City of Salem | April 2018

FLOODPLAIN MANAGEMENT PLAN

CITY OF Salem AT YOUR SERVICE

City of Salem
Floodplain Management Plan

Adopted ??
Revised April 2018

Prepared by

CITY OF Salem AT YOUR SERVICE

Public Works Department

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SPECIAL THANKS AND ACKNOWLEDGMENTS

The City of Salem developed this document through a community-wide planning process using plan templates provided by the Federal Emergency Management Agency. This project was completed through the work of two dedicated committees—the Floodplain Management Advisory Committee made up of citizens that provided input regarding needs of the community, and the Staff Technical Advisory Committee that coordinated the technical elements of the planning process. The City of Salem gratefully acknowledges the help of the following:

Floodplain Management Advisory Committee

Corey Benson

Rick Day

Kathleen Dewoina

Mike Erdmann

Mark Grenz

Ashley Howard

Jeff Leach

John Shepard

Steve Ward

Mark Weiprecht

Project Planning Team

Glenn Davis (Project Manager), City of Salem Public Works, Chief Development Engineer, Floodplain Administrator

Robin Dalke, City of Salem Public Works, Floodplain Management

Staff Technical Advisory Committee

Olivia Glantz, Community Development Urban Planning

Patricia Farrell, Public Works Natural Resources and Parks Planning

Heather Dimke, Public Works Public Information Officer

Kenny Larson, Community Engagement Manager

Justin Boyington, Flow Monitoring Analyst, Public Works Stormwater Operations

Claude Kennedy, Community Development, Building and Safety

Megan Furdson, Public Works Geographic Information System Mapping

Roger Stevenson, Fire Department, Emergency Manager

EXECUTIVE SUMMARY

Purpose

The *City of Salem Natural Hazard Mitigation Plan* prepares the City for the long term effects resulting from a variety of natural hazards. A natural hazard mitigation plan is required by the Federal Emergency Management Agency in order to receive federal funds for disaster projects. Flood Action Item #1 from the *City of Salem Natural Hazard Mitigation Plan* recommends creation of a floodplain management plan. This *Floodplain Management Plan* identifies flood-related hazards and establishes an action plan for how to mitigate those hazards.

Development of the Plan

The *Floodplain Management Plan* is the result of extensive collaboration by a citizen advisory committee, City staff, multiple public agencies, non-profit organizations, and other community groups. The plan development was led by a 10-member citizen advisory committee, which included representatives of a wide range of community interests. The citizen committee was assisted by a technical committee of City staff representing various divisions within the Public Works, Community Development, and Fire Departments.

Plan Goals

The goals of the *Natural Hazard Mitigation Plan* are also the goals that guided the overall direction of the *Floodplain Management Plan*; these goals are as follows:

Goal 1: Develop and implement mitigation activities to protect human life.

Goal 2: Protect existing buildings and infrastructure as well as future development from the impacts of natural hazards.

Goal 3: Strengthen communication and coordination of public and private partnerships and emergency services among local, county, and regional governments and the private sector.

Goal 4: Enhance economic resilience to reduce the impact on the local economy.

Goal 5: Preserve and rehabilitate natural systems to serve natural hazard mitigation functions and protect natural resources.

Action Items

The *Floodplain Management Plan* establishes 43 action items in six floodplain management categories: preventive activities, property protection activities, natural resource protection activities, emergency services measures, structural projects, and public information activities. (See **Appendix G**.) Through a wide variety of activities, these action items implement the plan's goals in order to mitigate flood-related hazards.

Plan Implementation

The plan implementation section details the process for ongoing implementation, evaluation, and modification of the *Floodplain Management Plan.* The City's Public Works Department is responsible for overseeing the annual review process with assistance from an advisory committee. The *Floodplain Management Plan* is scheduled for a complete update every five years.

INTRODUCTION

Purpose

Salem is home to an extensive system of natural waterways. As a result, Salem is susceptible to major flood events that pose threats to life and safety and that cause significant property damage. Though a number of government agencies and community groups attempt to mitigate flood hazards, a floodplain management plan integrates the community's efforts into one comprehensive program of activities. A floodplain management plan serves the following beneficial purposes for the Salem community:

- Identify existing and future flood related hazards and their causes.
- Ensure that a comprehensive review of all possible activities and mitigation measures are considered so that the most appropriate solutions will be implemented to address the hazard.
- Ensure that the recommended activities meet the goals and objectives of the community, are in coordination with land-use and comprehensive planning, do not create conflicts with other activities, and are coordinated to reduce the costs of implementing individual activities.
- Ensure criteria used in community land-use and development programs account for the hazards faced by existing and new development.
- Educate residents and property owners about hazards, loss reduction measures, and the natural and beneficial functions of floodplains.
- Build community support for activities and projects that prevent new problems, reduce losses, and protect the natural and beneficial functions of floodplains.

Regulatory Context

Natural Hazards Mitigation Plan

Federal regulations require that jurisdictions maintain an approved natural hazard mitigation plan in order to receive federal funds for mitigation projects. Local and federal approval of such a plan ensures that the local jurisdictions remain eligible for pre- and post-disaster mitigation project grants. A primary goal of a natural hazards mitigation plan is to reduce future loss of life and damage to property resulting from natural hazards.

The 2017 *City of Salem Natural Hazard Mitigation Plan* (NHMP) indicates that Salem is highly vulnerable to flood hazards. The NHMP identifies two action items related specifically to flood hazards:

FL1. Update, Maintain, and implement flood actions via a floodplain management plan with FEMA's Community Rating System guidelines.

FL2. Improve the City of Salem's National Flood Insurance Program (NFIP) CRS rating class to reduce NFIP premiums.

The primary regulatory function of this *Floodplain Management Plan* is to implement Flood Action Item FL#1 of the NHMP. This *Floodplain Management Plan* also serves as a guide for implementation of Flood Action Item FL#2, and it will direct the City's floodplain management activities to better address flood-related hazards throughout many areas of Salem and the surrounding community. Further details about the CRS are included below.

Community Rating System

FEMA's Community Rating System program reduces flood insurance premiums for communities that implement floodplain management activities in excess of the minimum federal standards. Salem reached a CRS rating of Class 5 in 2015. By preparing a floodplain management plan, Salem will be eligible to earn additional CRS credits and will benefit from an action plan that will guide further improvement of its CRS rating.

Initial Planning Process

The *Floodplain Management Plan* was initially adopted on June 10, 2013. In order to remain eligible for CRS credit, FEMA requires that the plan must be updated at least every five years. The timing of this Plan Update follows the Natural Hazards Mitigation Plan update, which was approved by FEMA on January 5, 2018.

Salem's CRS cycle verification visit by the Insurance Services Office is scheduled for April 26, 2018, and this Plan Update is an integral part of the verification process. The format of this Plan Update follows the process described in activity 510, "Floodplain Management Planning," in the 2017 CRS Coordinator's Manual.

THE PLANNING PROCESS

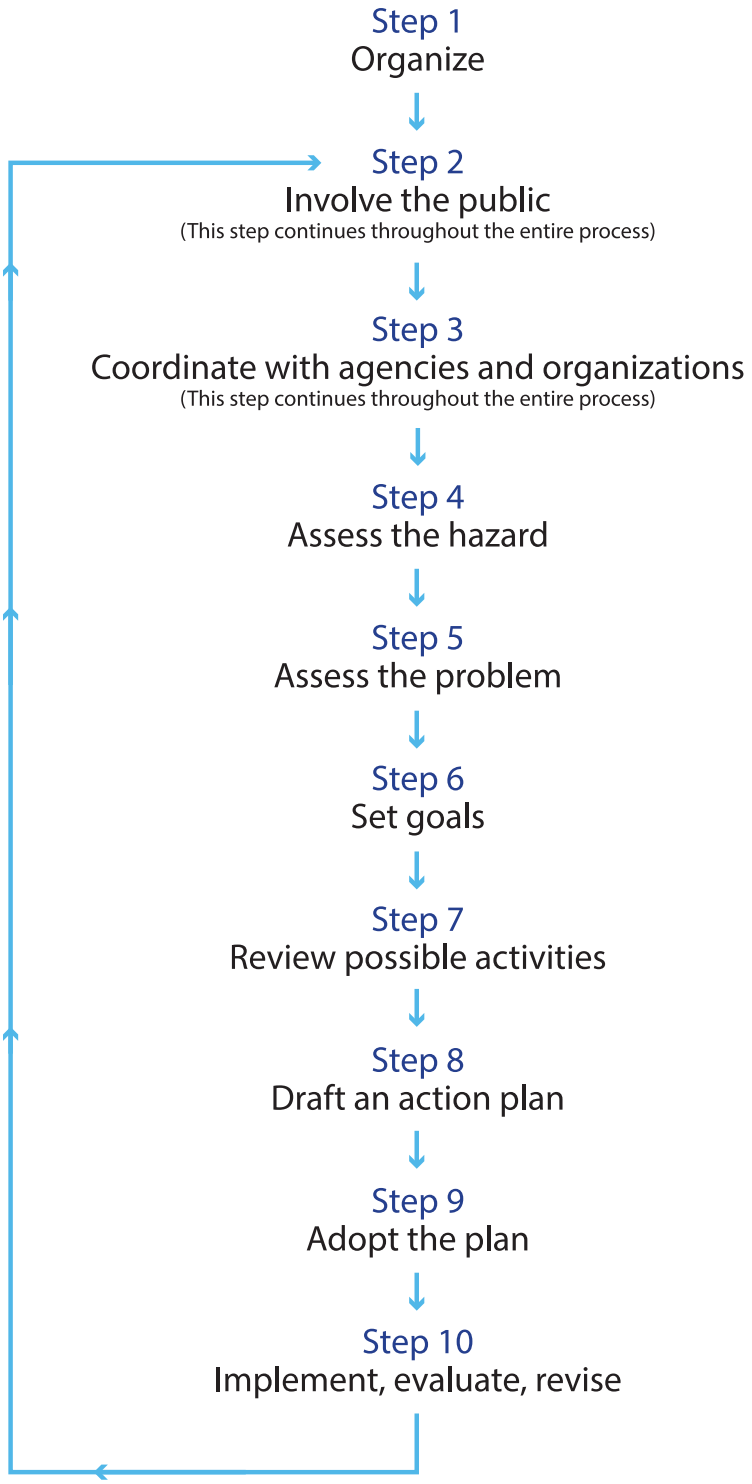


Figure 1: Ten Steps in the Planning Process

Organization of Plan

The organization of this plan document is based on FEMA's 10-step planning process:

Floodplain Management Plan Section	Planning Step	
Introduction	1	Organize
Public Involvement	2	Involve the Public
Coordination	3	Coordinate
Hazard Assessment	4	Assess the Hazard
Problem Evaluation	5	Assess the Problem
Setting Goals	6	Set Goals
Review of Possible Activities	7	Review Possible Activities
Action Plan	8	Draft an Action Plan
	9	Adopt the Plan
	10	Implement, Evaluate, and Revise

Table 1: FEMA's 10-Step Planning Process

PUBLIC INVOLVEMENT

Solicitation for Committee Members

In January 2018, a notice of solicitation for committee members was delivered to key stakeholders who have been involved in floodplain management, stormwater, and emergency management-related committees in recent years. Solicitation for committee members continued through February 2018.

Floodplain Management Advisory Committee

The members of the Floodplain Management Advisory Committee are given in **Table 2** on page 6. The Project Manager served as the Committee Chair throughout the planning process.

Member	Personal/Professional Affiliation
Glenn Davis, P.E., C.F.M.	City of Salem Public Works Chief Development Engineer, Community Rating System Coordinator, Project Manager, and Committee Chair
Rick Day	Business Owner, Old Castle Precast, Advantage
Corey Benson	Local Insurance Agent, Farmers
Mike Erdmann	CEO, Home Builder's Association of Marion and Polk Counties
Kathleen Dewoina	Real Estate Broker, Berkshire Hathaway, West Salem Neighborhood Association
Jeff Leach	Member, Southeast Salem Neighborhood Association Board
John Shepard	Resident, Business Owner
Ashley Howard	Real Estate Broker, Legacy Real Estate
Mark Grenz	Owner, MultiTech Engineering
Steve Ward, P.E.	Owner, Westech Engineering, Engineer
Mark Wieprecht	Member, Southeast Salem Neighborhood Association Owner of Flood-Damaged Property, Retired Architect

Table 2: Floodplain Management Advisory Committee Members

City Staff Participation

The Plan Update Committee included representatives from various departments as shown in Table 3.

Committee Member	Representing
Robin Dalke	Public Works Floodplain Management
Olivia Glantz	Urban Planning
Patricia Farrell	Natural Resources Planning
Heather Dimke	Public Information Officer
Kenny Larson	City Manager's Office
Claude Kennedy	Building and Safety
Justin Boyington	Public Works Stormwater Operations
Megan Furdson	GIS/Mapping
Roger Stevenson	Emergency Management

Table 3: Floodplain Management Plan Update Committee Members

Advisory Committee Meetings

The project planning team contacted FEMA and confirmed that three committee meetings were sufficient for completing this Plan Update, according to FEMA guidelines. Committee meetings followed the 10-step planning process recommended by FEMA for floodplain management planning, along with separate planning processes recommended each for the Flood Information and Outreach Plan and for the Flood Insurance Plan. Each meeting focused primarily on two or more specific steps of FEMA's planning process. Agendas were provided to committee members before each meeting. Agendas were posted to the City's floodplain management website, and notices of upcoming meetings were posted on the City's calendar of events web page.

Appendix C includes all meeting agendas, sign-in sheets, handouts, and minutes. Committee meeting dates and topics are summarized in **Table 4**.

Date	Main Subjects
February 2, 2018	Organization Public Involvement Coordination Hazard Assessment Problem Assessment
February 26, 2018	Setting Goals Review Possible Activities
March 12, 2018	Review Scored Activities Draft Action Plan Recommendation to Council

Table 4: Committee Meeting Topics

Public Meetings and Outreach

At the beginning of the planning process, the project manager met with the South Gateway Neighborhood Association to obtain public input on flooding concerns and possible solutions in key floodplain areas of South Salem. This group was selected because of recent flooding in the Battle Creek basin. A presentation was held at a public meeting on January 11, 2018, and follow-up discussions were coordinated with the project planning team.

A web page update with information explaining the planning process, meeting times, agendas, and the draft Plan Update was posted to the City of Salem City Committees web page.

The draft *Floodplain Management Plan* was completed in April 2018, and was submitted as an information report at the City Council's public meeting on April 9,

2018. Prior to the meeting, City staff mailed public notices to interested stakeholders (listed in **Appendix A**) and published the draft Plan Update on the City's website.

COORDINATION

Other Agencies and Organization

The Project Planning Team generated a list of affected jurisdictions and organizations based on FEMA guidelines and local notification lists on file with City staff. An outreach letter was sent to affected jurisdictions in February, 2018. The outreach letter and mailing list are included in **Appendix E**. No comments were received from these jurisdictions during the comment period.

Review Of Existing Reports

City of Salem Natural Hazard Mitigation Plan

FEMA approved the City of Salem Natural Hazard Mitigation Plan as adopted on December 11, 2017, under City Resolution 2017-48. The work was performed in cooperation with Oregon Partnership for Disaster Resilience at the University of Oregon's Community Service Center.

A natural hazards mitigation plan provides communities with a set of goals, action items, and resources designed to reduce risk from future natural disaster events. With re-adoption of the plan, the City of Salem maintains its eligibility to apply for federal funding for natural hazards mitigation projects. The local planning process involved a wide range of representatives from city governments, fire departments, and Salem Hospital, among others.

The NHMP identifies Salem to be highly vulnerable to flood hazard risks. It also documents flooding of Salem and surrounding communities on several occasions in the past that warranted federal disaster declarations—most recently in January 2012, February 2014, and December 2015.

The 2012 NHMP recommends two flood-related action items:

FL1. Update, maintain, and implement flood actions via a floodplain management plan in accordance with FEMA's Community Rating System guidelines.

FL2. Improve the City of Salem's National Flood Insurance Program (NFIP) CRS rating class to reduce NFIP premiums.

Marion County Natural Hazards Mitigation Plan

Relevant hazard mitigation elements of the *Marion County, Oregon, Multi-Jurisdictional Natural Hazards Mitigation Plan*, dated June 2016, were incorporated into the Salem NHMP. Page 2-16 of the Marion County plan includes additional details regarding flood damage resulting from recent floods.

Salem Area Comprehensive Plan

The *Salem Area Comprehensive Plan,* November 2015, is the long-range plan for guiding development in the Salem-Keizer urban area for the next 20 years. The Natural Resource goal of the *Salem Area Comprehensive Plan* is "To conserve open space, protect natural, historic, cultural and scenic resources, and to protect life and property from natural disasters and hazards" (page 46).

Regarding flood hazards, the *Salem Area Comprehensive Plan* specifies:

> *Development in the floodplain shall be regulated to preserve and maintain the capability of the floodplain to convey the flood water discharges and to minimize danger to life and property (page 47).*

Stormwater Master Plan

The Salem *Stormwater Master Plan* was adopted by City Council in September 2000 as a detailed part of the *Salem Area Comprehensive Plan*. The plan includes three major elements: (1) descriptions of the drainage basin for each major creek system; (2) a Drainage System Improvement Plan; and (3) a Stormwater Management Program Plan.

As the *Stormwater Master Plan* indicates, several of Salem's major creek systems are located in multiple jurisdictions. The drainage basins for most creek systems within Salem originate in rural areas outside the Urban Growth Boundary (UGB) including Battle, Croisan, Glenn-Gibson, Little Pudding, Mill, and Pettijohn-Laurel. Most Salem creeks discharge into the Willamette River within the Salem-Keizer UGB. However, a few creek systems can affect downstream communities not located along the Willamette River: Battle Creek discharges into Mill Creek near the City of Turner; Claggett Creek discharges near the City of Keizer; and Little Pudding River discharges into the Willamette River near Canby.

A component of the *Stormwater Master Plan,* the "Drainage System Improvement Plan," recommends construction projects to improve storm drains, culverts, open channels, streams, detention storage, and water quality facilities. This element of the plan identifies the need for 289 construction projects at a cost of $217 million (year 2000 dollars). The majority of these projects had not been constructed as of 2012, mostly due to lack of funding.

The "Stormwater Management Program Plan," also a component of the *Stormwater Master Plan,* included the broad elements needed for a successful stormwater management program, which evaluates financial needs, information gaps, adequate

levels of operation and maintenance, public involvement, specific stormwater problems, and cost/benefit analyses. This plan component emphasizes environmental stewardship, stormwater planning, long-term vision, cost-effective solutions, implementation, and financial planning. The Stormwater Management Program Plan includes a policy plan for specific topics of quantity, quality, policies, operations, education, and financing.

Salem is currently undergoing a process to update its Stormwater Master Plan. One key issue affecting the plan's policies relates to how flood inundation data may be used for floodplain management. In 2017, the Salem City Council directed a task force be convened to consider whether and how the City should use improved data and modeling methods to update Salem's floodplain maps. The Task Force included subject matter experts; representatives from municipal agencies; leaders from the engineering, development, and business communities; and representatives from potentially affected watersheds and neighborhood associations. The Task Force held three meetings (December 8, 2017, December 20, 2017, and January 29, 2018), all of which were open to the public.

Salem Transportation System Plan

The Salem *Transportation System Plan* (TSP), dated February 2016, provides a framework of goals, objectives, and policies that guides Salem's transportation system. The TSP recommends how Salem invest its resources in future transportation programs and infrastructure to meet anticipated travel demands.

