967, the Soil Conservation Service performed a preliminary investigation in the Prine Road and Lathrop Road as a “result of an application to the Thurston County SWCD by various landowners, for the Soil Conservation Service to study drainage possibilities on the lands described above. *The SCS described the problem as: “The area at present, has no system of surface drainage. Because of a ‘perched’ water condition, caused by permeable soils located in a basin of a less permeable sub-strata, drainage is limited to slow sub-surface movement.”* (Ludwig 1967)

3.3.4 A Preliminary Report of an Engineering Study for the Lathrop Road - Black Lake Area Thurston County Washington (1971/1972)

As a result of the 1971/72 flood, the Board of County Commissioners authorized a study to delineate the troubled areas and to determine what further, detailed studies would be required. As of 1972, this was the most comprehensive study of the basin. The study found:

“Flooding and flood-related problems in the study area were found to be the result of extended heavy rainfall in an area having poor drainage, soil with poor runoff characteristics, and drainage-channel obstructions. Much of the area studied historically has a high level of groundwater in the wet, winter months and experiences minor flooding during most wet winters. For this reason, efforts should be directed towards mitigating prolonged flooding, and the associated inconvenience and health hazards, rather than toward the elimination of all sources of standing water caused by heavy seasonal rainfall. Construction of an extensive storm sewer system to prevent flooding in all parts of the study area is impractical. Instead, zoning laws and platting ordinances should be revised to make allowances for natural topographic and hydrogeologic conditions. Regulations should be developed to regulate land clearing

practices, make provision for on-site storage of storm water, and designate green belts, open space, and flood zones for the mitigation of damage caused by heavy rainfall runoff. In addition, guidelines should be established for the construction of building in wet areas. These regulations should not stifle development or discourage growth, but should provide for the proper use of the land while recognizing natural limitations. An improved maintenance program for existing facilities in conjunction with a limited amount of new construction and application of proper land use principles can produce an effective long-range drainage program.” (KCM 1972)

This report was the first report to acknowledge the scale of the flooding and the difficulty in developing comprehensive structural solutions.

3.3.5 Salmon Creek Drainage Basin Conceptual Hydrologic Model (1999-2001)

In 1999, Thurston County hired a private consulting firm, URS Corporation (successor to Woodward Clyde), to describe factors influencing groundwater and surface water flow in Salmon Creek Basin and to develop a computer model for simulating flows (URS Corp, 2001b). In June 2001, URS Corporation and Pacific Groundwater Group produced the Salmon Creek Drainage Basin Conceptual Hydrologic Model, commonly referred to as “Salmon Creek Basin Plan, Phase I.” Phase II, this report, uses the model to evaluate alternative actions for solving flooding problems. The information from the Phase I study was used to determine the basin boundaries. (See Appendix H for Resolutions 12018 and 12593 setting the boundaries for Salmon Creek Basin.)

Past flood-control studies At a Glance

Flooding of 1954/55

- ☐ Conservation District study (1956-60)
- ☐ Soil Conservation Service Drainage survey (1961)

Flooding of 1966/67

- ☐ Soil Conservation Service investigation into Prine Road flooding

Flooding of 1971/72

- ☐ Lathrop Road Study

Flooding of 1998-99

- ☐ Salmon Creek Drainage Basin Phase 1 (hydrologic model)

3.4 ANECDOTAL DATA

In addition to maps and studies, anecdotal data provided by residents suggest that areas of Salmon Creek Basin have been prone to flooding for a long time. Thurston County was provided with several photos showing flooding in Salmon Creek Basin since 1961. In the photos, large areas north of present day 93rd Ave and west of Case Road can be seen flooded in April of 1961 and again in March 1972. In an editorial to a local newspaper, the photo’s owner states:

“I lived on property there most of my life until I married in 1974... That lake has been there all my life. My first memory of it was ice-skating on it during the winter of 1955. That year it extended all the way to Case Road. The wetland forms yearly but varies in size. Some years it’s a pond in the low pasture of the Wendler’s property. Some years it’s an extensive Lake...” (Jacobson 1997)

The following photos show areas flooding in Salmon Creek Basin. (All photos are courtesy of Clara Jacobson.)



