Flood Mitigation Action Plan

Eagle Point, Oregon

Final Draft - November 29, 2000

Final Report Prepared for:

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Executive Summary

Eagle Point has experienced numerous floods over the past decade resulting in property damage and the need for emergency services. The chronic nature of flooding in Eagle Point underscores the need for strategies to reduce risk and prevent loss from future flood events. As a result of the 1996/1997 flood damage, Eagle Point applied for and received a Federal Emergency Management (FEMA) Hazard Mitigation Grant. The grant, obtained through the Oregon State Police – Office of Emergency Management, supplied money principally for elevating or relocating damaged structures. The grant also provided funds for developing a Flood Mitigation Action Plan. The City of Eagle Point contracted with Community Planning Workshop (CPW) to develop the Flood Mitigation Action Plan.

Flooding in Eagle Point comes primarily from the overflow of Little Butte Creek. The major floods in this area are usually the result of heavy snowfall in the upper areas of the Little Butte Creek basin followed by a sudden warm rain event. If the top layer of snow freezes before warm rains, conditions conducive to very rapid runoff exist. Moreover, localized drainage problems exist in the western portions of the City. Several drainage channels for irrigation and stormwater collection traverse the City and have historically contributed to localized flooding.

As the population of Eagle Point grows, and land is developed for residential and business purposes, impervious surfaces, stormwater management and drainage become increasingly important because they affect drainage into the Little Butte Creek. Approximately ninety-eight percent of water running through, or generated in, the City of Eagle Point makes its way to Little Butte Creek.[1]

The Eagle Point Flood Mitigation Action Plan contains recommendations to meet flood mitigation goals as outlined by the Federal Emergency Management Agency. These recommendations consider the public prioritization of flood mitigation goals and activities conducted during a public forum in Eagle Point on September 28, 2000, as well as expert interviews conducted by CPW. Each of the recommendations are supplemented with information related to the potential constraints, as well as partners and/or resources available at the federal, state and local level to assist in implementation. The public participation process strengthens the value of this Flood Mitigation Action Plan and may assist as applications for flood mitigation funding are submitted to state and federal organizations. This Flood Mitigation Action Plan can be used in the following ways:

1. As a catalyst for agency coordination and public involvement;
2. To identify and prioritize future mitigation projects that the City can implement when funding becomes available;
3. To assist in meeting qualifications for the National Flood Insurance Program's (NFIP) Community Rating System (CRS); and
4. As a source of ideas for long term flood mitigation activities.

Act as a catalyst for agency coordination and public involvement

This plan recommends partnerships between local and regional government agencies, and local organizations and citizens. In addition, sections of this plan can be used for public education and outreach.

Attract funding for mitigation projects

Eagle Point can use this Plan as documentation of current mitigation activities and a needs assessment to justify applying for grant programs such as FEMA's Flood Mitigation Assistance Program (FMA) or to apply for updated Flood Insurance Rate Maps. This plan addresses criteria that can assist communities in gaining eligibility for FEMA Flood Insurance and Flood Mitigation Programs. *(Appendix D describes FEMA programs in more detail.)*

Qualifying for the Community Rating System

Jackson County is currently a CRS county and can assist Eagle Point in receiving a community rating.[2] Communities are given points by the NFIP based on the planning process they go through in drafting overall flood response plans and flood mitigation plans above and beyond the minimum requirements for the NFIP. The CRS advocates a comprehensive planning process, which includes a broad base of public support.

Act as a source of ideas for long-term flood mitigation activities.

This Flood Mitigation Action Plan includes comments and suggestions by local community members as well as City planning staff and emergency managers. As Eagle Point continues to grow and develop, ideas documented in this Plan can be built upon to ensure that growth does not contribute to risk, and that through community outreach and sound land use planning, risk from flooding in Eagle Point will ultimately diminish.