Pursuant to an Action Item in the 2013 Floodplain Management Plan, the TSP added the following paragraph related to critical routes:

> *The City's arterial street system connects people to critical facilities as well as providing emergency response and evacuation routes in the event of natural hazards. Planning for and maintaining a robust network of critical routes supports the health and safety of the community. Identification of transportation improvement projects for both existing and new facilities should take into consideration the function of the street as a critical route for emergency management purposes. Data available to support this analysis includes identification of street segments that are prone to flooding and information gained through bridge inspection reports. Future transportation projects should consider opportunities to reduce the potential for critical routes to be blocked during major floods or other hazards.*

Stormwater Management Program Plan

The Stormwater Management Program Plan (SWMP) was originally prepared in 1996 as part of the process for Salem to obtain its initial Municipal Separate Storm Sewer System (MS4) permit from the Oregon Department of Environmental Quality (DEQ) in December 1997. The City's SWMP has been reviewed and updated on several occasions in conjunction with applications for renewal of the MS4 Permit.

The most recent update of the SWMP is dated April 2011, which incorporates the most recent MS4 permit requirements.

The main purpose of the SWMP is to address four basic elements of the MS4 permit:

1. Structural and source control Best Management Practices to reduce pollutants from residential and commercial areas

2. Program to detect and remove illicit discharges and improper disposal into the storm sewer system

3. Program to monitor and control pollutants from industrial facilities

4. Program to reduce pollutants in stormwater discharges from construction sites

The SWMP includes detailed tasks, goals, and tracking measures for accomplishing each of the four basic elements of the MS4 permit. A number of these tasks were incorporated into Action Items within this *Floodplain Management Plan*.

Pringle Creek Watershed Management Plan

In June 2008, the City of Salem completed the *Pringle Creek Watershed Management Plan* (PCWMP). This plan initiated an overall watershed planning program for Salem's urban watersheds with the goal of developing a framework for improving the city's urban watershed health and for fostering community support and ownership of watershed protection and restoration.

The goals for the pilot *Pringle Creek Watershed Management Plan* included promoting community-wide support for funding urban watershed improvements, creating short-term and long-term visions for a healthy urban watershed, restoring watershed functions in an urban environment, and assessing what resources are needed to implement restoration and protection actions.

This plan includes a comprehensive list of recommendations with the aim of guiding City departments to meet the City's long-term vision for watershed health. This plan also recommends detailed tasks for implementation based on priority, organizational responsibility, cost, and funding sources.

Flood Insurance Study

The primary source for flooding patterns and flood elevation data in Salem is FEMA's *Flood Insurance Study: Marion County, Oregon, and Incorporated Areas* (FIS), dated January 2003. The FIS includes detailed flood profiles for all major waterways in Salem, including Mill Creek, Shelton Ditch, Pringle Creek and its forks, Battle Creek, Powell Creek, Claggett Creek, Croisan Creek, Gibson Creek, and Glen Creek.

The FIS includes a description of each community within Marion County and their respective flood history, risks, and protection measures. The study identifies Salem's

primary flood risks to be in December and January, caused by large storms moving inland from the Pacific Ocean. Salem is protected by two diversion structures: one diverting Mill Creek flows into Shelton Ditch, and a second diverting flows from West Fork Pringle Creek to Middle Fork Pringle Creek. The FIS is comprehensive of all major waterways in Salem; significant additional study is not warranted.

TMDL Implementation Plan

Salem (City) is a Designated Management Agency (DMA) under the 2006 Willamette Basin Total Maximum Daily Load (TMDL) and the 2008 Molalla-Pudding TMDL and is responsible for development and implementation of strategies to minimize and address the discharge of TMDL pollutants. As a DMA, the City developed an updated 2016 TMDL Implementation Plan (TMDL Plan) to address requirements of the Willamette Basin TMDL. This plan includes strategies and activities that the City is proposing to continue compliance with the TMDLs in accordance with DEQ's 2006 guidance document and Oregon Administrative Rule (OAR) 340-042-0080.

The TMDL Plan includes the following: (1) a regulatory background and summary related to the designation and definition of point and nonpoint sources in TMDLs; (2) the City's management strategies for bacteria, total suspended solids (TSS), and mercury as point source pollutants addressed under the City's NPDES Municipal Separate Storm Sewer System (MS4) permit; and (3) management strategies, implementation time frames, and performance monitoring specific for temperature (as a nonpoint source pollutant not otherwise addressed by NPDES MS4 permits).

The management strategies for point and nonpoint sources were reviewed and incorporated into the Review of Possible Activities as appropriate.

HAZARD ASSESSMENT

Overview

An assessment of all natural hazards is included in the Salem NHMP. A detailed description of Salem's flood-related hazards is provided below.

The City of Salem features the Willamette River, smaller tributaries, and streams that are susceptible to annual flooding events that pose threats to life and safety and cause significant property damage. The streams include Battle Creek, Cinnamon Creek, Claggett Creek, Clark Creek, Croisan Creek, Davidson Creek, Gibson Creek, Glenn Creek, Golf Creek, Jory Creek, Laurel Creek, Little Pudding, Mill Creek, Mill Race, Pettijohn Creek, Powell Creek, Pringle Creek, Scotch Creek, Shelton Ditch, Waln Creek, and Winslow Creek. Salem's flood events often occur when warm weather and heavy rains melt snow at higher elevations which flood local streams.

Historic Flood Events

The largest flood of the Willamette River on record occurred in 1861; the next significant flood occurred in 1890. In more recent times, many residents may remember the Christmas flood of 1964, which was rated "approximately a 100-year flood" by FEMA and may be the most damaging in Oregon's history. The Christmas flood of 1964 caused $157 million in damage, and 20 Oregonians lost their lives.

The Christmas flood occurred as a result of two storms, one on December 19, 1964, and the other on January 31, 1965. These storms brought record-breaking rainfall, and the resultant flooding was exacerbated by near-record early season snow depths. The Willamette River crested nearly ten feet above flood stage, and many other streams in Salem overflowed their banks. The floodwaters rendered the sewage treatment plant inoperable, causing raw sewage to be channeled directly into the Willamette River. One hundred and twenty-one patients were evacuated from Salem Memorial Hospital, and 15 families in the Turner and Salem areas were evacuated from their homes.

Since 1964, major storm events occurred in January 1974, February 1986, February 1996, November 1996, and January 2012. In February 1996, the Salem area saw nearly 100-year flood levels, causing flooding in both rural and urban areas. Damages to city businesses, residences, and infrastructure were tremendous, and most of the city's residents were affected by the substantial impact on the transportation system, the loss of potable water, and the damage to personal property. Claims filed under

FEMA's National Flood Insurance Program from Salem residences and businesses accounted for almost one-third of the claims filed for Marion County in 1996.

During the most recent event in January 2012, some areas of south Salem received over 9 inches of rain within a 5-day period. Heavy rainfall combined with melting snow caused substantial flooding in the Battle Creek, Mill Creek, Pringle Creek, and Croisan Creek basins. Approximately 300 people were evacuated from their homes, and 64 city streets were closed due to high water.

Causes of Flooding in Salem

Flooding occurs when climate (or weather patterns), geology, and hydrology combine to create conditions where river and stream waters flow outside of their usual course and overflow their banks. In Salem, the combination of these factors, augmented by ongoing development, create chronic seasonal flooding conditions.

Flooding is most common from November through March when storms from the Pacific Ocean, 60 miles away, bring intense rainfall to the area. Salem receives approximately 38 inches of rain on average each year. Larger floods result from heavy rains that continue over the course of several days, worsened by snow melt, at a time when the soil is near saturation from previous rains. Frozen topsoil also contributes to flooding.

Riverine flooding and urban flooding are the two types of flooding that primarily affect Salem. Riverine flooding is the over-bank flooding of rivers and streams, a natural process which adds sediment and nutrients to fertile floodplain areas. Urban flooding results from the conversion of land from fields or woodlands to parking lots and roads, through which the land loses its ability to absorb rainfall.

Characteristics

The principal types of floods that occur in Salem include riverine, shallow area, and urban floods. Riverine flooding is the most common type of flooding in Salem; it typically occurs on large rivers, such as the Willamette River, and usually results from large storms or prolonged wet periods. Portions of Salem that are located along water bodies have the potential to experience riverine flooding after spring rains, heavy thunderstorms, or rapid runoff from snow melt. Riverine floods can be slow- or fast-rising, but usually develop over a period of days. The danger of riverine flooding occurs mainly during the winter months, with the onset of persistent, heavy rainfall, and during spring, with melting of snow in the Coast Range. Shallow area floods are a special type of riverine flooding. FEMA defines a shallow area flood hazard as an area that is inundated by a 100-year flood with a flood depth of 1 to 3 feet. Such areas are generally flooded by low-velocity sheet flows of water.

Urban flooding occurs where land has been converted from open space to areas consisting of homes, parking lots, and commercial, industrial, and public buildings and structures. In such areas the previous ability of water to filter into the ground

is often prevented by the extensive impervious surfaces associated with urban development. During periods of urban flooding, streets can rapidly become swift moving rivers, and basements and backyards can quickly fill with water. Storm drains and smaller creeks can back up due to yard waste and debris. Clogged storm drainage systems often lead to further localized flooding.

Location/Extent

Salem has more than 4,000 acres of floodplain and approximately 3,000 individual parcels that are partially or entirely located within the floodplain. The most significant of the FEMA-determined floodplains and floodways either surround the southern side of the Willamette River west of Salem, or are within the greater Mill Creek/Pringle Creek watershed.

Properties in and near the floodplains in Salem are subject to frequent flooding events. Since flooding is such a pervasive problem throughout the city, many residents have purchased flood insurance to help recover from losses incurred from flooding events. (See **Map 1** on page XX.)

Other Areas of Flooding

Repetitive Loss Areas

Salem has five repetitive loss properties in four distinct geographic areas (see Maps 2 and 3 on page XX). Repetitive loss properties are those properties for which two or more claims of more than $1,000 have been paid by the NFIP within any 10-year period.

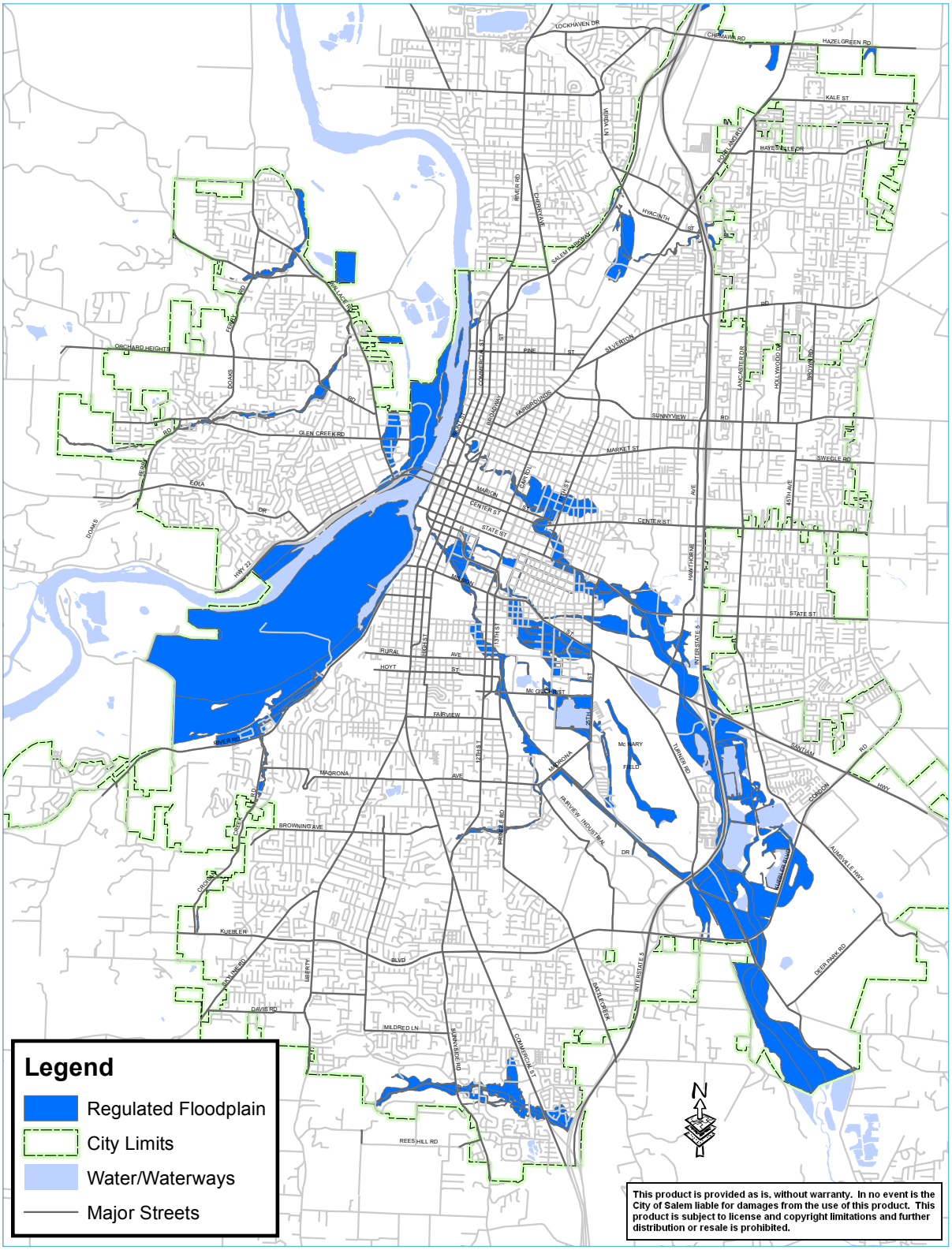
Salem Industrial Drive–Flooding hazards in the repetitive loss area of Salem Industrial Drive NE were mitigated in 2007 with the construction of Bill Frey Drive NE and channel improvements to Claggett Creek. This repetitive loss area is near a City-owned natural area along Claggett Creek, which was formerly operated as a gravel pit before being acquired by the City for natural and beneficial use.

Bellevue Street–This area experienced repetitive losses because of two structures within Shelton Ditch. One structure was a footbridge that experienced damage during the 1996 flood, which has been replaced at a higher elevation that does not obstruct flood flows. The second structure is the Winter Street Bridge, which is has been replaced.

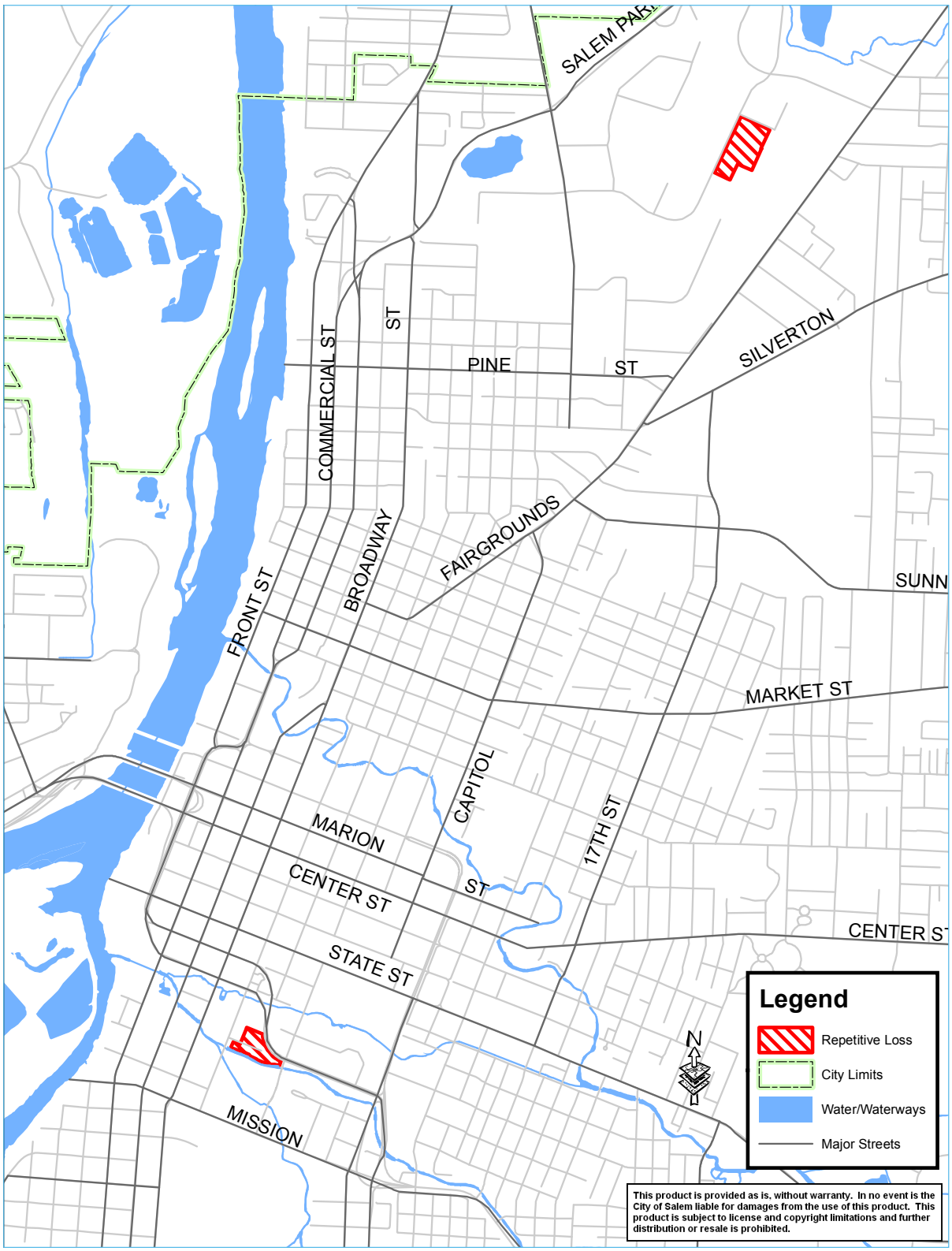
State Street–This RLA was added in 2016 based on two claims in the area from flood events in 2012 and 2015. This area has a number of pre-FIRM structures located in or near the floodway boundary. Based on discussions with operations staff, it appears the damage to this building has been limited to crawlspace flooding.