Photo left: West of Case Road, looking north from 93rd Avenue, April 1961. Flood water can be seen behind the swing set.

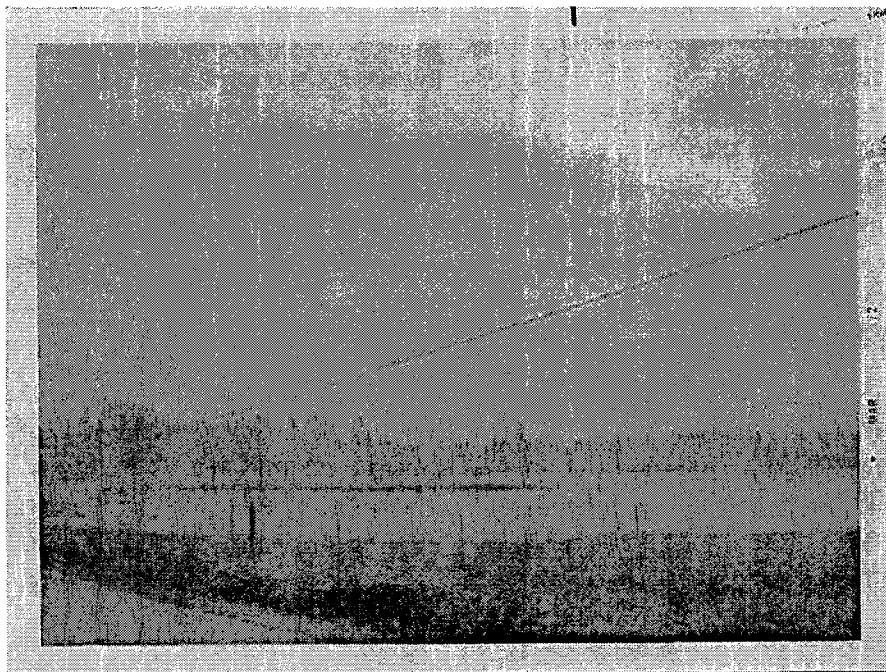


Photo left: West of Case Road, looking north from 93rd Avenue, March 1972.



Photo left: Case Road, south of 88th and north of 93rd, March 1972.

3.5 SUMMARY OF CHAPTER 3

Historical maps from all time periods indicate extensive wetlands in Salmon Creek Basin, and also indicate that natural drainage features in and around the basin, such as streams and wetlands, have been altered. As the population increased in the basin, people developed wetlands into farmlands, and later, to residential properties. During periods of above-average rainfall, people's farms and residential properties experienced flooding problems. Increased development, road building, and unmaintained culverts have likely also contributed to increased flooding over the years.

Thurston County residents began localized attempts to address flooding in Salmon Creek Basin in the late 1870s. Flood control efforts, authorized and unauthorized, have continued until present time. These efforts fall into four general categories:

1. Sanctioned, long-term flood control projects, such as Hopkins Ditch;
2. Emergency projects, such as the unnamed ditch in the vicinity of Pederson Place;
3. An interim project, known as the Hickman Sub-Area Drainage Improvement Project; and
4. Unrecorded or unauthorized projects of which official records could not be found.

Flood control efforts, including studies, have been sporadic and typically gain momentum immediately after significant flooding events. This sporadic cycle has repeated itself four times in the last century (including current efforts.). Citizens requested government assistance following the winters of 1954/55, 1966/67, 1971/72, and 1996/97 – 1998/99. Records suggest that most of these flood control efforts did not go beyond the study phase. It appears that failure to obtain funding, waning local interest, and the basin's natural limitations prevented these efforts from being realized.

The current planning effort is an attempt to assimilate the knowledge gained from past studies and maps with the most current technology to once again re-examine feasible alternatives for addressing flooding problems in Salmon Creek Basin.