This Plan should be adopted by the City of Eagle Point for use as a framework plan to address the City's flood hazards. As Eagle Point is completing periodic review of its Comprehensive Plan in 2001, there is further opportunity to integrate this Flood Mitigation Action Plan into the comprehensive plan, addressing elements of the Department of Land Conservation and Development's land use Goal 7 requirements.

Flood Mitigation Goals

Goals for this Flood Mitigation Action Plan were derived from FEMA flood mitigation goals and guidelines from the Flood Mitigation Assistance program. The five goals include:

1. **Protect Individual Properties**: Property protection focuses resources on activities involving property owners, and emphasizes measures that assist in protecting homes, structures or property from high water. *Property protection activities* primarily protect structures in flood hazard areas. Property owners can undertake them on a building-by-building or parcel basis.

2. **Guide Development and Use of the Floodplain**: Guiding development and use of the floodplain can prevent flood damage and reduce risk from flood damage through community organization, land use and planning. If no structures or important public facilities exist in the floodplain, there is minimal risk of damage from floods. This option is limited as some of the most desirable land for living, farming, and recreating lies in floodplains. *Preventative activities* attempt to keep flood problems from getting worse by addressing development collectively. Planning, land acquisition, or regulation helps to guide the use and development of flood-prone areas. Building, planning, and/or code enforcement offices administer most preventative activities.

3. **Protect and Enhance Natural Functions of the Floodplain**: Watershed planning activities act as a safeguard for flood protection and can help to protect and enhance fish and wildlife populations. *Watershed planning activities* preserve or restore natural areas or the natural functions of floodplain and watershed areas. Conservation agencies or organizations may help implement watershed planning activities.

4. **Enhance Emergency Services**: Emergency service activities focus resources on warning of impending flood conditions and emergency response after flooding events have occurred. *Emergency service activities* are taken prior to and during a flood to minimize its impact. County and City emergency management staff and emergency response personnel administer these measures.

5. **Increase Public Awareness**: Risk from flood events can also be reduced through increased public awareness. Residents and property owners well informed about mitigation activities, floodplain functions, emergency service procedures, and potential hazards will be more supportive of risk reduction efforts. *Public information activities* advise property owners, potential property owners, and visitors about the hazard, property protection and human safety measures, and the natural and beneficial functions of local floodplains. A variety of organizations and agencies can implement public information activities.

Chapter 5 of the Eagle Point Flood Mitigation Plan describes activities that can assist communities in reaching the different goals. Activities were derived from other flood mitigation planning documents and interviews with citizens and City staff in Eagle Point.

Recommendations

Recommendations consider local, state and federal resources, the public input, and the vulnerability assessment. They are organized by the order of goals and activities ranked at the September 28th, 2000 Eagle Point public forum. Recommendations for each goal section are marked by initials and the number of the recommendation such as R-1 (recommendation #1). Specific categories for recommendations are:

- Property Protection Action Item Recommendations (PP-#)
- Preventative Activity Action Item Recommendations (PA-#)
- Watershed Planning Action Item Recommendations (WP-#)
- Emergency Service Action Item Recommendations (ES-#)
- Public Information Action Item Recommendations (PI-#)

Chapter 6 of the Eagle Point Flood Mitigation Action Plan provides details on each of the recommendations, including a description of partners, tools for implementation and potential constraints. Partners of local, regional, state or federal representation can act as lead organizations or assist in implementing specific action items. Tools for implementation are resources that can assist during implementation of action items. These tools consist of state and federal technical documents, and local policy and planning measures. Some action items may not be feasible due to economic, administrative or environmental burdens. Identifying possible constraints early in the planning process may help to recognize potential solutions. This plan also includes a framework for completing the next step of the Flood Mitigation Action Plan. The framework provides opportunity to identify lead and participating organizations, timeline for implementation, total cost of the action item and potential funding sources.
Table 1-A describes recommendations for the five goal areas addressed in this document.