Marstone Court–This RLA was added in 2016 based on two claims in the area from flood events in 2012 and 2015. Flooding concerns have been attributed to an undersized culvert on the portion of Waln Creek that flows under Woodside Drive and

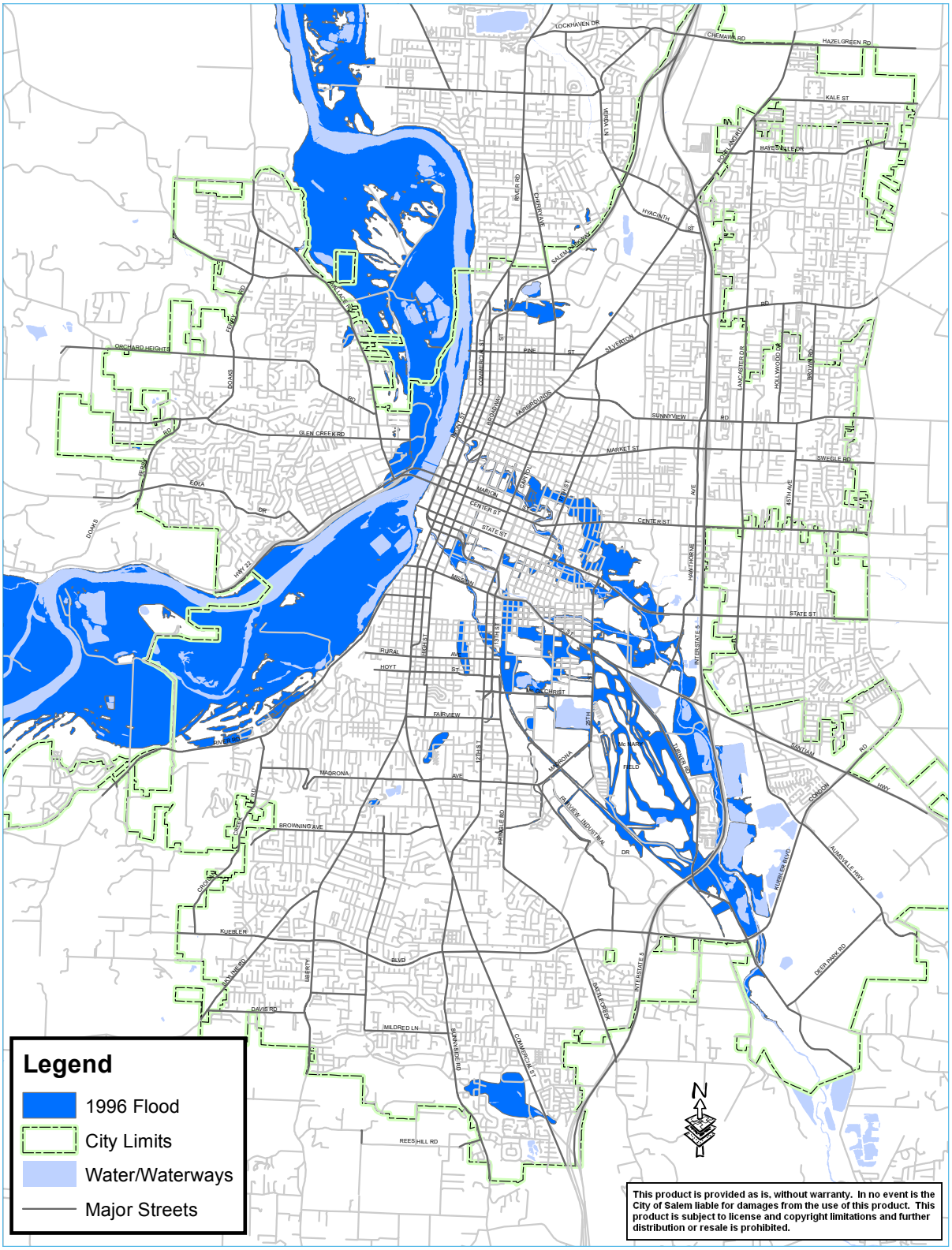
Map 1: Regulated Floodplain



Map 2: Repetitive Loss Area



Map 3: Flood Inundation 1996



capacity limitations from an above-ground detention system that was designed in the cul-de-sac of Marstone Ct. A culvert upgrade project was completed in 2015 by the City.

Flood Inundation Maps

Subsequent to the flood event of 1996, City staff documented flood inundation areas and generated flood inundation maps (see Map 3 on page 19) on the City's Geological Information System (GIS). The data from the 1996 flood inundation maps were used by FEMA to generate new Flood Insurance Rate Maps (FIRMs) in 2000.

Other Flood Hazards

Inventory of Levees

The Keizer River Wall protects the City of Keizer from Willamette River flooding. This wall was inspected by the US Army Corps of Engineers in 2010, as described in an inspection report titled *Keizer River Wall, Flood Damage Reduction Project, Periodic Inspection No. 1.* Because this flood wall is located sufficiently downstream of Salem to prevent backwater effects, this flood protection measure does not appear to affect the flood hazards within the city limits of Salem.

The FIS describes that an earthen berm protects the Sun Retirement Center along West Fork Pringle Creek at 12th Street SE. This berm appears to restrict localized flooding for one property along 12th Street Cutoff SE.

Inventory of Dams

The *Marion County, Oregon, Multi-Jurisdictional Natural Hazard Mitigation Plan* identifies two dams with high hazard potential—Big Cliff Dam and Detroit Dam—that are located on the North Santiam River, which ultimately discharges into the Willamette River upstream of Salem.

> *Dams play a crucial role in power generation and water control mechanisms for the region. Dam failures can occur rapidly and with little warning. Fortunately most failures result in minor damage and pose little or no risk to life safety. However, the potential for severe damage still exists. The Oregon Water and Resources Department has inventoried all dams located across Marion County and Salem. The "hazard level" estimates the amount of damage that could occur in the event of dam failure.*
>
> *Marion County has over 56 dams, and two are ranked at a high hazard level: Detroit Dam and Big Cliff Dam. Detroit and Big Cliff are hydroelectric dams that control the flow of water on the Santiam River, providing a major boating and recreational area. However, both dams are considered a major hazard for the large population downstream that would be at risk in the event of a dam failure, including populations in Salem. Besides the Detroit and Big Cliff dams, other major dams*

*surrounding the Salem area include Waconda and Silverton (*Salem Natural Hazard Mitigation Plan, *2017, p. C-32).*

Potential for Increased Flooding

Changes in Floodplain Development

Goal N (Scenic And Historic Areas, Natural Resources And Hazards) of the *Salem Area Comprehensive Plan* is "to conserve open space, protect natural, historic, cultural and scenic resources, and to protect life and property from natural disasters and hazards." Referencing Goal N: Flood Hazards, the *Salem Area Comprehensive Plan* also states, "Development in the floodplain shall be regulated to preserve and maintain the capability of the floodplain to convey the flood water discharges and to minimize danger to life and property."

Economic and residential demands for vacant land are analyzed in the *Salem Economic Opportunities Analysis, Table 7,* and the *Salem Housing Needs Analysis, Table 12.* These demands show that there is a potential shortage of multi-family residential and commercial land, and a potential surplus of industrial and single family residential land. Therefore, flood-prone areas in multi-family and industrial areas will be more likely to encroach into floodplain areas because of the deficiency of available land. These studies do not suggest that development patterns within the floodplain will vary significantly in the future from past trends.

The *Pringle Creek Watershed Management Plan* addresses the impacts of future development in the Pringle Creek watershed and provides a reasonable summary for other watersheds in Salem:

> *Encroachment on and Expansion in the Floodplain – The fertile soil and scenic location frequently make floodplains popular locations for development. However, streams are not static and it is often necessary to modify the floodplain to protect buildings and infrastructure. The most common protection mechanism is to fill the floodplain, raising the building elevation to beyond the reach of frequent flooding events. This solves the local flooding issue but the fill reduces the capacity of the floodplain and intensifies downstream problems. Other flood control measures such as levees, armoring, and channelization can all produce the same effect, as well as undersized culverts and bridges.*
>
> *Pringle Creek contributes stormwater to the Willamette River just upstream of downtown Salem. On-site detention is already required of new development. However, additional flow controls including additional regional detention facilities could create a more natural hydrograph pattern for Pringle Creek and reduce backwater effects from the storm-swollen Pringle Creek flows trying to outfall into an equally swollen Willamette River. The City is not currently prioritizing regional detention facilities based on the findings from the Regional Detention*

> *Facilities Study; however the most recent Stormwater Management Plan states that regional facilities would be considered as opportunities arise (HDR Engineering Inc. and Barney and Worth, Inc.,* Pringle Creek Watershed Management Plan, *2008, Section 3.3.6, page 3-17).*

Floodplain development may be affected significantly by federal changes being proposed to the National Flood Insurance Program to mitigate impacts to endangered species in Oregon. The Oregon Department of Land Conservation and Development's website states the following regarding the federal process:

> *On April 14, 2016 the National Marine Fisheries Service (NMFS) delivered to the Federal Emergency Management Agency (FEMA) a jeopardy biological opinion (BiOp) on implementation of the National Flood Insurance Program (NFIP) in Oregon. The BiOp includes a set of recommendations for reducing the impact of NFIP related development on salmon.*
>
> *A BiOp is a scientific judgment about the potential effects of a federal action on an ESA listed species. Although the document is called an "opinion," it has the force of a decision document. FEMA must respond to the findings in the BiOp. This BiOp is a "jeopardy opinion" to which NMFS has attached a set of recommendations, or "reasonable and prudent alternatives" (RPAs) to FEMA's February 2013 proposal for reducing the impacts of the NFIP on salmon. Essentially, NMFS has concluded that development in floodplains displaces important habitat, which salmon utilize during flood events, and contributes to instream water quality and hydrologic conditions that are unfavorable for fish….*
>
> *Ultimately, NFIP communities in the 31 counties with ESA listed salmonids will need to increase habitat protections. Development that degrades floodplain functions includes: clearing of native riparian vegetation; increases in impervious surface; displacement or reduction of flood storage via fill or structures; interruption of habitat forming process; increases of pollutant loading in receiving water bodies; and increases in stormwater. The new expectations will be described by FEMA guidance, which will be drafted over the next several months. (http://www.oregon.gov/LCD)*

Development in the Watersheds

The *Salem-Keizer Housing Needs Analysis,* dated December 2014, estimates a population increase within the Salem-Keizer UGB will grow from 210,035 people in 2015 to 269,274 people in 2035, adding 59,239 people over the 20-year period (page 15). The analysis shows that Salem has approximately 5,300 acres of buildable residential land, where approximately 1,700 acres is considered surplus land.

Similarly, the *Salem Economic Opportunities Analysis* also estimates that a majority of the buildable nonresidential land in the Salem UGB will be developed by 2032.

The *Stormwater Master Plan* describes the size of each drainage basin within Salem, the portion located within the UGB, and its potential for development (based on development patterns and urban/rural land use) as indicated in **Table 5.**

Watershed	Size (Sq Miles)	Ratio within UGB	Development Potential
Battle Creek	10.0	33%	High
Croisan Creek	4.9	50%	High
East Bank	2.0	100%	Low
Glenn Gibson	10.4	50%	High
Little Pudding	9.1	Not specified	Medium
Lower Claggett	1.5	Not specified	Low
Mill Creek	110	8%	Medium
Pettijohn Laurel	2.6	Less than 50%	Low
Pringle Creek	13.3	100%	Medium
Upper Claggett	7.4	100%	Low
West Bank	2.3	Nearly 100%	Medium
Willamette Slough	4.8	Not specified	Low

Table 5: Watershed Potential for Development

The *Stormwater Master Plan* analyzed stormwater flows based on anticipated flows within 20 years of creation of the plan. However, 100-year inundation maps were not created as part of the 2000 plan. The updated Stormwater Master Plan is anticipated to include inundation maps, first for the Battle Creek Basin, then subsequently for the Mill and Pringle Creek basins.

Climate Change

The Third Oregon Climate Assessment Report, dated January 2017, by the Oregon Climate Change Research Institute summarizes recent literature on climate change science and impacts as it relates to the state of Oregon. Precipitation projections vary based on the excerpts below:

> *Annual precipitation is projected to increase slightly, although climate scientists have less confidence in precipitation projections than temperature projections. Summers are expected to warm more than the annual average and are likely to become drier. Extreme heat and extreme precipitation events are expected to become more frequent.*

In many respects, 2015 was a notable year in its record warmth and snowpack drought that resembles what climate model projections indicate would be normal conditions by middle of this century (page 4).

Likewise, averaged over the Pacific Northwest, there was no significant trend in annual precipitation from 1901–2012, although a positive trend was noted for spring. Interannual-to-decadal variability dominated any long-term signal in precipitation. Future precipitation trends are expected to continue to be dominated by large natural variability (fig. 2.3). Still, annual precipitation in Oregon is projected to increase on average by 1.9% by the 2050s, and 3.4% by the 2080s under the low emissions pathway. Under the high emissions pathway, increases in annual precipitation are a bit larger for each time period: 2.7%, and 6.3%, respectively. However, the range of responses from individual global climate models surrounds zero (table 2.3). Larger changes are projected for seasonal precipitation. Oregon's already dry summers are projected to become drier while winter, spring, and fall are projected to become wetter, albeit some models project increases and others project decreases in each season (page 9).

Other Natural Hazards

The *City of Salem Natural Hazard Mitigation Plan* (NHMP), dated December 11, 2017, describes all natural hazards that affect Salem in addition to flooding. The NHMP includes detailed descriptions of the severity of each hazard, history of past events, and the probability of future events in the Risk Assessment portion of the plan. The following hazards are addressed in the plan:

- Drought
- Earthquake
- Extreme heat
- Flood
- Landslide
- Wildfire
- Volcano
- Windstorm
- Winter storm
- Hazardous materials incident

For the Plan Updated purposes, the committee recommends referencing Section 2: Risk Assessment of the adopted NHMP for more detailed information on each hazard.

PROBLEM EVALUATION

Vulnerability to all hazards is addressed in the NHMP, which assesses Salem to be highly vulnerable to and highly probable of experiencing flood hazards. This chapter evaluates flooding problems related to life safety, public health, critical facilities and infrastructure, economy and major employers, damage to buildings and natural areas, land development impacts, and potential for increased flooding.

Life Safety

The most immediate threats to life safety are flash floods on Salem's smaller waterways, especially the Battle Creek and Glen-Gibson Creek systems. These waterways can reach flood stage in a matter of hours, so immediate warning systems and prompt evacuation procedures are critical to life safety. Flood-prone properties along Battle Creek, Gibson Creek, and the upper reaches of Pringle and Glen Creeks have mostly residential uses. Land along lower reaches of Glen Creek are primarily commercial developments; properties at the lower reaches of Pringle Creek have a variety of land uses.

The Mill Creek system (including Shelton Ditch) poses the greatest flood hazard city-wide, encompassing a significant portion of central and southeast Salem. Because of the size of Mill Creek's watershed, flash flooding is not a significant hazard. Water levels rise gradually, providing adequate response time for flood warning systems and evacuation. However, floods along Mill Creek have a longer duration, which cause additional impacts to life safety and property damage.

Through a FEMA-funded grant awarded after the 2012 floods, new monitoring infrastructure in the Mill Creek watershed was installed and completed in the fall of 2014. The expansion and upgrades to the existing gauging network were critical to the development of an automated alerting system and hydrologic forecasting model. The development of a new Flood Warning System for Salem provides operational response staff and emergency managers with valuable information to aid in the warning and evacuation of residents and visitors. Warning and evacuation measures have been updated and detailed in the adopted *Salem Emergency Management Plan* and *Salem Flood Warning and Response Plan*.

Life safety is a vital concern when flood events interrupt a number of critical transportation corridors throughout Salem. Emergency vehicles can be delayed because of restricted mobility in flooded areas. Major streets that may likely be closed during flood events include those indicated in **Table 6**.

Classification	Street Names
Parkway	Mission Street SE
Major Arterial	Center Street NE State Street Capitol Street NE/SE 12th Street NE/SE Hawthorne Avenue NE/SE Summer Street NE Madrona Avenue SE 25th Street SE McGilchrist Avenue SE River Road
Minor Arterial	17th Street NE/SE Airport Road SE Broadway Street NE Glen Creek Road NW Orchard Heights Road NW Fairview Industrial Drive SE Turner Road SE
Collector	Airway Drive SE Croisan Creek Road S D Street NE Fairway Avenue SE Oxford Street SE Hines Street SE 22nd Street NE/SE Rural Street SE Cross Street SE

Table 6: Critical Transportation Corridors Affected by Flooding

Public Health

The Centers for Disease Control and Prevention warn that floodwaters pose a variety of health risks, including exposure to infectious diseases, chemical hazards, and injuries. Flood waters can become contaminated with bacteria and hazardous chemicals which pose risk of disease through physical contact, ingestion, or open wounds. Floodwaters pose risk of physical injury from floating objects and damaged electrical power lines. Floodwaters, especially when rapidly moving, also pose risk of drowning.

Floodwaters can also cause indirect health risks. Animals can be displaced during flooding and pose a risk to public health. Standing water during and after a flood

can increase insect populations, posing an additional risk to insect-borne diseases. If clean-up efforts are delayed after flood events, water-damaged buildings can collect mold, which is a significant health concern to building occupants. Many of these indirect public health concerns can be reduced after flood events by expediting repair of water-damaged buildings and other cleanup efforts.

Critical Facilities and Infrastructure

The *City of Salem Natural Hazard Mitigation Plan* states:

> *Critical facilities (i.e. police, fire, and government facilities), housing supply and physical infrastructure are vital during a disaster and are essential for proper functioning and response. The lack or poor condition of infrastructure can negatively affect a community's ability to cope, respond and recover from a natural disaster. Following a disaster, communities may experience isolation from surrounding cities and counties due to infrastructure failure. These conditions force communities to rely on local and immediately available resources (page 2-62).*
>
> *Virtually all state and city roads and bridges in Salem are vulnerable to multiple hazards including flood, landslide, and earthquake. Impacts to the transportation system can result in the isolation of vulnerable populations, limit access to critical facilities such as hospitals and adversely impact local commerce, employment, and economic activity (page 2-63).*

Fourteen critical facilities are located within the regulatory floodplain, totaling approximately $930 million in improvement value. Salem Hospital is a critical facility that can be substantially impacted during flood events, since vehicular access to the facility can be limited by street closures surrounding the hospital. Salem has also identified approximately 200 essential facilities (i.e. schools, residential care facilities, daycares, record retention facilities, hazardous waste storage, etc.) in the regulatory floodplain. City staff coordinates contact and flood response planning efforts with both critical and essential facilities. A critical and essential facilities database is maintained in the Salem Emergency Operations Center Situational Awareness Framework for Events (SAFE) system.

In the January 2012 flood event, City public infrastructure damage was estimated at approximately $10 million. The majority of damage, $7.5 million, was to vehicular bridges; other damage included City-owned parks, buildings, streets, and water, wastewater, and stormwater facilities. The January 2012 event was somewhat localized to the Battle Creek and Mill Creek basins; however, the potential damage to critical facilities and infrastructure city-wide is significant.

Economy and Major Employers

A number of employment centers are located within the regulatory floodplain. The Pringle Creek floodplain area includes industrial employment areas in the vicinity of McGilchrist Street SE and Salem Memorial Hospital, one of Salem's largest employers. Mill Creek can overflow into Salem Airport, which would potentially restrict air traffic, and the overflow can continue through industrial employment areas west of 25th Street SE, including the City Operations Complex. In West Salem, the Willamette River causes flooding in commercial areas along Wallace Road NW and Edgewater Street NW.

Transportation impacts during flood events can cause significant economic impacts. Major transportation corridors can be closed by high water, restricting commercial traffic. The most significant transportation impacts involve the potential closure of arterial streets, including the Wallace/Edgewater intersection, Mission Street SE, Center Street NE/SE, State Street, and River Road S.

Types of Affected Buildings

Approximately 3,190 buildings are located within the City's regulatory floodplain. **Table 7** shows the zoning designation and the number of structures in the regulatory floodplain.

Zoning Designation	Number of Structures
Critical Facilities (All Zones)	14
Commercial	274
Industrial	364
Public	120
Residential	2,417
Mixed Use	1

Table 7: Improvement Values of Buildings Within the Floodplain

As shown in Table 7, buildings zoned residential comprise approximately 70 percent of buildings in the floodplain. In addition to structural and life-safety impacts, flooding in residential areas can also result in the need for temporary shelters to house displaced residents.