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Table 1-A Recommendations for flood mitigation action items				
Goal #1 Property Protection (PP-#)	**Goal #2 Preventative Activities (PR-#)**	**Goal #3 Watershed Planning (WP-#)**	**Goal #4 Emergency Services (ES-#)**	**Goal #5 Public Information (PI-#)**
PP-1: Avoid developing in flood hazard areas.	**PR-1:** Develop revised Flood Insurance Rate Maps (FIRM).	**WP-1:** Conduct a wetlands inventory.	**ES-1:** Disseminate information on "registration for seniors and persons with disabilities."	**PI-1:** Develop and conduct workshops for community members on NFIP programs, mitigation and potential assistance.
PP-2: Consider applying for the Federal Emergency Management Agencies (FEMA) Flood Mitigation Assistance (FMA) program funds. FMA grant programs can provide assistance for elevation and acquisition projects.	**PR-2:** Consider using land acquired from the HGMP program as open space and parks. Land acquired through hazard mitigation grant programs must adhere to federal guidelines, such as not allowing the construction of buildings or impervious surfaces.	**WP-2:** Target wetland restoration to use wetlands as stormwater detention systems.	**ES-2:** Coordinate river gauge information between the Little Butte Watershed Council, Jackson County Emergency Management and the National Weather Service to make effective use of the river gauges in notifying the City of Eagle Point of potential flooding.	**PI-2:** Disseminate the Jackson County Emergency Preparedness Plan for Families to all Eagle Point residents using means that will ensure residents understand the value and use of the document.
PP-3: Consider applying for eligibility for FEMA's Community Rating System, which provides reduced insurance premium incentives for homeowners with flood insurance or who have undertaken other mitigation activities such as elevation.	**PR-3:** Review and evaluate the draft storm water management plan for flood elements and relevant flood mitigation activities. **PR-4:** Develop stormwater detention in new subdivisions using existing wetlands where available. **PR-5:** Use GIS technology by mapping future high water events to establish a more accurate flood hazard database.	**WP-3:** Work with Little Butte Watershed Council to enhance the natural floodplains.	**ES-3:** Review and update the Eagle Point Emergency Operations Plan.	

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Chapter 1: Introduction

1.1 Background

When the Little Butte Creek flooded December 31st, 1996, and into early 1997, many residents were reminded of the devastating floods of the early 1960's. The 1996/1997 floods were predicated by snow and rain that had been abundant in the weeks before. On January 23, 1997, President Clinton declared four Oregon counties, including Jackson County, eligible for disaster assistance due to damages resulting from severe winter storms, landslides and mudslides.[3] In the wake of these flood events, Eagle Point applied for and received a Federal Emergency Management (FEMA) Hazard Mitigation Grant. The grant, obtained through the Oregon State Police – Office of Emergency Management, supplied money principally for elevating and relocating damaged structures. The grant also supplied a portion of funds for developing this Flood Mitigation Action Plan.

Photo by: Jim Cowan/Mail Tribune January 1997

The City of Eagle Point, incorporated in 1911, is located in Jackson County in southwestern Oregon. Since the 1960s, Eagle Point, northeast of Medford, has been growing rapidly. From 1960 to 1999, the population of Eagle Point increased by eighty-four percent.[4] Moreover, most of the remaining undeveloped land within the urban growth boundary of Eagle Point has been platted. The substantial inventory of undeveloped residential lots, along with the completion of the Eagle Point Golf Course in 1996, suggest that the rapid population growth experienced over the last decade will continue for the next several years. A growing population, future development and the likelihood of potential flood events emphasizes the need for strategies to reduce risk and prevent loss from future flood events.

Little Butte Creek, which has repeatedly subjected Eagle Point to major flooding, has its origin in the Rogue River National Forest, which lies to the north and east of the City. It enters the expansive agricultural valley, in which Eagle Point is located, approximately three to four miles upstream from Eagle Point. Little Butte Creek flows through the center of Eagle Point from the northeast to the southwest, eventually emptying into the Rogue River; it is the major cause of flooding in the City. In the vicinity of Eagle Point, Little Butte Creek has a drainage area of approximately nine hundred thirty-eight square miles.[5]

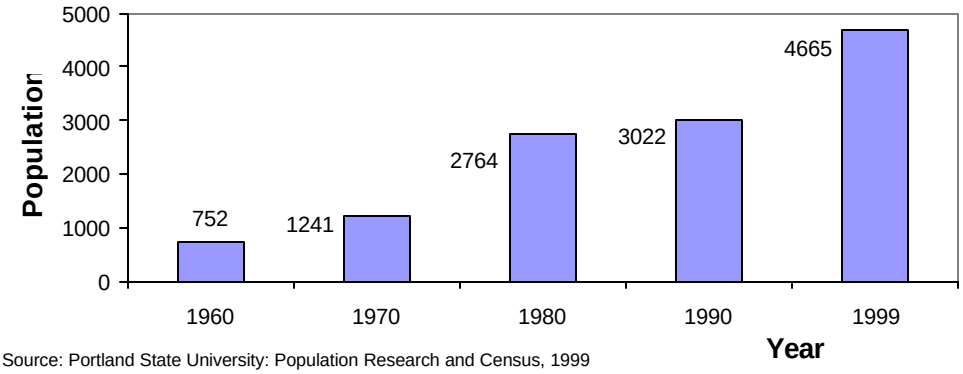
The major access roads in the area are Crater Lake Highway (State Highway 62), and Royal Avenue (Brownsboro Highway) to State Highway 140 and Shasta Avenue. All three of these roads were under water during the flood of 1962, isolating Eagle Point.[6] Map 1-1 shows the study area for this Flood Mitigation Action Plan. The 100-year floodplain extends from Reese Creek Road on the north side of the Little Butte Creek, southwest to Highway 62. On the eastern side of the creek the floodplain extends the length of Shasta Avenue to both ends of Eagle Point's urban growth boundary.

INSERT: Map 1-1 – Eagle Point Study Area Map

Flooding in Eagle Point comes primarily from the overflow of Little Butte Creek. The major floods in this area are usually the result of a heavy snowfall in the upper areas of the Little

Butte Creek basin followed by a sudden warm rain. If the top layer of snow freezes before warm rains, conditions conducive to very rapid runoff exist. Moreover, localized drainage problems exist in the western portions of the City. Several drainage channels for irrigation and stormwater collection traverse the City and have historically contributed to localized flooding. As the City of Eagle Point grows (as shown in Figure 1-1 below), and land is developed for residential and business purposes, impervious surfaces, stormwater management and drainage become increasingly important because they affect drainage into the Little Butte Creek. Approximately ninety-eight percent of water running through, or generated in, the City of Eagle Point makes its way to Little Butte Creek.[7]

Figure 1-1
Eagle Point Population



Source: Portland State University: Population Research and Census, 1999
Source: U.S. Census 1960, 1970, 1980, 1990

Within the City of Eagle Point, most existing development subject to flood damage is concentrated along the Little Butte Creek. Areas of the floodplain are on both sides of the creek, accessed by Royal Avenue and Shasta Avenue. There are one hundred and seventy-one parcels in the 100-year floodplain. Seventy-eight homes in the 100-year floodplain are insured through the National Flood Insurance Program (NFIP) as of October, 1999. Forty-nine of those homes insured with NFIP were constructed before the Flood Insurance Rate Maps (FIRM), and the adoption of the county's flood hazard area regulations. The majority of structures within the study area are generally not constructed to elevation standards that protect against larger magnitude flood events. Table 1-1 depicts the number of homes in the floodplain with flood insurance and the number of homes constructed before the Flood Insurance Rate Maps (pre-FIRM homes) were developed.