All City-owned buildings are protected by flood insurance policies, whether or not they are located within the floodplain. Among the publicly-owned properties, the City of Salem owns approximately 114 buildings that are located in the regulatory floodplain. The general uses of those buildings are tabulated in **Table 8**.

Use of City-Owned Building	Number of Buildings
Airport	14
Fire	10
General	13
Housing Authority	21
Library	1
Parks	23
Transportation	14
Utility	18

Table 8: City-Owned Buildings

Flood Insurance Claims

FEMA records show that 197 flood insurance claims in the Salem community have been filed prior to 2011, totaling nearly $3.4 million. The claim payments paid for significant flood damages are tabulated in **Table 9**.

Date of Flood Damage	Total Claims
February 1996	$901,000
November 1996	$587,000
November 1998	$101,000
June 2000	$92,000
January 2012	$1,589,000
December 2015	$59,000

Table 9: Claim Payments

Of those claims listed above, approximately $325,000 in claims were paid to owners of properties in the Salem Industrial Drive NE area. No claims have been paid in the Salem Industrial Drive NE area since 2003, so the improvements in the vicinity of Claggett Creek in 2007 may have mitigated the potential for further flood damage.

Approximately $382,000 in claims have been paid to owners of properties in the Bellevue Street SE area; the latest claim was filed in 2012. Improvements made in 2015 to the Winter Street Bridge along Shelton Ditch may have mitigated the flooding concerns in this repetitive loss area.

There are two new areas of repetitive loss claims that have been identified since the original adoption of the Floodplain Management Plan. These areas, including State Street and Marstone Court SE, have been paid claims of approximately $142,000 due to flood damage caused by the January 2012 and December 2015 flood events. These areas were recently identified in 2016 data provided to the City, and will be assessed for possible mitigation projects.

Natural Areas

The *City of Salem Natural Hazard Mitigation Plan* states:

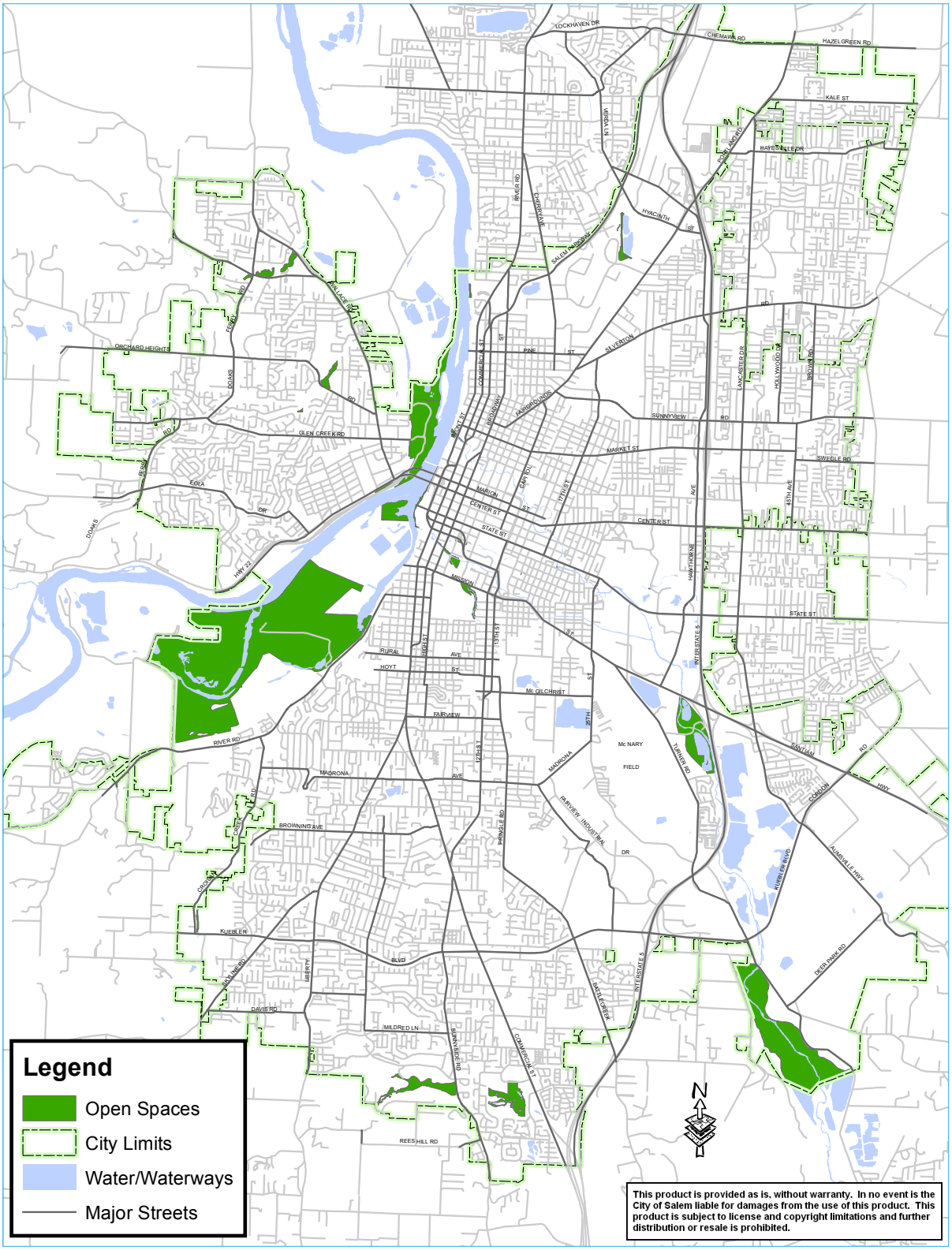
> *The capacity of the natural environment is essential in sustaining all forms of life including human life, yet it often plays an underrepresented role in community resiliency to natural hazards. The natural environment includes land, air, water, and other natural resources that support and provide space to live, work and recreate. Natural capital such as wetlands and forested hill slopes play significant roles in protecting communities and the environment from weather-related hazards, such as flooding and landslides. When natural systems are impacted or depleted by human activities, those activities can adversely affect community resilience to natural hazard events….*
>
> *The primary river that flows through Salem is the Willamette River; other important streams that pass through are Mill Creek, the Mill Race, Pringle Creek, and the Shelton Ditch. Smaller streams in the eastern part of the city include Clark Creek, Jory Creek, Battle Creek, Croisan Creek and Claggett Creek, while Glen Creek and Brush Creek flow through West Salem. These streams frequently flood, and while this can provide natural benefits, flooding can inflict personal injury and property damage. (Oregon Partnership for Disaster Resilience,* City of Salem Natural Hazards Mitigation Plan, *University of Oregon's Community Service Center, Eugene, Oregon, 2012, pages 4-28–4-29.)*

(See **Map 4** on page 31.)

A detailed study of natural areas in the Pringle Creek basin is included in the *Pringle Creek Watershed Management Plan*, and this analysis provides a reasonable summary for much of the Salem community.

> *Wetlands and Floodplains – Riparian areas, adjacent wetlands and local floodplains are important drainage features in a watershed because they decrease flood volumes and rates of flow. Well-vegetated riparian areas may also store floodwaters, thereby reducing associated flood damage downstream. Furthermore, the natural capacity of a watershed to manage flood events is reduced when channelization occurs, impervious surfaces increase and wetlands are filled in. (HDR Engineering Inc. and*

Map 4: Open Spaces in Floodplain



Barney and Worth, Inc., Pringle Creek Watershed Management Plan, *2008, Section 4.1.3, page 4-3.)*

Impacts of Land Development

Based on hazard assessment information, three creek systems appear to be most vulnerable to future development: Battle Creek, Pringle Creek, and Croisan Creek:

- Battle Creek has a high potential for development and has experienced significant impacts from major flood events in both 1996 and 2012. Impacts of urbanization are limited because two-thirds of the watershed is located outside the UGB. Flood impacts within the basin affect mostly residential properties.

- Pringle Creek has a medium potential for development and has high impacts from urbanization because 100 percent of the watershed is located within the UGB. The *Pringle Creek Watershed Management Plan, Section 3.1* states, "Estimates of current imperviousness in the Pringle Creek watershed range from 19 to 25 percent according to the City of Salem's Impervious Surface Report. With over 20 percent of the watershed already covered with impervious surface, Pringle Creek ranks as an 'impacted stream' according to the index proposed by Schueler (1994). Future development will easily push this stream into the 'non-supporting' category. Imperviousness is projected to ultimately increase to approximately 52 percent." These changes in imperviousness could have a considerable impact on future flood flows.

- Croisan Creek has a high potential for development with 50 percent of the watershed located within the UGB. Existing commercial and residential developments along River Road S are the most likely properties to be impacted by development within the basin, though those impacts will not be known until further study.

Other creek systems have a low potential for impact and are not expected to see significant changes as a result of future development.

Potential for Increased Flooding

The hazard assessment identified three potential sources of increased flooding: (1) changes in floodplain development; (2) development in the watersheds; and (3) climate change. Potential impacts from these sources of increased flooding are as follows:

Changes in Floodplain Development

The development requirements within floodplains are contained in *Salem Revised Code Chapter 601,* Floodplain Overlay Zones. The current ordinance restricts most development in floodways unless an engineered analysis demonstrates no increase

in flood levels. Development within floodplains is allowed as long as buildings are constructed to minimize flood damage.

Based on past development patterns and the current floodplain overlay ordinance, development in the future will reduce available flood storage as fill is placed in floodplains. Ultimately, this development will not increase flood elevations more than one foot. New buildings are required to be elevated a minimum of one-foot above base flood elevation, so new buildings are not at measurably increased risk of flooding because of development in floodplains. However, existing buildings constructed under earlier regulations may experience additional flood hazards over time as floodplains are filled and developed. These impacts are not known until further study.

Development in the Watersheds

The Developable Land Analysis in the Hazard Assessment Chapter showed that three creek systems—Battle Creek, Pringle Creek, and Croisan Creek—are most vulnerable to potential impacts of future development within the watershed. These impacts are anticipated to be addressed in the future update to the *Stormwater Master Plan.* As a result, the impacts of development upon each watershed and future inundation areas are expected to be identified in the future *Stormwater Master Plan* update.

Climate Change

The Third Oregon Climate Assessment Report, dated January 2017, by the Oregon Climate Change Research Institute summarizes the flood-related impacts from climate change as follows: "Annual precipitation is projected to increase slightly, although climate scientists have less confidence in precipitation projections than temperature projections."

Additional study is needed to determine how potential climate changes could be factored into flood studies to identify changes in base flood elevations.

SETTING GOALS

The Floodplain Management Advisory Committee was presented with two options for setting goals: (1) adopt distinct goals for the Plan Update; or (2) adopt the same goals as the *City of Salem Natural Hazard Mitigation Plan*. The committee elected to adopt the NHMP goals for the Plan Update. The goals are listed in **Table 10** below.

Goal Number	Description
1	Develop and implement mitigation activities to protect human life.
2	Protect existing buildings and infrastructure as well as future development from the impacts of natural hazards.
3	Strengthen communication and coordination of public and private partnerships and emergency services among local, county, and regional governments and the private sector.
4	Enhance economic resilience to reduce the impact on the local economy.
5	Preserve and rehabilitate natural systems to serve natural hazard mitigation functions and protect natural resources.

Table 10: Floodplain Management Plan Goals

Table 11 on page 35 illustrates which plan goals address the issues identified in the chapter titled "Problem Evaluation."

Flood-Related Problem	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
Life Safety	X				
Public Health	X				
Critical Facilities and Infrastructure	X	X	X		
Economy and Major Employers		X		X	
Buildings		X			
Natural Functions			X		X
Impacts of Land Development		X	X		
Potential for Increased Flooding		X	X		X

Table 11: Flood-Related Problems

REVIEW OF POSSIBLE ACTIVITIES

Effectiveness of Existing Regulations

Existing regulations were analyzed as part of selecting potential activities. Analysis of regulatory codes and plans is as follows:

- Comprehensive Plan–The goals of this Plan are consistent with the policies in the comprehensive plan related to Section N. "Scenic and Historic Areas, Natural Resources and Hazards." No activities were proposed that relate to changes to the Comprehensive Plan.

- Building Code–Activity 21 (protect new buildings from shallow flooding) was selected because building code provisions are not sufficient to attain maximum CRS local drainage protection credits. Activity 81 (Equipment freeboard) was proposed because building code provisions do not meet CRS Class 4 prerequisites.

- Zoning Code–Parks and open space are allowed uses in many zoning classifications. Planned Unit Development criteria in SRC 210.025(d)(2)(D) includes provision for "Common open space that will preserve significant natural or cultural features." The South Waterfront Zone includes building setbacks from Pringle Creek. Activity 41 (Riparian setback) was proposed to modify riparian buffer requirements.

- Subdivision Ordinance–SRC 205.045 includes special standards for conservation lots or parcels. Subdivision approval criteria requires compliance with floodplain development standards. No activities were proposed that relate to changes to the subdivision code.

- Floodplain Overlay Zone–Ordinance Bill 17-15 was adopted by Council in 2015, amending the floodplain overlay zone to prohibit first-floor enclosures. Activity 11 (Oregon model ordinance) was proposed to ensure statewide consistency in floodplain ordinances. Activity 80 (Compensatory storage) was proposed as an ordinance change to limit fill in flood prone areas. Activity 81 (Equipment freeboard) was proposed because the floodplain overlay zone does not meet CRS Class 4 prerequisites.

- Stormwater Ordinance–Ordinance Bill 28-13 was adopted by Council in 2013, creating a new Salem Revised Code Chapter 71 dedicated solely to stormwater management. Activity 83 (Design Storms) was proposed because the stormwater ordinance does not meet CRS Class 4 prerequisites.

The overall floodplain management program—with its regulations, standards, and procedures—has succeeded in earning the City a class 5 CRS rating. Major adjustments are not warranted in order to address issues raised in the Problem Assessment chapter. The criteria described below provide a numerical basis for determining the benefit-to-cost ratio to make minor program improvements and maximize reduction of future flood losses.

Current and Future Conditions

The Stormwater Ordinance requires the use of low-impact development techniques through installation of green stormwater infrastructure. These techniques reduce the potential for additional runoff resulting from future development conditions. The existing Stormwater Master Plan addresses current and future conditions, but is out of date and in the process of being updated. Once the Stormwater Master Plan Update is complete, additional information will be available regarding current and future conditions. Future plan updates will likely consider new activities as identified in the updated Stormwater Master Plan.

Activity Selection Criteria

Appendix F includes the original 78 activities that were considered by the Floodplain Management Advisory Committee to prevent or reduce flood-related problems. These activities included a variety of floodplain management categories: regulatory standards, preventive activities (PA), property protection (PP) activities, natural resource (NR) protection activities, emergency services (ES) measures, structural projects (SP), and public information (PI) activities. The activities were selected from Appendix F of the 2013 Floodplain Management Plan along with additional activities recommended by the advisory committee. The activities that are included in the action plan for the Plan Update are described in Appendix G.

Criteria were adopted to aid the committee in ranking the effectiveness of each activity. The criteria included a scoring system for anticipated costs and potential benefits. Costs included available funds, available staff resources, and negative impacts to key stakeholders in the community. Potential benefits included activities that were already required or adopted in another plan, reduced cost or liability, enhanced livability, improved safety and CRS-creditable activities.

The additional criteria resulted in a numerical scoring system that ranked all potential activities. The committee then reviewed all activities to confirm that the numerical ranking was appropriate. The advisory committee generally recommended or rejected potential activities based on their benefit-to-cost ratio. This selection process ensures that funding is available or achievable for selected activities.

ACTION PLAN

Review of Prior Action Plan Items

The 2013 Floodplain Management Plan included 30 action items. Of those activities, five were one-time endeavors that have been completed and have not been considered in this Plan Update. Seventeen of the Action Plan items were activities that were partially or fully completed, but have been selected in this Plan Update. The remaining eight Action Items were not completed. Six of those eight remaining activities have been selected in this Plan Update. The two activities not selected are explained below:

- The activity titled "Investigate FEMA's Cooperating Technical Partnership program" was completed, but resulted in a decision not to enroll in the program. This decision was based on the results of the Council subcommittee that analyzed flood mapping options based on Stormwater Master Plan technical data.

- The activity titled "Implement Riparian Action Plan" was deemed obsolete because it was based on an informal report adopted by City Council in 2009.

Updated Action Plan Items

A detailed description of each Action Plan item is included in **Appendix G** as tabulated below in **Table 12**. Item numbers reflect the general floodplain management category of each activity: preventive activities (PA), property protection activities (PP), natural resource protection activities (NR), emergency services measures (ES), structural projects (SP), and public information activities (PI). The prioritization of each action plan item depicted in the "Time Line" column, which varies in implementation from zero to five years. Responsibility for implementation and availability of funding is included in Appendix G.

Item #	Description	Time Line	Goals				
			1	2	3	4	5
PA1	Maintain benchmark data	Ongoing		X	X		
PA2	Inspect and clean streams and stormwater facilities annually	Ongoing		X			X
PA3	Establish Stormwater Master Plan policies to reduce peak flows during 100-year flood events	0–2 years	X	X			
PA4	Promote low impact development practices in development and redevelopment projects	Ongoing				X	X
PA5	Create 100-year inundation maps using data from Stormwater Master Plan	0–2 years		X			X
PA6	Adopt Oregon model floodplain management ordinance	0–2 years			X		
PA7	Provide additional staff training in administering regulations	0–2 years		X	X	X	
PA8	Coordinate stormwater and flood management regulations with communities and organizations that share Salem's watersheds	Ongoing			X		
PA9	Improve program for periodic site inspections of existing development within the floodplain	Ongoing	X	X			
PA10	Modify floodplain ordinance to require 1-foot freeboard for equipment servicing buildings	0–2 years		X		X	
PA11	Update stormwater ordinance to manage runoff from all storms up to and including the 100-year event	0–2 years	X	X	X	X	
PA12	Protect buildings from shallow flooding	3–5 years		X		X	

Table 12a: Action Plan Items

Item #	Description	Time Line	Goals				
			1	2	3	4	5
PP1	Improve floodplain protection assistance program	Ongoing		X		X	
PP2	Implement Flood Insurance Plan	Ongoing		X		X	
PP3	Acquire easements for public and private stormwater facilities	Ongoing		X			
PP4	Investigate financial assistance program for Elevation Certificates and Letter of Map changes	0–2 years		X		X	
PP5	Analyze repetitive loss areas	0–2 years		X		X	
NR1	Provide grant funding for restoration projects in riparian areas	Ongoing					X
NR2	Amend *Salem Revised Code* to implement provisions of the *Endangered Species Act* as they relate to floodplain development	0–2 years			X		X
NR3	Enhance natural functions for City-owned properties in the floodplain	Ongoing					X
NR4	Form Watershed Planning Committee	3–5 years			X	X	X
NR5	Develop and maintain watershed management plans	0–2 years			X		X
NR6	Streamline process to accept land donations to City for natural areas	3–5 years					X
NR7	Increase quality and quantity of vegetative cover	Ongoing					X
ES1	Implement emergency response plans for critical facilities	Ongoing	X		X		
ES2	Create post-flood procedures for gathering flood data	3–5 years	X	X	X		
ES3	Improve flood warning and response	Ongoing	X		X		
ES4	Investigate dam failure threat to Salem and prepare plan	0–2 years	X	X	X		
ES5	Create a levee inventory	0–2 years	X	X			
ES6	Modify questionnaires that are used during flood events to improve data	3–5 years		X			
ES7	Investigate development of incentives for critical facilities and industries in the floodplain to develop flood warning and response plans	3–5 years	X	X			
ES8	Implement post-disaster mitigation policies from the Emergency Management Plan		X	X	X		
SP1	Construct stormwater capital improvement projects	Ongoing	X	X			
SP2	Include damage assessments from Natural Hazard Mitigation Plan as a criteria for prioritizing CIP projects	0–2 years		X		X	

Item #	Description	Time Line	Goals				
			1	2	3	4	5
SP3	Construct capital improvement projects to improve stream banks	Ongoing		X			X
SP4	Update Stormwater SDC methodology consistent with Stormwater Master Plan to provide funding for capital projects	0–2 years	X	X		X	
PI1	Require hazard disclosure in real-estate transactions	0–2 years				X	
PI2	Create and implement a Program for Public Information	2–5 years		X	X		
P13	Improve information on City website regarding floodplain management as needed to improve CRS rating	Ongoing		X		X	
P14	Coordinate floodplain management outreach efforts with the City's stormwater program implementation activities	0–2 years			X		
P15	Compile and improve outreach materials to guide property owners in planting and habitat restoration of flood-prone properties	3–5 years		X			X
P16	Improve information on City website regarding planting and habitat restoration along waterways	3–5 years		X			X
P17	Improve information on City website regarding protection of tree canopy for reducing stormwater runoff	3–5 years		X			X

Table 12b: Action Plan Items

Adoption

Prior to the public comment period, a draft version of the Plan Update was included as an information item on the City Council agenda for April 9, 2018. Upon incorporating comments into the draft document, the final Plan Update was adopted by City Council under Resolution 20XX-XX on April XX, 2018.

Plan Evaluation and Update

In order to be implemented effectively, the *Floodplain Management Plan* will be regularly monitored and evaluated. The Public Works Director will oversee the implementation and evaluation of the *Floodplain Management Plan* with assistance the Floodplain Management Plan advisory committee or equivalent. The advisory committee will hold annual meetings at a minimum but may meet more frequently, as warranted, to effectively monitor progress of the plan implementation. An annual evaluation report will be submitted as an information report to City Council, made available to the media, and posted on the City's website.

APPENDIX A: Council Report

FOR COUNCIL MEETING OF: May 29, 2012
AGENDA ITEM NO.: 7 (f)
PUBLIC WORKS FILE NO.: _____

TO: MAYOR AND CITY COUNCIL
THROUGH: LINDA NORRIS, CITY MANAGER
FROM: PETER FERNANDEZ, P.E., PUBLIC WORKS DIRECTOR
SUBJECT: FLOODPLAIN MANAGEMENT PLAN AND ADVISORY COMMITTEE

ISSUE:

Information report regarding the selection of an advisory committee to assist in the creation of a Floodplain Management Plan.

RECOMMENDATION:

Information only.

BACKGROUND:

Floodplain management planning is an important process for preparing the community for major flood events. The Federal Emergency Management Agency (FEMA) has established a ten-step planning process for creating a Floodplain Management Plan. City staff has initiated the planning process and anticipates that the plan will be complete and submitted to Council for adoption within the next year.

One of the initial steps of the planning process is the formation of an advisory committee that represents various stakeholders within the community. City staff requested volunteers through a variety of sources such as email groups, the City's website, neighborhood associations, community groups, and personal contact. Twelve members of the community requested to serve on the advisory committee. Each member and their personal or professional affiliation is shown below:

Member	Personal/Professional Affiliation
Aneta Synan	State of Oregon, Business Development Department
Rick Day	President, Advantage Precast
Ken Gettys	Community Volunteer, Center 50+
Rick Massey	Board Member, Home Builder's Association
Peter Olsen	Engineer, Keller Associates
Corey Poole	Manager, Paradise Island
John Shepard	Resident, Business Owner
TJ Sullivan	Chair, South Gateway Neighborhood Association Agent, Huggins Insurance
Steve Ward	Owner, Westech Engineering, Engineer
Keith Whisenhunt	Owner, Project Delivery Group, Engineer
Mark Wieprecht	Member, SESNA Owner of Flood-Damaged Property, Retired Architect

Consistent with FEMA's ten-step planning process, an additional outreach letter was submitted to government agencies and a variety of groups representing diverse interests in the community. Meeting notices, agendas, and minutes have been made available through an email distribution list and on the City's website.

FACTS AND FINDINGS:

1. FEMA's ten-step process for creating a floodplain management plan includes involving the public, coordinating with other government agencies, assessing hazards and problem areas, setting goals, reviewing possible activities, creating an action plan, adopting and implementing the plan, and evaluating the plan's effectiveness.

2. FEMA requires that floodplain management planning efforts be included within the City's Natural Hazard Mitigation Plan (NHMP). The floodplain management elements of the current NHMP were not adopted as part of a separate stand-alone floodplain management planning process. The NHMP update is currently underway and scheduled for completion during 2012. The floodplain management planning elements of the NHMP are being analyzed through a separate process because of additional complexities in floodplain management as follows:

   a. Based on recent court decisions, FEMA is modifying the National Flood Insurance Program to better implement the Endangered Species Act (ESA). The League of Oregon Cities anticipates that every city will be required to update its floodplain ordinance to comply with ESA considerations as established in consultations between FEMA and the National Marine Fisheries Service. In the interim, the Oregon Department of Land Conversation and Development is advising cities to implement policy changes that limit potential harm to endangered species.

   b. The City has achieved a Class 6 rating in FEMA's Community Rating System (CRS), which provides all flood insurance policy holders a 20 percent reduction on their premiums. This rating been accomplished through documentation of existing City policies and has not required major policy changes. In order to make further improvements to the City's CRS rating, policy changes will be needed.

   c. Recent flooding events have heightened interest in floodplain management. The Floodplain Management Plan will provide an opportunity for community-wide participation in reducing flood hazards.

3. The advisory committee conducted its first meeting on March 5, 2012, and will be meeting approximately once a month through August 2012.

4. The Floodplain Management Plan will be prepared based on input from the committee and other community stakeholders. Staff anticipates that the plan will be submitted to Council for adoption by the end of 2012.

Wards: All
May 16, 2012/Prepared by Glenn J. Davis, P.E., C.F.M., Chief Development Engineer

JP/TLC:G:\Group\director\Judy\Council 2012\May 29\Advisory Committee rev.doc

FOR COUNCIL MEETING OF: February 25, 2013
AGENDA ITEM NO.: 7 (c)
PUBLIC WORKS FILE NO.:

TO: MAYOR AND CITY COUNCIL

THROUGH: LINDA NORRIS, CITY MANAGER

FROM: PETER FERNANDEZ, P.E., PUBLIC WORKS DIRECTOR

SUBJECT: PUBLIC REVIEW OF THE DRAFT FLOODPLAIN MANAGEMENT PLAN

ISSUE:

Information report regarding the outreach and comment period for the public review draft of the Floodplain Management Plan.

RECOMMENDATION:

Information only.

BACKGROUND:

Following more than a year-long planning process, a draft of the Floodplain Management Plan is available for public review and comment. As a key element of the City's Natural Hazard Mitigation Plan, the Floodplain Management Plan identifies flood hazards throughout the community, evaluates problems caused by those hazards, reviews possible mitigation activities, and creates an action plan to mitigate those flood hazards. The plan is also integral to the City's participation in the Federal Emergency Management Agency's (FEMA) Community Rating System, which reduces annual flood premiums city-wide.

The planning process has followed the ten-step process established by FEMA for creation and adoption of planning documents. As described in the information report to Council on May 29, 2012, the plan has been developed by City staff during the past year with the assistance of a citizen advisory committee.

A variety of outreach opportunities are being used to solicit input from citizens, business owners, community groups, government agencies, and other stakeholders interested in the plan. The public comment period is scheduled to end on April 19, 2013. Staff anticipates that the final plan will be forwarded to Council for adoption in June 2013 once all public comments are evaluated and integrated into the final plan.

FACTS AND FINDINGS:

1. FEMA requires floodplain management planning efforts be included within the City's Natural Hazard Mitigation Plan (NHMP), which was adopted by FEMA on December 16, 2012. The NHMP identifies Salem as having a high vulnerability to and a high probability for flood hazards. The NHMP identifies two action items related specifically to flood hazards:

a. Adopt a floodplain management plan in accordance with FEMA's Community Rating System guidelines.

b. Improve the City of Salem's National Flood Insurance Program Community Rating System to reduce National Flood Insurance Premiums.

2. FEMA's ten-step process for creating a floodplain management plan includes involving the public, coordinating with other government agencies, assessing hazards and problem areas, setting goals, reviewing possible activities, creating an action plan, adopting and implementing the plan, and evaluating the plan's effectiveness. Review of the draft plan is a key element of the public involvement component of the planning process.

3. Proposed outreach efforts include a press release, a link on the City's website for review and comment on the draft plan, public meetings already scheduled at five neighborhood associations, and an outreach letter distributed to a wide variety of stakeholders. City staff will initiate coordination meetings with key community groups, government agencies, and other stakeholders as appropriate.

4. The final plan is scheduled to be presented to Council for adoption in June 2013. Once adopted, the plan will be evaluated quarterly to establish its effectiveness consistent with FEMA guidelines. The adopted plan would remain valid for five years.

Attachment: Draft Floodplain Management Plan
Wards: All
February 14, 2013

JP/TLC/:G:\Group\director\Judy\Council 2013\Feb 25\FM Plan Public Review Draft Report.doc

APPENDIX B: Agendas, Sign-in Sheets, and Minutes

Floodplain Management Plan Update Agenda
February 5, 2018

1. Overview and Committee Purpose

2. Floodplain Management Plan
    a. Public involvement
    b. Agency and organization coordination
    c. Hazard assessment and problem evaluation

3. Flood Information and Outreach Plan (PPI)
    a. Assess public information needs
    b. Inventory of public outreach

4. Flood Insurance Plan
    a. Flood insurance coverage assessment (FIA)
    b. Coverage Improvement Plan (CIP)

5. Committee Decision
    a. Next steps
    b. Additional information needed

6. Adjourn

FLOODPLAIN MANAGEMENT PLAN 2018 UPDATE
SIGN IN SHEET
DATE: February 5, 2018

Name	Affiliation	Signature
Glenn Davis	COS- Chief Development Engineer, Floodplain Administrator	
Robin Dalke	COS- Administrative Analyst III, Floodplain Manager	
Olivia Glantz	COS- Community Development Urban Planning-Planner II	
Claude Kennedy	COS- Building and Safety Administrator	
Heather Dimke	Public Information Officer, Public Works, Management Analyst	
Justin Boyington	COS- Flow Monitoring Analyst	
Megan Klein	COS-Public Works Geographic Information System Mapping	
Patricia Farrell	COS- Parks Planning and Natural Resources Manager	
Corey Benson	Farmers Insurance Representative	
Steve Ward	Professional Engineer Westech Engineering	
Rick Day	~~Business Owner~~, Old Castle Precast Advantage Real Group-Owner	
Brenda James	Professional Land Surveyor- Project Delivery Group	- absent
Cory Poole	SEMCA NA Chair, Floodplain Property Owner	- absent
Ashley ~~Brack~~ Howard	Real Estate Broker, Legacy Real Estate	
Mark Wieprecht	Floodplain Property Owner	
Mike Erdman	Home Builders Association of Marion & Polk Counties	
Mark Grenz,	Professional Engineer, MultiTech Engineering	
John Shepard	Property Owner	
Jeff Leach	SESNA Board Member	

Kathleen Dewoina	Broker, Berkshire Hathaway, West Salem NA	Kathleen Dewoina
Craig Evans	Broker, Salem Association of Realtors	Craig Evans
Roger Stevenson	City of Salem Emergency Manager	
Kenny Carson	Communication Manager	

Floodplain Management Plan Update
Meeting Minutes
February 5, 2018
11:30a.m. - 1:30p.m.
Public Works Department, Rm 325

1. Introductions
    a. Members present: Glenn Davis, Robin Dalke, Olivia Glantz, Claude Kennedy, Heather Dimke, Justin Boyington, Megan Klein, Patricia Farrell, Corey Benson, Steven Ward, Rick Day, Ashley Howard, Mark Wieprecht, Mike Erdman, Mark Grenz, John Shepard, Jeff Leach, Kathleen Dewoina, Craig Evans, Roger Stevenson, Kenny Larson

    b. Members absent: Brenda James, Cory Poole

    c. Committee meeting coordinated by Glenn Davis, Chief Development Engineer for Salem Public Works Department with assistance from Public Works staff member Robin Dalke. Discussion by Glenn Davis unless otherwise noted.

2. Overview and Committee Purpose
    a. Powerpoint Presentation including background and objectives of Floodplain Management Plan
    b. CRS Program requires a 5-year Update
    c. Committee's role
        i. Spokespeople for the community
        ii. Evaluate alternatives
        iii. Provide feedback
        iv. Review draft plan

3. Floodplain Management Plan
    a. Public Involvement
        a. Committee formed by public stakeholders and notice sent to affected agencies.
        b. Web page updated with Committee Meeting agendas and draft plan information
        c. Public notice mailed to interested stakeholders
    b. Agency and Organization Coordination
        a. Notice will be sent to affected jurisdictions and organizations based on FEMA guidelines and local contacts of interested parties. Request will ask for flood data, updated plan information and an offer to participate in planning effort for Plan Update.
    c. Hazard Assessment
        a. Discuss context of hazard assessment

b. Review of existing/adopted plans from 2014 FMP. Updated Natural Hazard Mitigation plan, TMDL Plan. Requested feedback from Committee for additional plan documents.
c. Changes to flood hazard – No new flood hazard maps, or FIRM since original adoption of FMP. New inundation map discussion with updates to Stormwater Master Plan. There have been no new properties annexed into flood-prone areas of Salem.
d. Repetitive Loss Properties- 2 new areas since 2014. Committee discussed causes of Marstone Court repetitive loss area, including culvert project that replaced undersized culvert on Waln Creek.
e. Discussed mitigation projects completed, most occurred after 2012 flood with the help of FEMA mitigation grant funding. Mill Creek Watershed flood mitigation committee underway with City of Turner. Committee member Justin B. discussed Early Warning System was that funded after 2012 flood.
f. No major floods since 2012. December 2015 resulted in some damage, but was not considered a major event.
g. Development conditions discussed

d. Problem Evaluation
    a. Life Safety and Critical Facilities – planning efforts underway to improve critical facilitates early warning and coordination efforts. TSP adopted critical routes plan
    b. Updates are being made to affected buildings in the regulatory floodplain. New flood insurance claim data is available and will be discussed with Flood Insurance Assessment plan
    c. Natural areas and open space are evaluated with each annual review

4. Flood Information and Outreach Plan (PPI)
    a. Powerpoint presentation with background on previously adopted Flood Information and Outreach Plan
    b. Assess public information needs
        a. Review of existing plan details and new needs analysis
    c. Inventory of public outreach
        a. Existing public outreach has been successful. Committee member Mark W. suggested that Architects and Engineers be added as a priority audience.
        b. Jeff L. suggested employers, non-residents and motorists (commuters) be included
        c. Heather D. discussed website updates that allow for a better ability to post time sensitive updates. There is a strong social media presence that is improving, as well as streamside mailers and the stream cleaning crew.
        d. Kenny L. discussed social media presence, over 14,000 users. Focus on making social media a major aspect, continue with Community Connections weekly publications, press releases, radio, CCTV.

5. Flood Insurance Plan (FIA)
    a. Powerpoint presentation with background on previously adopted Flood Insurance Plan
    b. Flood insurance coverage assessment
        a. Presentation on updated data
        b. Committee discussion of policies in force
    c. Coverage Improvement Plan
        a. New inundation mapping may increase coverage. Need to look at options for outreach to lenders if Interim Flood Hazard Areas are adopted

5. Committee Discussion
    a. Next Steps
        i. Floodplain Management Plan
            - Step 6 – Set Goals
            - Step 7- Review possible activities
        ii. Flood Information and Outreach Plan
            - Set 3- Formulate Messages
            - Step 4- Identify Outreach Projects
        iii. Flood Insurance Plan
            - Review Coverage Improvement Projects

    b. Additional Information Needed – Committee member feedback handout. Review positive, neutral and negative activities from previously adopted FMP plan. Next meeting will cover possible activities, PPI outreach plan messages and projects and Coverage Improvement Projects. Handout will be emailed and paper copies provided.

6. Adjourn – Next Meeting is February 26th, Monday at 11:30

Floodplain Management Plan Update Agenda
February 26, 2018

1. Call to Order

2. Floodplain Management Plan
    a. Set goals
    b. Review possible activities
        i. Compile
        ii. Review criteria for scoring
        iii. Recommendations

3. Flood Information and Outreach Plan (PPI)
    a. Formulate messages
    b. Identify ad review outreach projects
    c. Other public information initiatives

4. Flood Insurance Plan (FIA)
    a. Coverage Improvement Plan outreach
    b. Projects and goals

5. Committee Discussions
    a. Next steps–draft plans
    b. Additional information needed

6. Adjourn

FLOODPLAIN MANAGEMENT PLAN 2018 UPDATE
SIGN IN SHEET
DATE: February 26, 2018

Name	Affiliation	Signature
Glenn Davis	COS- Chief Development Engineer, Floodplain Administrator	
Robin Dalke	COS- Administrative Analyst III, Floodplain Manager	
Olivia Glantz	COS- Community Development Urban Planning-Planner II	
Claude Kennedy	COS- Building and Safety Administrator	absent
Heather Dimke	COS –PW Public Information Officer, Management Analyst	
Kenny Larson	COS- Communications and Community Engagement Manager	
Justin Boyington	COS- Flow Monitoring Analyst	
Megan Klein	COS-Public Works Geographic Information System Mapping	absent
Patricia Farrell	COS- Parks Planning and Natural Resources Manager	ZACH DIEHL
Roger Stevenson	COS- Emergency Manager	
Corey Benson	Farmers Insurance Representative	
Steve Ward	Professional Engineer Westech Engineering	
Rick Day	Old Castle Precast Advantage Bus. Group - Owner	
Brenda James	Professional Land Surveyor- Project Delivery Group	absent
Cory Poole	SEMCA NA Chair, Floodplain Property Owner	absent
Ashley Howard	Real Estate Broker, Legacy Real Estate	
Mark Wieprecht	Floodplain Property Owner	absent
Mike Erdman	Home Builders Association of Marion & Polk Counties	
Mark Grenz,	Professional Engineer, MultiTech Engineering	absent

John Shepard	Property Owner	absent
Jeff Leach	SESNA Board Member	
Kathleen Dewoina	Broker, Berkshire Hathaway, West Salem NA	
Craig Evans	Broker, Salem Association of Realtors	

Floodplain Management Plan Update
Meeting Minutes
February 26, 2018
11:30a.m. - 1:30p.m.
Public Works Department, Rm 325

1. Call to Order
    a. Members present: Glenn Davis, Robin Dalke, Olivia Glantz, Heather Dimke, Justin Boyington, Zach Diehl, Corey Benson, Steven Ward, Rick Day, Ashley Howard, Mike Erdman, Jeff Leach, Kathleen Dewoina, Craig Evans, Roger Stevenson, Kenny Larson

    b. Members absent: Brenda James, Cory Poole, Claude Kennedy, Megan Klein, Mark Wieprecht, Mark Grenz, John Shepard

    c. Committee meeting coordinated by Glenn Davis, Chief Development Engineer for Salem Public Works Department with assistance from Public Works staff member Robin Dalke. Discussion by Glenn Davis unless otherwise noted.