Table 1-1
Homes in the 100-year floodplain

Number of homes in the 100-year Floodplain	171	100%
Number of homes with flood insurance.	78	46%
Pre-FIRM housing	49	63%

Flooding in the South Fork of the Little Butte Creek is also affected by regulations of the Endangered Species Act. Increased amounts of woody debris placed to enhance fish habitat can also cause debris dams that attribute to damaging flood events and debris flows. The

South Fork of the Little Butte Creek supports Southern Oregon/Northern California coho salmon, Southern Oregon/Northern California Chinook salmon and Klamath Mountain Province steelhead. The stream also supports resident fish populations of SOCC cutthroat trout, rainbow trout, and brook trout.[8]

1.2 Purpose of the Plan

Eagle Point has experienced numerous floods over the past decade resulting in property damage and the need for emergency services. The chronic nature of flooding in Eagle Point underscores the need for strategies to reduce risk and prevent loss from future flood events. As a result of the 1996/1997 flood damage, Eagle Point applied for and received a Federal Emergency Management (FEMA) Hazard Mitigation Grant. The grant, obtained through the Oregon State Police - Office of Emergency Management, supplied money principally for elevating or relocating damaged structures. The grant also supplied a portion of funds for developing a Flood Mitigation Action Plan. The City of Eagle Point contracted with Community Planning Workshop (CPW) to develop the Flood Mitigation Action Plan.

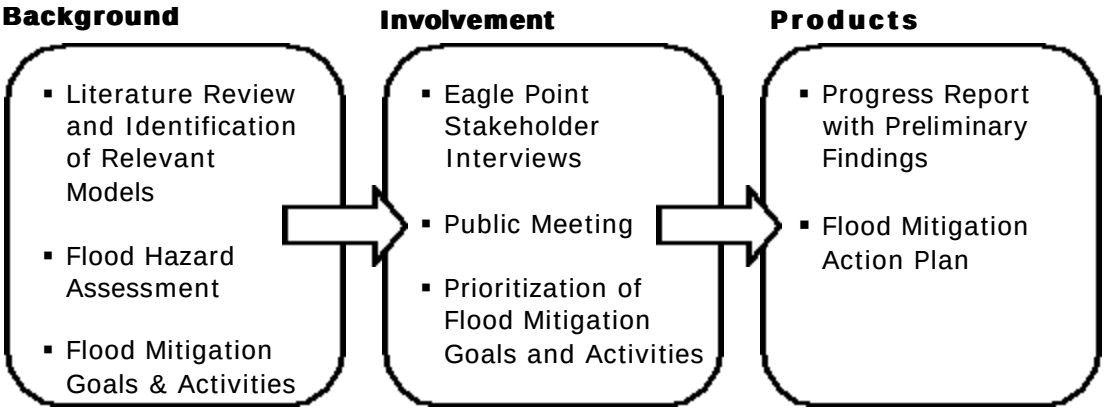
FEMA recommends a process for creating flood mitigation plans in its publication *Flood Mitigation Assistance: Program Overview and Guidance for Planning Grants*, yet the agency states that there is not a "cookbook" solution to fix a problem.[9] Therefore, this plan uses FEMA's recommended planning framework, modified to address the specific issues faced in the Eagle Point. The purpose of this plan is to:

- Ensure that all possible flood risk reduction activities are considered so that the local flood problem may be addressed by the most appropriate and efficient solutions;
- Link floodplain management policies to flood risk reduction activities;
- Ensure that flood risk reduction activities are coordinated as much as possible with each other (to prevent conflicts and reduce costs of implementing each individual activity);
- Educate residents on the flood hazard, flood risk reduction activities, and the natural and beneficial functions of floodplains;
- Build public and political support for projects that prevent new flood problems, reduce flood losses, and protect the natural and beneficial functions of floodplains;
- Facilitate implementation of floodplain management activities; and
- Fulfill planning requirements for state and federal assistance programs.

1.3 Methodology

Community Planning Workshop used FEMA's *Flood Mitigation Assistance: Program Overview and Guidance for Planning Grants* in developing this plan, and reviewed other documents, including Wisconsin's *Community Flood Mitigation Planning Guidebook*[10], Massachusetts' *Flood Hazard Mitigation Planning: A Community Guide*[11], and a number of Oregon hazard mitigation plans. Figure 1-2 shows the planning process for the Eagle Point Flood Mitigation Action Plan.