2. Floodplain Management Plan
    a. Set Goals
        a. Recommended goals are based on original plan and recently adopted 2017 NHMP. Committee agrees to use NHMP goals in the FMP rather than distinct FMP goals.
        b. Roger S. notes that the adopted NHMP goals have been reviewed and accepted by FEMA
        c. Establish final recommendation
    b. Review Possible Activities
        a. Reminder: The FMP will guide other efforts, not be a funding source. Funding sources come from CIP (Capital Improvements Program) list, SMP (Stormwater Master Plan), etc.,.
        b. Compile Activities from existing plan- this includes on-going action items, incomplete action items, neutral activities and negative activities. Committee Discussion:
            i. Steve W- What is Salem doing about updating benchmarks to 88' datum? This is on hold, FIRM is still based on 29' datum and should match
            ii. Jeff – PA8, Does this include representative from City of Keizer and Marion County? Yes, should clarify that all surrounding communities are included
            iii. Justin – PA13 What about mapping to the 10 year flood and ESA requirements? We are waiting for ESA updates and the SWMP process with continue to evaluate this option.

iv. Steve W- #41 Creating a 50-foot riparian setback. Isn't that a taking? Seems we would not want to adopt that unless required by the ESA BiOp.
v. Steve W- #42 Local ordinance for wetlands. Salem doesn't have a program currently? No, we follow State and Federal Law. Proposal was to include a wetlands program.
vi. Mike E - #42 Where do we feel we are lacking in a local wetland program, seems things are fine.
    1. Glenn- Sounds like a high stakeholder impact and funding issue for staff resources. These things will be considered in scoring.
vii. Steve W- #26 A lot of other communities have done significant repetitive loss area analysis. Seems like a long term benefit for the community.
    1. Glenn- Yes, we are considering this as a new activity
viii. Steve W, Kathy D and Cory- Discussion of new elevation certificate program. Encouraging buyers to get EC's at purchase and for flood insurance purposes. Might be worth exploring for all building permits in the SFHA (with a minimum cost associated) to provide a new EC.
ix. Kathy D- Do we need a program for helping with LOMCs?
    1. Robin- Might be worth considering, however, this service is already offered for free if someone contacts a floodplain manager at the City
x. Steve W- Would the group object to a higher freeboard?
    1. Mike E. – Yes, this would be very difficult for residential subdivisions
    2. Cory- It would definitely save on insurance costs
    3. Kathy- One area I would like clarification on is mitigation factors that reduce flood insurance. Discussion with Cory.
xi. Craig E- Who does dam failure plan? We would hire a consultant

c. Review Criteria for Scoring
    i. PowerPoint presentation with scoring criteria, including adding "availability of funds" and "availability of staff resources"
d. Recommendations
    i. Committee will go over final recommendation activities at next meeting based on committee discussion and scoring criteria

3. Flood Information and Outreach Plan (PPI)
    a. Formulate Messages
        a. PowerPoint presentation with information about existing messages and proposed changes to messaging. Recommend adopting additional messaging for Flood Warning Program
    b. Identify and Review Outreach Projects

a. Review of existing outreach project and additional project recommendation. Utility bill stuffers may be a good option. Adding new sandbag station signs and pamphlets, interpretative trail signs and streamside mailer information.

c. Other Public Information Initiatives
    a. Review of existing program for public information initiatives
    b. Committee recommends moving forward existing initiatives and adding Flood Warning and Response improvements

4. Flood Insurance Plan (FIA)
    a. Coverage Improvement Plan Outreach Projects and Goals
        a. Flood Insurance Assessment shows an improvement in flood insurance coverage since adoption of plan. Desired outcome is to increase flood insurance coverage
        b. Recommend carrying forward existing Coverage Improvement Projects with improvements to CP5 “Project involving Mayor/Council” and adding CP6 Social Media messages

5. Committee Discussion
    a. Next Steps

        i. Submit additional project ideas prior to March 5th
        ii. Draft Plans
        iii. Committee review of draft FMP, Flood Information and Outreach (PPI) and Flood Insurance Plan (CIP)
        iv. Adopt Plans
            1. Information Report to Council April 9th
            2. Final public draft review and feedback
            3. Final staff report to Council April 23rd recommending adoption

6. Adjourn – Next Meeting is March 12th, Monday at 11:30

Floodplain Management Plan Update Agenda
March 12, 2018

1. Call to Order

2. Floodplain Management Plan
    a. Review scored activities
    b. Draft Plan changes
    c. Final Plan recommendations

3. Flood Information and Outreach Plan (PPI)
    a. Review draft Plan changes

4. Flood Insurance Plan (FIA)
    a. Review draft Plan changes

5. Committee Discussion
    a. Informational report
    b. Recommendation to Council

6. Public Comment

7. Adjourn

FLOODPLAIN MANAGEMENT PLAN 2018 UPDATE
SIGN IN SHEET
DATE: March 12, 2018

Name	Affiliation	Signature
Glenn Davis	COS- Chief Development Engineer, Floodplain Administrator	
Robin Dalke	COS- Administrative Analyst III, Floodplain Manager	
Olivia Glantz	COS- Community Development Urban Planning-Planner II	
Claude Kennedy	COS- Building and Safety Administrator	- absent -
Heather Dimke	COS –PW Public Information Officer, Management Analyst	- absent -
Kenny Larson	COS- Communications and Community Engagement Manager	
Justin Boyington	COS- Flow Monitoring Analyst	
Megan Klein	COS-Public Works Geographic Information System Mapping	
Patricia Farrell	COS- Parks Planning and Natural Resources Manager	
Roger Stevenson	COS- Emergency Manager	
Corey Benson	Farmers Insurance Representative	- absent -
Steve Ward	Professional Engineer Westech Engineering	
Rick Day	Old Castle Precast Advantage Bus. Group - Owner	
Brenda James	Professional Land Surveyor- Project Delivery Group	- absent
Cory Poole	SEMCA NA Chair, Floodplain Property Owner	- absent -
Ashley Howard	Real Estate Broker, Legacy Real Estate	
Mark Wieprecht	Floodplain Property Owner	
Mike Erdman	Home Builders Association of Marion & Polk Counties	
Mark Grenz,	Professional Engineer, MultiTech Engineering	
Craig Evans –	Salem Association of Realtors	

John Shepard	Property Owner	
Jeff Leach	SESNA Board Member	
Kathleen Dewoina	Broker, Berkshire Hathaway, West Salem NA	Kathleen Dewoina
Craig Evans	Broker, Salem Association of Realtors	See front
Zach Diehl	Natural Resource Coordinator	
Greg Walch	Emergency Manager	

Floodplain Management Plan Update
Meeting Minutes
March 12, 2018
11:30a.m. - 1:30p.m.
Public Works Department, Rm 325

1. Call to Order
    a. Members present: Glenn Davis, Robin Dalke, Olivia Glantz, Justin Boyington, Megan Klein, Zach Diehl, Corey Benson, Steven Ward, Rick Day, Ashley Howard, Mike Erdman, Jeff Leach, Kathleen Dewoina, Craig Evans, Roger Stevenson, Kenny Larson, Mark Wieprecht, Mark Grenz, John Shepard, Greg Walsh

    b. Members absent: Brenda James, Cory Poole, Claude Kennedy

    c. Committee meeting coordinated by Glenn Davis, Chief Development Engineer for Salem Public Works Department with assistance from Public Works staff member Robin Dalke. Discussion by Glenn Davis unless otherwise noted.

2. Floodplain Management Plan
    a. Review Scored Activities - Draft Proposed Action Items handout to committee Members. Handout includes previously adopted Action Items that are were recommended to be moved forward in Plan Update and New Action Items. Second handout includes negatively scored activates. Committee discussion led by Glenn, including questions from members:
        i. John S- Low impact development, what are examples?
            1. Enhance the stormwater facilities when the City improves a street. This is usually incorporated into CIP projects
        ii. John S- Is there not a regulatory problem with not adopting new flood inundation maps?
            1. No, we have confirmed there is not regulatory requirement to initiate this
        iii. John S- Conversion of existing detention basins, is this happening or being discussed?
            1. Yes, this is a Stormwater Operations funded project
        iv. Steve W- Elevation of HVAC systems would have an impact on developers.
            1. This is often already being done, but it is a CRS Class 4 pre-requisite to update our floodplain ordinance to include elevation to the 1-foot freeboard rather than just the BFE.
        v. Steve W- Do we have to add an overflow for the proposed stormwater ordinance update?

1. We are not sure how this will impact stormwater design requirements, but we are working on all implications and will do additional public information outreach efforts before making any changes.

vi. John S- What about the Reese Hill dam?
1. This is a mitigated earthen dam. A dam failure study will be conducted by a consultant and these will be investigated.

vii. Justin B- Clarified the Watershed Planning Committee. The Mill Creek Watershed funded study will produce different alternatives. In order to do these projects, we need a watershed planning committee to discuss projects, funding and alternatives. It would be helpful to move forward with forming this group (similar to a flood authority).

viii. Roger S- Suggested giving critical facilities a template for flood response and preparation

b. Draft Plan Changes
   a. Directed committee to webpage where draft plan changes will be posted for public review. A copy of the plan will also be emailed directly to all committee members
c. Final Plan Recommendations
   a. Final plan updates sent to committee chair prior to Council meeting on 4/23/18
   b. Recommend council adopt Plan Update at 4/23/18 meeting
   c. Implement, monitor and evaluate program on an annual basis

3. Flood Information and Outreach Plan (PPI)
   a. Review Draft Plan Changes
      a. PowerPoint presentation on plan changes and updated (final) 2018 Proposed Outreach Projects
      b. Kenny L suggested proper sandbag techniques video be produced by the City

4. Flood Insurance Plan (FIA)
   a. Review Draft Plan Changes
      a. PowerPoint presentation on plan changes and updated (final) 2018 Proposed Outreach Projects
      b. Committee did not have any additional suggestions

4. Committee Discussion
   a. Informational Report to Council April 9th
   b. Final public draft review and feedback April 9th-April 23rd
   c. Final staff report to Council April 23rd recommending adoption

5. Adjourn

APPENDIX C: Notification Letter

CITY OF Salem AT YOUR SERVICE
PUBLIC WORKS DEPARTMENT
555 Liberty Street SE / Room 325 • Salem OR 97301-3513 • Phone 503-588-6211 • Fax 503-588-6025

Si usted necesita esta información traducido, por favor llame 503-588-6211.

If you need this information translated, please call 503-588-6211.

February 28, 2018

SUBJECT: **Floodplain Management Plan Update**

Dear [Salutation Placeholder]:

The City of Salem has initiated a planning process for a 5-year update to the previously adopted City of Salem Floodplain Management Plan (Plan Update). The overall goals of the Plan Update are to identify new flood hazards, update the program of identified activities to mitigate the hazards, and coordinate mitigation activities to prevent conflicts with other community needs.

The City is following a ten-step planning process consistent with Federal Emergency Management Agency (FEMA) guidelines and anticipates completing the process by the end of April, 2018. An important step in the planning process is coordination with other agencies to ensure the Plan Update is consistent with other goals, policies, and plans already adopted in the surrounding community.

We invite other agencies and diverse community groups to participate in the process by submitting written testimony, providing links to existing adopted plans, scheduling individual meetings with City staff, or other opportunities for coordination. You can review meeting agendas and the existing Floodplain Management Plan on the City's website at https://www.cityofsalem.net/Pages/city-committees.aspx. We anticipate to a have review draft of the Plan Update available for public review by the end of March 2018. We encourage public review and input on draft Plan Update and appreciate feedback prior to its finalization by the end of April 2018.

If you would like to participate in the planning process, provide technical materials that would assist in the advisory committee, schedule an individual discussion, or would like more information about floodplain management planning, please contact me at gdavis@cityofsalem.net or submit written materials to Public Works Department, 555 Liberty Street SE, Room 325, Salem, Oregon 97301.

Engineering Division
Parks and Transportation Services Division
555 Liberty Street SE / Room 325
Salem OR 97301-3513
Phone 503-588-6211
Fax 503-588-6025

Operations Division
1410 20th Street SE / Building 2
Salem OR 97302-1209
Phone 503-588-6063
Fax 503-588-6480

Parks Operations
1460 20th Street SE / Building 14
Salem OR 97302-1209
Phone 503-588-6336
Fax 503-588-6305

Willow Lake Water Pollution Control Facility
5915 Windsor Island Road N
Keizer OR 97303-6179
Phone 503-588-6380
Fax 503-588-6387

❖ ADA Accommodations Will Be Provided Upon Request ❖

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Thank you for helping coordinate the City's floodplain management planning process.

Sincerely,

Glenn J. Davis, P.E., C.F.M.
Chief Development Engineer

It is the City of Salem's policy to assure that no person shall be discriminated against on the grounds of race, religion, color, sex, marital status, familial status, national origin, age, mental or physical disability, sexual orientation, gender identity and source of income, as provided by Salem Revised Code Chapter 97. The City of Salem also fully complies with Title VI of the Civil Rights Act of 1964, and related statues and regulations, in all programs and activities.

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cc: File: Chrono

OREGON DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES DIVISION
635 CAPITOL STREET NE
SALEM OREGON 97301-2532

OREGON EMERGENCY MANAGEMENT AGENCY
ATTN: ANDREW PHELPS
PO BOX 14370
SALEM OREGON 97309-5062

MARION COUNTY EMERGENCY MANAGEMENT
ATTN: ALAN HALEY
5155 SILVERTON RD NE
SALEM OREGON 97305

POLK COUNTY EMERGENCY MANAGEMENT
ATTN: DEAN BENDER
850 MAIN STREET
DALLAS OREGON 97338-3185

OREGON DEPARTMENT OF ENVIRONMENTAL QUALITY
DEQ HEADQUARTERS OFFICE
700 NE MULTNOMAH ST #600
PORTLAND OR 97232-4100

OREGON NATIONAL RESOURCES CONSERVATION SCIENCE
SALEM SERVICE CENTER
650 HAWTHORNE AVE SE SUITE 130
SALEM OREGON 97301-5894

U.S. ARMY CORPS OF ENGINEERS, PORTLAND DISTRICT
ATTN: CENWP-OP-G
PO BOX 2946
PORTLAND OREGON 97208-2946

FEDERAL EMERGENCY MANAGEMENT AGENCY
FEDERAL REGIONAL CENTER
130 228TH STREET SW
BOTHELL WA 98021-8627

OREGON DEPARTMENT OF FISH AND WILDLIFE
4034 FAIRVIEW INDUSTRIAL DR SE
SALEM OR 97302-1142

ODA SOIL AND WATER CONSERVATION DISTRICT
NATURAL RESOURCES DIVISION
635 CAPITOL STREET NE
SALEM OREGON 97301-2532

OREGON RED CROSS
3131 N. VANCOUVER AVENUE
PORTLAND OREGON 97227

OREGON STATE CHAMBER OF COMMERCE
867 LIBERTY ST NE
SALEM OREGON 97301

OREGON HOME BUILDERS ASSOCIATION
2075 MADRONA AVE SE #150
SALEM OREGON 97302

US BUREAU OF RECLAMATION
LORRI GRAY, REGIONAL DIRECTOR
PACIFIC NORTHWEST REGIONAL OFFICE
1150 NORTH CURTIS ROAD, SUITE 100
BOISE IDAHO 83706-1234

CITY OF INDEPENDENCE
ATTN: FLOODPLAIN ADMINISTRATOR
P.O BOX 7
INDEPENDENCE OR 97351-2420

CITY OF MONMOUTH
ATTN: FLOODPLAIN ADMINISTRATOR
151 MAIN STREET W
MONMOUTH OR 97361-2136

CITY OF STAYTON
ATTN: FLOODPLAIN ADMINISTRATOR
362 N 3RD AVE
STAYTON OR 97383-1726

CITY OF TURNER
ATTN: FLOODPLAIN ADMINISTRATOR
5255 CHICAGO ST SE
TURNER OR 97392-9452

CITY OF AUMSVILLE
ATTN: FLOODPLAIN ADMINISTRATOR
595 MAIN ST
AUMSVILLE OR 97325-9005

CITY OF CORVALLIS
ATTN: FLOODPLAIN ADMINISTRATOR
501 SW MADISON AVE
CORVALLIS OR 97333-4601

CITY OF ALBANY
ATTN: FLOODPLAIN ADMINISTRATOR
333 BROADALBIN ST SE
ALBANY OR 97321-2247

CITY OF KEIZER
ATTN: FLOODPLAIN ADMINISTRATOR
930 CHEMAWA RD NE
KEIZER OR 97303-3716

MARION COUNTY
ATTN: FLOODPLAIN ADMINISTRATOR
P.O. BOX 14500
SALEM OR 97309-5036

POLK COUNTY
ATTN: FLOODPLAIN ADMINISTRATOR
850 MAIN STREET
DALLAS OR 97338-3128

OREGON DEPT. OF LAND CONSERVATION AND DEVELOPMENT
ATTN: CHRISTINE SHIRLEY
635 CAPITOL STREET NE, SUITE 150
SALEM OR 97301-2540

SUBURBAN EAST SALEM WATER DISTRICT
3805 LA BRANCH ST SE
SALEM OR 97317-5373

NETWORK OF OREGON WATERSHED COUNCILS
SHAWN MORFORD, EXECUTIVE DIRECTOR
1130 LIBERTY ST SE, SUITE #3
SALEM OR 97302-4143

NATIONAL WEATHER SERVICE
NWS LOCAL COORDINATOR
5241 NE 122ND AVENUE
PORTLAND OR 97230-1089

USGS OFFICE OF SURFACE WATER.
USGS NATIONAL FLOOD HAZARD COORDINATOR
1400 INDEPENDENCE
ROLLA MO 65401

SALEM-KEIZER URBAN WATERSHED COUNCILS, ASSOCIATION
650 HAWTHORNE AVE SE, SUITE 130
SALEM OR 97301-5894

APPENDIX D: Possible Activities

All possible activities were analyzed based on a scoring system of costs and benefits as shown in the following tables. Numerical values for items in **Tables 17 and 18** are explained in the key below.

Column	Description	Numerical Score		
		0	1	2
Availability of Funds	Availability of financial investments necessary to implement activity	High	Low	Very low
Availability of Staff Resources	The level of City staff resources needed to implement activity, and availability of staff time.	High	Low	Very low
Stakeholder Impacts	The overall impact of the activity to stakeholders within the community.	Positive	Mixed	Negative
Already Required or Adopted	Indicates whether existing plans or programs identify this activity as required or needed.	No	Yes	-
Reduces Cost or Liability	Indicates whether existing costs or known liabilities to the community will be reduced as a result of this activity.	No	Mixed	Yes
Enhances Livability and Improves Safety	Indicates whether this activity will enhance livability and improve safety within the community.	No	Yes	-
CRS Points	Activity is eligible for Community Rating System (CRS) credit.	No	Yes	-

Table 16: Key to Tables 17 and 18

Table 17: Review of Possible Activities—Positive and Neutral

Activity Number	Activity Description	Costs				Benefits					
		Availability of Funds	Availability of Staff Resources	Stakeholder Impacts	Sub-total	Already required or Adopted	Reduced Cost or Liability	Enhanced Livibility and Safety	CRS Points	Sub-total	Total
Preventive Measures											
5	Identify and remove barriers for implementing Low Impact Development techniques. Update the Stormwater Management Design Standards and associated Salem Revised Code (SRC)provisions as appropriate.	Recommend removal, activity completed.									
6	Adopt a new stormwater chapter of SRC	Recommend removal, activity completed.									
7	Promote low impact development practices in development and redevelopment projects	0	0	1	1	1	1	1	1	4	3
11	Adopt Oregon model floodplain management ordinance	0	1	1	2	1	1	1	0	3	1
13	Conduct periodic site inspections of existing development within floodplain	0	2	0	2	0	1	0	1	2	0
20	Prohibit first-floor enclosures	Recommend removal, activity completed.									
21	Protect new buildings from shallow flooding	0	1	1	2	0	2	0	1	3	1
22	Provide additional staff training in administering regulations	0	1	0	1	0	1	0	1	2	1
23	Maintain benchmark data	0	1	0	1	0	1	0	1	2	1
25	Additional stormwater regulations	Recommend removal, activity completed.									
26	Analyze repetitive loss areas	1	1	0	2	1	1	0	1	3	1
34	Inspect and clean streams and stormwater facilities annually	0	0	0	0	1	1	1	1	4	4
36	Coordinate stormwater and flood management regulations with communities and organizations that share Salem's watersheds	0	1	0	1	1	1	1	0	3	2
47	Adopt critical routes plan in TSP	Recommend removal, activity completed.									
83	Update stormwater ordinance to manage runoff from all storms up to and including the 100-year event (CRS Class 4 prereq)	0	1	1	2	1	1	0	1	3	1
Emergency Services Measures											
48	Develop a post-flood procedure for documenting damaged properties	0	1	0	1	1	1	0	0	2	1
49	Develop a post-flood procedure for collecting survey information about flood elevations	0	1	0	1	1	1	0	0	2	1
50	Modify questionnaires that are used during flood events to improve flood data collection	0	1	0	1	0	1	0	0	1	0
51	Adopt emergency response plan for critical facilities	0	2	0	2	1	1	1	0	3	1

Table 17a: Review of Possible Activities—Positive and Neutral

Table 17: Review of Possible Activities—Positive and Neutral (Continued)

52	Develop a flood warning system on local creeks that is consistent with the 2000 Stormwater Master Plan and the Corps of Engineers (COE) Section 205 Flood Damage Reduction Study for Mill Creek	1	1	0	2	1	1	1	1	4	2
53	Improve flood warning and response	1	1	0	2	1	1	1	1	4	2
77	Develop incentives for industries and critical facilities in the SFHA to develop and submit to the City their own flood warning and response plans	1	1	2	4	0	2	1	1	4	0
84	Create a levee inventory consistent with CRS Activity 620 (CRS Class 4 prereq)	1	1	0	2	1	1	0	1	3	1
85	Investigate dam failure threat to Salem and prepare plan consistent with CRS Activity 620 (CRS Class 4 prereq)	1	1	0	2	1	1	0	1	3	1
	Natural Resources Protection										
9	Form "Watershed Planning Committee"	0	1	0	1	1	1	1	0	3	2
10	Adopt code provisions related to ESA requirements	Recommend removal, activity completed.									
27	Adopt stormwater quality design standards	Recommend removal, activity completed.									
30	Identify key floodplain wetlands for protection, acquisition, and restoration	1	1	1	3	0	1	1	1	3	0
31	Provide grant funding for restoration projects in riparian areas	1	1	0	2	1	1	1	1	4	2
33	Develop and maintain watershed management plans	1	1	0	2	1	1	1	1	4	2
35	Streamline process to accept land donations to City for natural areas	0	2	0	2	0	1	1	1	3	1
37	Modify storm drain system to increase infiltration	1	1	0	2	1	1	1	0	3	1
38	Increase quantity and quality of canopy and other vegetative cover	1	1	0	2	1	1	1	0	3	1
39	Enhance natural functions for City-owned properties in floodplain	1	1	0	2	0	0	1	1	2	0
64	Public outreach materials to encourage land donations	1	1	0	2	1	1	1	1	4	2
76	Implement Riparian Action Plan	Remove, Riparian Action Plan has not been created.									
	Public Information										
61	Compile and improve outreach tools (information) to guide floodplain owners	1	1	0	2	1	1	1	1	4	2
62	Update and adopt Floodplain Planting and Habitat Restoration Guide	1	1	0	2	1	1	1	1	4	2
63	Upload and organize outreach materials on website	1	1	0	2	1	1	1	1	4	2
65	Improve tree canopy outreach as means to reduce runoff	1	1	0	2	1	1	1	1	4	2
66	Create and implement a Program for Public Information	1	1	0	2	1	1	1	1	4	2
67	Improve floodplain information on City website	1	1	0	2	1	1	1	1	4	2
70	Require disclosure of floodplain properties in real-estate transactions	1	1	0	2	1	1	0	1	3	1
82	Coordinate floodplain management outreach efforts with the City Stormwater Program Implementation Activites	0	0	0	0	0	2	0	0	2	2
	Property Protection										
2	Acquire easements for public and private stormwater facilities	1	1	0	2	1	2	0	0	3	1

Table 17b: Review of Possible Activities—Positive and Neutral

Table 17: Review of Possible Activities—Positive and Neutral (Continued)

68	Improve floodplain protection assistance program	1	1	0	2	1	1	1	1	4	2
71	Create and implement an insurance coverage improvement plan	1	1	0	2	1	1	0	1	3	1
79	Investigate financial assistance program for Elevation Certificates and Letter of Map Changes	1	1	0	2	0	2	1	1	4	2
81	Modify floodplain ordinance to require 1-foot freeboard for all equipment servicing buildings	0	1	1	2	1	2	0	1	4	2
	Structural Projects										
3	Address 100-year flood events in the Stormwater Master Plan	0	0	1	1	0	1	1	0	2	1
54	Include damage assessments from NHMP as a criteria for prioritizing CIP projects	0	1	0	1	1	1	0	0	2	1
55	Implement stormwater projects based on priorities established under the Capital Improvement Program (CIP) and the Stormwater Master Plan consistent with available funding	1	1	0	2	1	1	1	1	4	2
56	Update the Stormwater SDC methodology consistent with the Stormwater Master Plan to provide funding for projects	0	1	0	1	1	0	1	1	3	2
59	Streambank stabilization	1	1	1	3	1	2	1	0	4	1
69	Acquire elevation certificates for existing buildings - duplicate	Recommend removal, duplicate activity (see #79)									

Table 17c: Review of Possible Activities—Positive and Neutral

Table 18: Review of Possible Activities—Negative

Activity Number	Activity Description	Costs				Benefits					
		Availability of Funds	Availability of Staff Resources	stakeholder impacts	Sub-total	Already required or Adopted	Reduced Cost or Liability	Enhanced Livibility and Safety	CRS Points	Sub-total	Total
Natural Resources											
32	Complete a hydromodification study and a retrofit plan	2	2	0	4	0	1	1	0	2	-2
40	Provide incentives for floodplain restoration and vegetation	1	2	0	3	0	0	1	1	2	-1
41	Create a 50-foot riparian setback for all development	0	1	2	3	0	1	1	0	2	-1
42	Establish local ordinance for wetland protection	0	2	1	3	0	0	1	0	1	-2
43	Expand erosion control program to include projects over 1 acre	0	2	1	3	0	0	0	0	0	-3
44	Create watershed management master plans	See #33									
45	Natural floodplain functions plan	1	2	0	3	0	0	1	1	2	-1
46	Acquire open space lands in floodplains to preserve natural functions	2	1	1	4	0	1	1	1	3	-1
Preventive Measures											
1	Increase open space and (modify, investigate, change, update, increase/decrease)density requirements in floodplains	1	2	2	5	0	1	1	1	3	-2
4	Provide variable detention requirements throughout the watershed to minimize peak flows during 100-year flood events	2	2	1	5	0	1	1	0	2	-3
8	Revise or update zoning ordinances to provide incentive-performance-or watershed-based zoning	1	2	1	4	0	1	1	1	3	-1
12	Acquire gravel pits/lakes for flood mitigation	2	1	1	4	0	1	1	1	3	-1
14	Limit fill, buildings, and/or material storage in floodplain	0	1	2	3	0	1	0	1	2	-1
15	Increase freeboard floor requirements	0	1	2	3	0	1	0	1	2	-1
16	Require engineered foundations in floodplain	0	1	2	3	0	1	0	1	2	-1
17	Restrict substantial improvements cumulatively	0	2	2	4	0	1	0	1	2	-2
18	Reduce substantial improvement threshold below 50%	0	2	2	4	0	1	0	1	2	-2
19	500-year protection of critical facilities	2	1	2	5	0	1	1	1	3	-2
24	Improve mapping data	1	2	0	3	0	1	0	1	2	-1
72	Analyze unmapped areas to create new flood studies	2	1	1	4	0	0	0	1	1	-3
74	Sign Cooperating Technical Partner agreement with FEMA	1	1	1	3	0	1	0	1	2	-1
78	Fund study to help grasp potential impacts of climate change to better inform long term development and utilities planning.	2	1	0	3	0	1	1	0	2	-1
80	Adopt compensatory storage requirements for development in the floodplain (1.5 to 1)	0	1	2	3	0	1	1	1	3	0
Property Protection											
28	Acquire repetitive loss / flood prone properties	2	1	1	4	0	1	1	1	3	-1

Table 18a: Review of Possible Activities—Negative

Table 18: Review of Possible Activities—Negative

Activity Number	Activity Description	Costs				Benefits					
		Availability of Funds	Availability of Staff Resources	stakeholder impacts	Sub-total	Already required or Adopted	Reduced Cost or Liability	Enhanced Livibility and Safety	CRS Points	Sub-total	Total
29	Retrofit existing buildings or other structural protection	2	2	0	4	0	1	1	1	3	-1
Structural Projects											
57	Increase stormwater conveyance capacity	2	1	1	4	0	1	0	0	1	-3
58	Channel and floodplain redesign & construction	1	1	1	3	0	1	1	0	2	-1
60	Include 100-year structural flood mitigation projects in Master Plan	2	1	1	4	0	1	1	0	2	-2
Unknown											
73	Adopt more restrictive floodway standard	1	1	2	4	0	1	0	1	2	-2
75	Improve the City of Salem's National Flood Isnurance Program (NFIP) Community Rating System (CRS) to reduce NFIP premiums	x	x	x		x	x	x	x		

Table 18b: Review of Possible Activities—Negative

APPENDIX E: Proposed Action Plan Items with Goals

Proposed Action Item: Preventive Activity 1

Proposed Action Item PA1 (23)		Alignment with Goals
Maintain benchmark data		• Protect existing and future development • Increase cooperation and coordination among stakeholders
Rationale for Proposed Action Item		
Accurate benchmarks are critical for surveyors when completing elevation certificates and when performing land surveys before a new structure is built. If the benchmarks are not accurate, structures can be built too low, or perhaps even in the wrong location. The National Spatial Reference System (NSRS) is maintained by the National Geodetic Survey (NGS) in the U.S. Department of Commerce. It is a compendium of vertical and horizontal benchmarks for the country. The CRS provides credit if the community has a sufficient number and density of benchmarks that meet the NSRS prerequisites. If the community does not, it is encouraged to either survey new ones or submit the data necessary to add qualifying existing benchmarks to the national system.		
Ideas for Implementation		
• City Surveyor's office to research status of City benchmarks, especially those in floodplains. • Develop a strategy for confirming existing City benchmarks and establishing new benchmarks consistent with NSRS standards.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Ongoing	CRS
Internal Partners	**External Partners**	
Fire—Emergency Management	FEMA, NGS	

Proposed Action Item: Preventive Activity 2

Proposed Action Item PA2 (34)		Alignment with Goals
Inspect and clean streams and stormwater facilities annually		• Protect existing and future development • Protect the natural environment
Rationale for Proposed Action Item		
This item is identified as RC4, Task 7, of the 2010 Stormwater Management Plan. By removing debris and obstructions to flow, flooding hazard are reduced and water quality is improved.		
Ideas for Implementation		
• Continue supporting annual Stream Cleaning Program. More than one half of the stream miles in Salem are inspected annually by walking each stream segment. Using summer interns the City inspects the riparian areas and streams, picks up litter and garbage, inspects for illicit discharges, addresses potential conveyance concerns, and evaluates areas for stream restoration.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Ongoing	SWMP, CRS
Internal Partners		**External Partners**
Community Development—Planning		FEMA, DEQ

Proposed Action Item: Preventive Activity 3

Proposed Action Item PA3 (4)		Alignment with Goals
Establish Stormwater Master Plan policies to reduce peak flows during 100-year flood events		• Protect lives • Protect existing and future development
Rationale for Proposed Action Item		
Flood levels increase in direct proportion to the peak flows experienced during a flood event. Reducing peak flows during 100-year events will reduce flood damage and other impacts caused by flooding.		
Ideas for Implementation		
• Provide variable detention requirements throughout the watershed to minimize peak flows during a 100-year flood event. • Construct regional detention basins where feasible to reduce peak flows in major events. • Require infiltration and other runoff reduction measures where feasible in key areas within the drainage basin to minimize peak flows in major events.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA, DEQ

Proposed Action Item: Preventive Activity 4

<table>
<tr><th colspan="3">Proposed Action Item PA4 (5)</th><th>Alignment with Goals</th></tr>
<tr><td colspan="3">Identify and remove barriers for implementing low impact development techniques</td><td>• Reduce economic loss
• Protect the natural environment</td></tr>
<tr><th colspan="4">Rationale for Proposed Action Item</th></tr>
<tr><td colspan="4">Low impact development techniques can reduce stormwater runoff through interception, evapotranspiration, and infiltration. This action item is identified in activity RC3 in the City's 2010 Stormwater Management Plan.</td></tr>
<tr><th colspan="4">Ideas for Implementation</th></tr>
<tr><td colspan="4">• Update the Stormwater Management Design Standards and Salem Revised Code to eliminate requirements for piped drainage and other barriers to LID.
• Update the Salem Transportation System Plan to include LID features within the rights-of-way.</td></tr>
<tr><th>Lead Agency</th><th>Timeline</th><th>Other Benefits</th><th></th></tr>
<tr><td>Salem Public Works</td><td>Short term (0–2 years)</td><td>SWMP</td><td></td></tr>
<tr><th colspan="2">Internal Partners</th><th colspan="2">External Partners</th></tr>
<tr><td colspan="2">Community Development—Planning
Fire—Emergency Management</td><td colspan="2">DEQ</td></tr>
</table>

Proposed Action Item: Preventive Activity 5

Proposed Action Item PA5 (6, 25)		Alignment with Goals
Develop a new *Salem Revised Code* chapter dedicated solely to stormwater management		• Protect existing and future development • Protect the natural environment
Rationale for Proposed Action Item		
This item is identified as RC9, Task 3, of the 2010 Stormwater Management Plan. The new code chapter provides proper legal authority for the City to enforce its strategies for improving water quality through the management of stormwater runoff.		
Ideas for Implementation		
• Implement code chapter consistent with the Stormwater Management Plan according to timelines established in the City's MS4 permit.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	SWMP
Internal Partners		**External Partners**
Community Development—Planning Legal		FEMA, DLCD, DEQ

Proposed Action Item: Preventive Activity 6

Proposed Action Item PA6 (11)		Alignment with Goals
Adopt Oregon model floodplain management ordinance		• Increase cooperation and coordination among stakeholders
Rationale for Proposed Action Item		
The floodplain management ordinance has remained substantially unchanged for decades. DLCD has created a model floodplain management ordinance and continuously updates the ordinance language to ensure compliance with National Flood Insurance Program requirements. By adopting the model ordinance, Salem better ensures compliance with the NFIP.		
Ideas for Implementation		
• Omit ordinance provisions that do not apply to hazards in the Salem community. • Modify ordinance language to consider those items receiving credit in the CRS and other adjustments as specified in the Floodplain Management Plan.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA, DLCD

Proposed Action Item: Preventive Action 7

Proposed Action Item PA7 (13, 22)		Alignment with Goals
Provide additional staff training in administering regulations		• Reduce economic loss • Protect existing and future development
Rationale for Proposed Action Item		
CRS provides credit points for obtaining Certified Floodplain Manager certification or otherwise providing floodplain management training for staff members who administer floodplain regulations.		
Ideas for Implementation		
• Provide opportunities for staff to obtain Certified Floodplain Manager certification • Enroll staff members in FEMA's Emergency Management Institute (EMI) • Encourage other staff training opportunities that are eligible for CRS credit • Improve floodplain management training of field personnel to help identify hazards and code violations in flood-prone areas.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	CRS
Internal Partners	**External Partners**	
Fire—Emergency Management	FEMA, DLCD	

Proposed Action Item: Preventive Action 8

Proposed Action Item PA8 (36)		Alignment with Goals
Coordinate stormwater and flood management regulations with communities and organizations that share Salem's watersheds.		• Increase cooperation and coordination among stakeholders
Rationale for Proposed Action Item		
This item is identified as RC1, Task 6, of the 2010 Stormwater Management Plan.		
Ideas for Implementation		
• Coordination may include the establishment of appropriate intergovernmental agreements (IGAs) regarding potential uniform stormwater design standards, operations and maintenance activities, and public education and involvement efforts within the UGB. • Continue to be an active member of the Oregon Association of Clean Water Agencies (ORACWA).		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	SWMP
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA, DLCD

Proposed Action Item: Preventive Action 9

Proposed Action Item PA9 (47)		Alignment with Goals
Adopt critical routes plan in the *Salem Transportation System Plan.*		• Protect lives • Increase cooperation and coordination among stakeholders • Reduce economic loss
Rationale for Proposed Action Item		
Maintenance of safe transportation routes during flood events is critical for emergency response and evacuation. A critical routes plan will inform emergency responders where to direct traffic during a flood event. By adopting the plan in the TSP, future street improvement projects will be designed to ensure that critical routes are not inundated during flood events.		
Ideas for Implementation		
• Identify major streets located outside of Special Flood Hazard Areas • Determine critical routes in Special Flood Hazard Areas that need to remain open during flood events. • Amend the TSP to include the critical routes map, including regulations needed to ensure that critical routes are designed and constructed at or above base flood elevations.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA, ODOT, City of Keizer, Marion County, Polk County

Proposed Action Item: Preventive Action 10

Proposed Action Item PA10 (20)		Alignment with Goals
Investigate prohibition of first-floor enclosures		• Protect existing and future development • Reduce economic loss
Rationale for Proposed Action Item		
Enclosures allow limited uses below the base flood elevation. Enclosures increase the risk of flood damage in two ways: (1) the building's structural integrity can be compromised by wave action or hydrostatic pressure; and (2) valuable or hazardous items stored in enclosures are frequently damaged or destroyed. This item is eligible for Community Rating System credits under Activity 320 (Enclosure Limits).		
Ideas for Implementation		
• Modify the floodplain ordinance to restrict the construction or substantial improvement of enclosures constructed below the base flood elevation.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	CRS
Internal Partners		**External Partners**
Community Development—Planning Community Development—Building/Safety		FEMA, DLCD

Proposed Action Item: Preventive Action 11

Proposed Action Item PA11		Alignment with Goals
Investigate FEMA's Cooperating Technical Partners program		• Protect existing and future development • Increase cooperation and coordination among stakeholders
Rationale for Proposed Action Item		
FEMA's Cooperating Technical Partners program creates an agreement between local jurisdictions and FEMA in order to improve flood mapping. The objective of the Cooperating Technical Partners program is to maximize limited funding by combining resources and to help maintain consistent national standards. This item is eligible for Community Rating System credits under Activity 410 (Floodplain Mapping).		
Ideas for Implementation		
• Determine level of local commitment required to enter agreement with FEMA • Assess local resources available to meet FEMA guidelines • Investigate level of Community Rating System credits available from partnership		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	CRS
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA

Proposed Action Item: Preventive Action 12

Proposed Action Item PA12 (21)		Alignment with Goals
Protect buildings from shallow flooding		• Protect existing and future development • Reduce economic loss
Rationale for Proposed Action Item		
Approximately 20 percent of NFIP claims are for properties located outside the SFHA. Some of these claims are from flooding caused by local drainage problems. Community Rating System credits are available for ensuring that new buildings are well above the street level or otherwise protected from shallow drainage flooding.		
Ideas for Implementation		
• Create regulations, administrative rules, and/or Stormwater Management Design Standards that conform with CRS guidelines for local drainage protection (LDP). • The preferred alternative for CRS credit is LDP2, which requires an applicant to prepare a site plan that accounts for street flooding and local drainage from and onto adjoining properties and protects the building from local drainage flows.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	CRS
Internal Partners		**External Partners**
Community Development—Building		FEMA, DLCD, Oregon Building Codes Division

Proposed Action Item: Preventive Action 13

Proposed Action Item PA13 (24, 72, 74)	Alignment with Goals
Improve floodplain mapping data	• Protect existing and future development • Increase cooperation and coordination among stakeholders

Rationale for Proposed Action Item
Development regulations need thorough and accurate mapping of hazard areas and related flood hazard data. Most Flood Insurance Rate Maps (FIRMs) provided by FEMA have detailed data, but some maps have flood problem areas where detailed data were not provided by FEMA. As a result, new development in those areas is often not adequately protected from flood damage. This item is eligible for Community Rating System credits under Activity 410 (Floodplain Mapping).