Figure 1-2
Little Butte Creek Flood Mitigation Action Plan Process



Flooding has no regard for jurisdictional boundaries making it necessary for a regional perspective for flood hazard planning. The decisions made in one area of a watershed may affect flooding events in an area downstream. Furthermore, coordinated mitigation efforts facilitate efficiency through shared knowledge gained from research and policy initiatives.

The Eagle Point Flood Mitigation Plan takes into account floodplain planning and development guidelines as outlined by the U.S. Army Corps of Engineers and the Department of Land Conservation and Development. The plan recognizes that flood mitigation efforts must address the Land Conservation and Development Commission's Statewide Planning Goals; specifically Goal 7 (Areas Subject to Natural Disasters and Hazards), Goal 3 (Agricultural Lands), Goal 4 (Forest Lands), Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources), and Goal 6 (Air, Water, and Land Resources Quality).

1.4 Organization of the Plan

Following the plan introduction discussed in **Chapter 1**, the remainder of the Flood Mitigation Action Plan is organized as follows:

- **Chapter 2**: **Eagle Point Flood Hazard** describes flooding characteristics in Eagle Point.
- **Chapter 3: Flood Hazard Information** presents technical information on the flood hazard, flood hazard identification and how floods affect Oregon communities.
- **Chapter 4: Flood Hazard Assessment** describes the three phases of hazard assessment: hazard identification, vulnerability assessment and risk analysis.
- **Chapter 5: Flood Mitigation Goals and Activities** presents goals and activities as outlined by the Federal Emergency Management Agency to reduce risk from the flood hazard, as well as existing mitigation activities happening in Eagle Point.
- **Chapter 6: Recommendations** provides a set of recommendations based on the research findings of the flood hazard assessment and the public ranking of goals and activities.

- **Chapter 7: Implementation and Evaluation** describes strategies for implementing the Plan's recommendations and evaluating flood mitigation goals and activities.

This report also includes four appendices:

- **Appendix A: Stakeholder Interviews** provides a summary of responses given to questions posed to City and County staff and local residents.

- **Appendix B: Public Meeting Comments** presents the comments provided by residents and stakeholders in Eagle Point at a September, 2000 public meeting.

- **Appendix C: Glossary** provides definitions of terms relevant to flood hazard mitigation.

- **Appendix D: Flood Mitigation Programs** presents information on programs providing community assistance in the realm of flood mitigation.

Chapter 2: Eagle Point Flood Hazard

2.1 Causes and Characteristics of Flooding in Eagle Point

Harsh weather patterns and precipitation in the upper Butte Creek watershed causes the water level in the lower watershed to rise within a matter of hours. A hydrograph was not graphed for the 1996/1997 flood events, as there were no river gauges on the Little Butte Creek at that time, nor is there specific data on earlier historical flood levels in the City of Eagle Point. Currently, there are three full telemetry stations in the vicinity of Eagle Point measuring flows on Little Butte Creek, including a station at the southwestern edge of the City limits. Information from those stations will provide valuable data to public works and emergency management officials in the future.

2.2 1996/1997 Flood Damage

Twenty-eight recorded homes experienced damage in the 1996/1997 flood events. According to the Federal Emergency Management Agency (FEMA) flood damage survey, thirty-five percent of the homes that reported damage in the 1996/1997 floods were built in the post-FIRM (Flood Insurance Rate Maps) time period.[12]

Of the twenty-eight homes damaged in the 1996/97 floods, twenty-five had flood insurance. It was primarily from these insured properties that monetary damage was reported and could be assessed. Table 2-1 describes the statistics of homes in the 100-year floodplain that experienced damage in the 1996/1997 flood events.

Table 2-1
Statistics of 1996/1997 damage in the 100-year floodplain[13]

Number of homes in the 100-year Floodplain	171	100%
Number of homes with flood insurance.	78	46%
Number of homes that experienced flood damage	28	17%
Number of damaged homes built before the Flood Insurance Maps were done (pre-FIRM).	10	36% of all damaged homes

Table 2-2 shows the results of the FEMA damage assessment.