Ideas for Implementation
• Review status of Cooperating Technical Partnership agreement. • Coordinate technical information created in Stormwater Master Planning and flood mitigation efforts as part of Cooperating Technical Partnership agreement. • Initiate flood studies in critical hazard areas in order to prepare new maps. • Modify agreement as needed to reflect available resources and information.

Lead Agency	Timeline	Other Benefits
Salem Public Works	Long term (2–5 years)	CRS

Internal Partners	External Partners
Community Development—Planning Fire—Emergency Management	FEMA

Proposed Action Item: Property Protection Activity 1

Proposed Action Item PP1 (68)		Alignment with Goals
Improve floodplain protection assistance program		• Protect existing and future development • Reduce economic loss
Rationale for Proposed Action Item		
FEMA has found citizens are more likely to undertake activities to reduce flood hazards to their property if they can get reliable information in their own community. Community information and advice could be for addressing drainage problems, retrofitting existing structures, and properly locating and building new structures. Research has also found that property owners are much more likely to implement appropriate mitigation measures if they have financial support.		
Ideas for Implementation		
Implement four areas of protection assistance as specified in the CRS Coordinator's Manual: • Property protection advice for providing one-on-one advice about property protection (such as retrofitting techniques and drainage improvements). • Establishing a policy to make a site visit before providing property protection advice. • Providing advice on financial assistance programs that may be available. • Providing training for advisors through the Emergency Management Institute on retrofitting or grant programs.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	CRS
Internal Partners	**External Partners**	
Community Development—Planning Fire—Emergency Management	FEMA	

Proposed Action Item: Property Protection Activity 2

Proposed Action Item PP2 (71)		Alignment with Goals
Promote flood insurance		• Protect existing and future development • Reduce economic loss
Rationale for Proposed Action Item		
Many people are not aware that flood insurance is available, and many of those who are aware do not see a need to insure their property. Promoting flood insurance protects citizens from the consequences of flooding.		
Ideas for Implementation		
• Assess the community's current level of coverage and identify shortcomings. • Form a flood insurance committee of local insurance agents and lenders to prepare a coverage improvement plan • Implement projects in the coverage improvement plan. • Providing advice to citizens about flood insurance.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	CRS
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA, DLCD, Salem Chamber of Commerce

Proposed Action Item: Property Protection Activity 3

Proposed Action Item PP3 (2)		Alignment with Goals
Acquire easements for public and private stormwater facilities		• Protect existing and future development
Rationale for Proposed Action Item		
This item is identified as RC2, Task 3, of the 2010 Stormwater Management Plan. City staff maintains the stormwater system by removing debris and ensuring proper function of infrastructure. Where easements are lacking along open channel or piped drainage systems, City staff has limited access to infrastructure, which can result in improper function of stormwater systems during rainfall events, increasing risk of local flooding.		
Ideas for Implementation		
• Research stormwater systems on private property to determine where easements are lacking. • Prioritize easement acquisition based on critical nature of stormwater infrastructure and risk of flooding.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	SWMP
Internal Partners		**External Partners**
Urban Development—Real Estate Legal		FEMA

Proposed Action Item: Natural Resource Protection Activity 1

Proposed Action Item NR1 (31)		Alignment with Goals
Provide grant funding for restoration projects in riparian areas		• Protect the natural environment
Rationale for Proposed Action Item		
This item is identified as RC8 of the 2010 Stormwater Management Plan. This program provides small matching grants for restoration and enhancement of properties to enhance water quality benefits.		
Ideas for Implementation		
• Select projects that reduce stormwater runoff, restore natural areas, and protect water quality through education. • Currently focused on volunteer organizations and educational facilities, the program could be expanded to industry, businesses, and individuals, pending available funding. • Evaluate the criteria for selecting projects to optimize the benefits and the costs for each project and to assure meeting overall water quality goals of the Stormwater Management Program in reducing pollutants to the MEP.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	SWMP
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		Oregon Division of State Lands (DSL), US Army Corps of Engineers, watershed councils

Proposed Action Item: Natural Resource Protection Activity 2

<table>
<tr><th colspan="3">Proposed Action Item NR2 (10)</th><th>Alignment with Goals</th></tr>
<tr><td colspan="3">Amend Salem Revised Code to implement provisions of the Endangered Species Act as they relate to floodplain development</td><td>• Protect the natural environment</td></tr>
<tr><th colspan="4">Rationale for Proposed Action Item</th></tr>
<tr><td colspan="4">FEMA and the National Marine Fisheries Service (NMFS) are consulting about the effect of floodplain development on endangered species. The Oregon Department of Land Conservation and Development has formed a committee to consider statewide policies to ensure Oregon's National Flood Insurance Program is not likely to adversely affect endangered species. Local communities are advised to adopt changes to their floodplain management programs to ensure compliance with the Endangered Species Act.</td></tr>
<tr><th colspan="4">Ideas for Implementation</th></tr>
<tr><td colspan="4">• Participate with DLCD in statewide policy creation.
• Once completed, adopt Oregon model ordinance language regarding endangered species protection in floodplains.</td></tr>
<tr><th>Lead Agency</th><th>Timeline</th><th colspan="2">Other Benefits</th></tr>
<tr><td>Salem Public Works</td><td>Short term (0–2 years)</td><td colspan="2"></td></tr>
<tr><th colspan="2">Internal Partners</th><th colspan="2">External Partners</th></tr>
<tr><td colspan="2">Community Development—Planning</td><td colspan="2">FEMA, National Marine Fisheries Service, Oregon Department of Land Conservation and Development, League of Oregon Cities</td></tr>
</table>

Proposed Action Item: Natural Resource Protection Activity 3

Proposed Action Item NR3 (27)		Alignment with Goals
Develop stormwater quality design and associated maintenance standards for new and redevelopment		• Protect the natural environment
Rationale for Proposed Action Item		
This item is identified as RC 3,Task 1, of the 2010 Stormwater Management Plan. Stormwater quality standards will help reduce pollutants associated with stormwater runoff from new development after construction is completed through the requirement of structural controls for water quality and quantity (post-construction controls).		
Ideas for Implementation		
• Implement standards consistent with the Stormwater Management Plan according to timelines established in the City's MS4 permit.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	SWMP, CRS
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		DEQ, HomeBuilders Association, Salem Chamber of Commerce

Proposed Action Item: Natural Resource Protection Activity 4

Proposed Action Item NR4 (77,78)		Alignment with Goals
Implement Riparian Action Plan.		• Protect the natural environment
Rationale for Proposed Action Item		
The City's Riparian Action Plan compiles city-wide efforts to improve and protect riparian areas surrounding local waterways. This item combines a number of riparian action items in the City's Stormwater Management Plan.		
Ideas for Implementation		
Riparian Action Plan elements include but are not limited to the following: • Implement code revisions to appropriate sections of *Salem Revised Code Chapters 68 and 132* to enhance riparian buffer protection. • Prioritize target riparian areas to increase tree canopy. • Develop a process for managing conservation areas. • Develop an outreach plan.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	
Internal Partners		**External Partners**
Community Development—Planning		FEMA, watershed councils, HomeBuilders Association, Salem Chamber of Commerce

Proposed Action Item: Natural Resource Protection Activity 5

Proposed Action Item NR5 (9, 32 ,33, 39, 40, 41, 44, 45, 76)	Alignment with Goals
Develop and maintain watershed management plans	• Increase cooperation and coordination among stakeholders • Protect the natural environment

Rationale for Proposed Action Item

This item is identified as RC1, Task 2, of the 2010 Stormwater Management Plan. The Pringle Creek Watershed Management Plan was adopted as a model for other plans. Watershed Management Plans provide greater detail by focusing on the needs of each specific urban watershed. Watershed Management Plans identify major CIPs listed in the Stormwater Master Plan and integrate these facilities with development codes for on-site facilities, stream restoration projects, and other specific smaller scale improvements. This action item is eligible for Community Rating System credits under Activity 510 (Natural Floodplain Functions Plan).

Ideas for Implementation

- Complete a hydromodification study and a retrofit plan.
- Using the Pringle Creek Watershed Management Plan as a guideline, create additional watershed management plans.
- Create a Watershed Planning Committee of City staff and other community stakeholders to track implementation of the City's watershed management plans, coordinate efforts to seek funding for the plan actions, and monitor changes to the watershed.

Elements of watershed management master plans may include:

- A plan for enhancing natural functions for City-owned properties in the floodplain.
- A habitat conservation plan that explains and recommends actions to protect rare, threatened, or endangered aquatic or riparian species.
- A habitat protection or restoration plan that identifies critical habitat within the floodplain, actions to protect remaining habitat, and/or actions to restore fully functioning habitat.
- A green infrastructure plan that identifies open space corridors or connected networks of wetlands, woodlands, wildlife habitats, wilderness and other areas that support native species, maintain natural ecological processes, and sustain air and water resources.
- An inventory of the ecological attributes of the watershed and/or the floodplain and recommends appropriate actions for protecting them.
- A plan for providing incentives for floodplain restoration and vegetation.

Lead Agency	Timeline	Other Benefits
Salem Public Works	Long term (2–5 years)	SWMP

Internal Partners	External Partners
Community Development—Planning Fire—Emergency Management	FEMA, watershed councils

Proposed Action Item: Natural Resource Protection Activity 6

Proposed Action Item NR6 (35,64)		Alignment with Goals
Streamline process to accept land donations to City for natural areas		• Protect the natural environment
Rationale for Proposed Action Item		
Property owners occasionally request to donate natural areas to the City for preservation of natural resources. The process of donation can be lengthy because the City lacks a formal process for such requests. By streamlining the donation process, the City will increase the amount open space preserved for natural functions.		
Ideas for Implementation		
• Form a staff committee to determine barriers to land donations • Adopt codes, standards, or policies needed to implement needed changes • Distribute public outreach materials to encourage land donations		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	
Internal Partners		**External Partners**
Community Development—Planning Legal		Watershed councils

Proposed Action Item: Natural Resource Protection Activity 7

Proposed Action Item NR7 (38)		Alignment with Goals
Increase quality and quantity of vegetative cover		• Protect the natural environment
Rationale for Proposed Action Item		
Tree canopy provides a host of watershed benefits, including water purification, ground water and surface flow regulation, erosion control, and streambank stabilization. Floodplain function can be restored to a more natural condition by increasing the quality and quantity of tree canopy.		
Ideas for Implementation		
• Create and implement a Community Forestry Strategic Plan based on committee recommendations.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA

Proposed Action Item: Emergency Services Measure 1

Proposed Action Item ES1 (51)		Alignment with Goals
Coordinate emergency response plans for critical facilities		• Protect lives • Increase cooperation and coordination among stakeholders
Rationale for Proposed Action Item		
Critical facilities throughout the community include emergency response plans. Joint efforts continue among emergency management representatives to coordinate emergency responses community-wide.		
Ideas for Implementation		
• Continue multi-jurisdictional coordination efforts throughout the community through emergency management representatives.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Ongoing	
Internal Partners	**External Partners**	
Community Development—Planning Fire—Emergency Management	FEMA, Oregon Emergency Management, City of Keizer, Marion County, Polk County, Salem Hospital	

Proposed Action Item: Emergency Services Measure 2

Proposed Action Item ES2 (48, 49, 50)		Alignment with Goals
Create post-flood procedures for gathering flood data		• Protect lives • Protect existing and future development • Increase cooperation and coordination among stakeholders
Rationale for Proposed Action Item		
During and after flood events, City staff receives numerous questions and comments from citizens affected by flooding. Citizens often have first-hand information regarding flood data, including depth of flooding, damage assessment, and other related flood information. By establishing post-flood procedures, City staff will be prepared to collect key flood information from affected parties immediately after a flood event.		
Ideas for Implementation		
• Develop a post-flood procedure for documenting damaged properties. • Develop a post-flood procedure for collecting survey information about flood elevations. • Modify questionnaires that are used during flood events to improve flood data collection.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Long term (2–5 years)	
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management		FEMA, Oregon Emergency Management

Proposed Action Item: Emergency Services Measure 3

Proposed Action Item ES3 (52, 53)	Alignment with Goals
Improve flood warning and response	• Protect lives • Increase cooperation and coordination among stakeholders

Rationale for Proposed Action Item

This item is identified in part as Multi-Hazard #7 in the Salem Natural Hazards Mitigation Plan. CRS credits are available for flood warning and response to encourage communities to ensure timely identification of impending flood threats, disseminate warnings to appropriate floodplain occupants, and coordinate flood response activities to reduce the threat to life and property.

Ideas for Implementation

- Develop strategies in local building codes and zoning ordinances to reduce the impact of natural hazard events on buildings and infrastructure.
- Continue to develop a reverse 9-1-1 system to alert nearby residents and businesses of natural hazard events.

Lead Agency	Timeline	Other Benefits
Salem Fire—Emergency Management	Long term (2–5 years)	CRS

Internal Partners	External Partners
Community Development—Planning Public Works	ODOT, FEMA, OSHA

Proposed Action Item: Structural Project 1

Proposed Action Item SP1 (3, 55 ,56, 57, 58, 59, 60)	Alignment with Goals
Construct stormwater capital improvement projects	• Protect lives • Protect existing and future development

Rationale for Proposed Action Item

The *Stormwater Master Plan* identifies the location of deficient culverts and open channel facilities. Capital improvement projects are often needed in order to provide additional capacity or other forms of mitigation to reduce flood damage. By addressing 100-year flood flows and damage caused during major flood events, the Master Plan targets expenditures for flood mitigation based on a comprehensive view of all flood impacts. This item is identified as RC2, Task 1, of the 2010 *Stormwater Management Plan*. Capital improvement projects can provide increased capacity, restore natural and beneficial functions and reduce flood hazards.

Ideas for Implementation

- Include 100-year flood flows when developing stormwater modeling analysis for the Master Plan.
- Consider valuation from damage assessments in the Natural Hazard Mitigation Plan when prioritizing mitigation projects.
- When proposing solutions to flooding problems in the Master Plan, prioritize solutions based on reduction in flood damage during 100-year events.
- Implement stormwater projects based on priorities established under the Capital Improvement Program (CIP) and the *Stormwater Master Plan* consistent with available funding.
- Update the Stormwater Systems Development Charge methodology consistent with the Master Plan to provide funding for eligible projects.

Lead Agency	Timeline	Other Benefits
Salem Public Works	Ongoing	

Internal Partners	External Partners
Community Development—Planning Fire—Emergency Management Administrative Services—Finance	FEMA, Oregon Division of State Lands, US Army Corps of Engineers

Proposed Action Item: Structural Project 2

Proposed Action Item SP2 (54)		Alignment with Goals
Include damage assessments from Natural Hazard Mitigation Plan as a criteria for prioritizing CIP projects		• Protect existing and future development • Reduce economic loss
Rationale for Proposed Action Item		
Capital improvement projects are selected based on wide variety of factors. For stormwater and flood mitigation projects, CIP projects should use damage assessment data as additional criteria to ensure capital improvements reduce all sources of potential flood damage.		
Ideas for Implementation		
• Include damage assessment information in assess management data and CIP prioritization templates. • Publish estimated damage reductions when considering and selecting stormwater and flood mitigation projects in the CIP.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	
Internal Partners		**External Partners**
Community Development—Planning Fire—Emergency Management Administrative Services—Finance		FEMA

Proposed Action Item: Public Information Activity 1

Proposed Action Item PI1 (70)		Alignment with Goals
Require hazard disclosure in real-estate transactions.		• Reduce economic loss
Rationale for Proposed Action Item		
Federal regulations enacted pursuant to the Flood Disaster Protection Act of 1973 (as amended by the National Flood Insurance Reform Act of 1994) require only that a lender advise a person of the flood hazard before closing on the loan. CRS credits are available when communities require hazard disclosure earlier in the real-estate transaction.		
Ideas for Implementation		
• Require real estate agents to notify those interested in purchasing properties located in the Special Flood Hazard Area (SFHA) about the flood hazard and the flood insurance purchase requirement. • Provide multiple methods of hazard disclosure, such as subdivision plats, landlord disclosure to renters, disclosure in deed records, and other methods as described in the CRS Coordinator's Manual. • Create brochures or handouts for real estate agents to advise potential buyers to investigate the flood hazard for a property. • Include disclosure of other flood-related hazards, such as erosion, subsidence, or wetlands.		
Lead Agency	**Timeline**	**Other Benefits**
Salem Public Works	Short term (0–2 years)	CRS
Internal Partners		**External Partners**
Community Development—Planning Legal		FEMA, Salem Chamber of Commerce, Oregon Real Estate Agency

Proposed Action Item: Public Information Activity 2

Proposed Action Item PI2 (61, 62, 63, 65, 66, 67)	Alignment with Goals
Create and implement a Program for Public Information	• Protect existing and future development • Increase cooperation and coordination among stakeholders

Rationale for Proposed Action Item

CRS credits are available for communities that create a public information program for floodplain management. The Program for Public Information (PPI) is an ongoing public information effort to design and transmit the messages most important to flood safety and the protection of natural floodplain functions. A PPI includes a variety of public information endeavors, such as outreach efforts, website information, and technical assistance.

Ideas for Implementation

Follow the seven-step PPI creation process as specified in the CRS Coordinator's Manual. Elements of the PPI could include the following:
- Compile and improve outreach tools (information) to guide floodplain owners
- Update and adopt Floodplain Planting and Habitat Restoration Guide
- Upload and organize outreach materials on website
- Improve tree canopy outreach as means to reduce runoff
- Improve floodplain information on City website

Lead Agency	Timeline	Other Benefits
Salem Public Works	Long term (2–5 years)	CRS

Internal Partners	External Partners
Community Development—Planning Fire—Emergency Management	FEMA, Oregon Emergency Management