Table 2-2
1996/1997 Eagle Point Flood Damage[14]

Type	Amount
Assessed Value, Improvements	$2,670,948
Reported damage to buildings	$248,999
Reported damage (buildings and other possessions)	$ 278,053
Building Damages Claims Paid	$238,362
Building and Contents Damages Claims Paid	$ 261,207
Repetitive Loss (From 1995 Floods)	
Reported damage to buildings	$20,526
Building Damages Claims Paid	$19, 025

1997 flood effects on the stream and riparian areas

There were beneficial flood effects from the 1997 floods, including an increase in sinuosity (winding and turning), gravels, mean bankfull depth, a slight increase in large woody debris in the stream and on the floodplain, and a decrease in stream gradient. There were adverse effects, including an increase in stream entrenchment (disconnection from the floodplain), a slight increase in fine particles in the stream substrate, bank degradation, and a considerable loss of conifer and hardwood trees established within the floodplain since a flood event that occurred in 1974.

2.3 Current Flooding Issues

In the aftermath of the 1996/97 floods, the City of Eagle Point submitted an application to the State Hazard Mitigation Grant Review Board in 1997 for drainage and storm water control improvements. While the project was not selected, the Board recognized that the City of Eagle Point faces a recurring flood hazard as described in their initial application. In February of 1998 Eagle Point staff, Jackson County Emergency Management, and Oregon Economic and Community Development Department identified the following issues:

- There is a flood hazard that, at a minimum, impacts neighborhood areas along Little Butte Creek.[15]

- Stormwater from the hills to the west of town, crossing Highway 62, and exacerbated by irrigation ditches that seem to direct the runoff, impacts businesses and residences along the ditch line.[16] Approximately ninety-eight percent of water running through, or generated in, the City of Eagle Point makes its way to Little Butte Creek.[17]

- The City is interested in accomplishing non-structural flood hazard mitigation through voluntary acquisitions and elevations in the highest priority areas. Residential areas along Little Butte Creek bordered by South Shasta and South Royal avenues receive repetitive flooding.[18]

- The FEMA FIRM maps for Eagle Point are not accurate and require updating. In 1998, the City adopted a new floodplain ordinance (City Ordinance no. 12-213), requiring a 24" elevation above the flood of record (if that exceeds the 100-year Base Flood Elevation).[19]

- The City used Community Development Block Grant funds as a strategy for non-federal match as the program was developed.[20]

- The City does not have the staff or financial resources to begin an accelerated flood hazard mitigation planning process and has asked for support from OEM and FEMA.[21]

In February 1998, the City adopted a new floodplain ordinance (no. 12-213) and was approved for Community Developed Block Grant Funding to assist in the flood mitigation projects identified by the Federal Emergency Management Agency.

Chapter 3: Flood Hazard Information

This chapter is largely based on the Flood Technical Resource Guide in *Planning for Natural Hazards: Oregon Technical Resource Guide*, (Community Planning Workshop and Oregon Department of Land Conservation and Development, 2000).

3.1 What are the Types of Flood Hazards?

Many types of flooding occur in Oregon, including riverine flooding, flash flooding, urban flooding, coastal flooding, and playa flooding. Flooding hazards affecting Eagle Point could include riverine, flash, shallow and urban flooding.

Riverine Floods

Riverine floods - overbank flooding of rivers and streams – are the most common of all natural disasters. Most communities in the United States have the potential to experience this type of flooding after spring rains, heavy thunderstorms, or snowmelt. These floods can be slow or fast rising, but generally develop over a period of days.[22] Flooding in large river systems typically results from large-scale weather systems that generate prolonged rainfall over wide geographic areas, causing flooding in hundreds of smaller streams, which then drain into the major rivers.[23]The most severe flooding conditions generally occur when direct rainfall is augmented by snowmelt. If the soil is saturated or frozen, stream flow may increase due to the inability of the soil to absorb additional precipitation.[24]Almost every county in Oregon experiences riverine flooding. In fact, Oregon has over 250 flood-prone communities. The danger of riverine flooding occurs mainly during the winter months, with the onset of persistent, heavy rainfall, and during the spring, with the melting of snow in the Cascade and Coast Ranges. Most of Western Oregon is highly susceptible to riverine flooding, especially Coos, Tillamook and Columbia Counties, as well as the western drainages of the Cascade Range.[25] Examples of riverine flood events occurred in February of 1996, and the "Christmas Floods" that occurred during December of 1964 and January of 1965.[26]

Flash Floods

Flash floods are a major cause of weather-related deaths in the United States. Flash floods usually result from intense storms dropping large amounts of rain within a brief period. Flash floods occur with little or no warning and can reach full peak in only a few minutes.[27] Topography, soil conditions and ground cover are all important factors that contribute to flash flooding. [28] Flash floods are most common in arid and semi-arid areas where there is steep topography, little vegetation and intense but short-duration rainfall. Flash floods occur in both urban and rural settings, principally along smaller rivers and drainage ways. Flash floods occur quickly in smaller waterways, or drainage streams that do not typically carry large amounts of water.[29] Flash floods usually occur in the summer during the thunderstorm season.[30] In flash flood situations, waters not only rise rapidly, but also generally move at high velocities and often contain large amounts of debris. In some situations, a flash flood may arrive as a fast moving wall of debris, mud and water. Occasionally, floating debris or ice can accumulate at a natural or man-made obstruction and restrict the flow of water. Water held back by the ice jam or debris dam can cause flooding upstream. Subsequent flash flooding can occur downstream if the obstruction suddenly releases. Areas subject to flash floods are often less obvious than those located on a typical riverine floodplain. Flash floods, however, may be associated with recognizable locations such as canyons or arroyos.[31] Central and Eastern Oregon are the areas of the state most susceptible to flash flooding, particularly due to the arid climate, steep

topography and low vegetative cover found there.[32] The most notorious flash flood in Oregon was the June 1903 event in Heppner.[33]

Shallow Area Flooding

Shallow area flooding is a special type of riverine flooding. FEMA defines shallow flood hazards as areas that are inundated by the 100-year flood with flood depths of only 1 to 3 feet. These areas are generally flooded by low velocity sheet flows of water.[34]

Urban Flooding

As land is converted from fields or woodlands to roads and parking lots, it loses its ability to absorb rainfall. This transition from pervious to impervious surfaces results in more water running off instead of filtering into the ground. Thus, water moves faster to watercourses, with resulting water levels rising above historic, pre-development levels. During periods of urban flooding, streets can become swift moving rivers and basements can fill with water. Storm drains often back up with yard waste causing additional, localized flooding.[35] Another cause of urban flooding is grading associated with development. Grading may cause changes in drainage direction from one property to another. Although this is a small, isolated impact of development, it may be significant to the adjacent property owner.

3.2 What are Some Terms Related to Flooding?

Floodplain

A floodplain is a land area adjacent to a river, stream, lake, estuary or other water body that is subject to flooding. These areas, if left undisturbed, act to store excess floodwater. The floodplain is made up of two sections: the flood fringe and the floodway.[36]

Floodway

The floodway is one of two main sections that make up the floodplain. Floodways are defined for regulatory purposes. Unlike floodplains, floodways do not reflect a recognizable geologic feature. For National Flood Insurance Program (NFIP) purposes, floodways are defined as the channel of a river or stream, and the overbank areas adjacent to the channel. The floodway carries the bulk of the floodwater downstream and is usually the area where water velocities and forces are the greatest. NFIP regulations require that the floodway be kept open and free from development or other structures, so that flood flows are not obstructed or diverted onto other properties.[37] The NFIP floodway definition is "the channel of a river or other watercourse and adjacent land areas that must be reserved in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.[38]" Floodways are not mapped for all rivers and streams but are generally mapped in developed areas.

Development

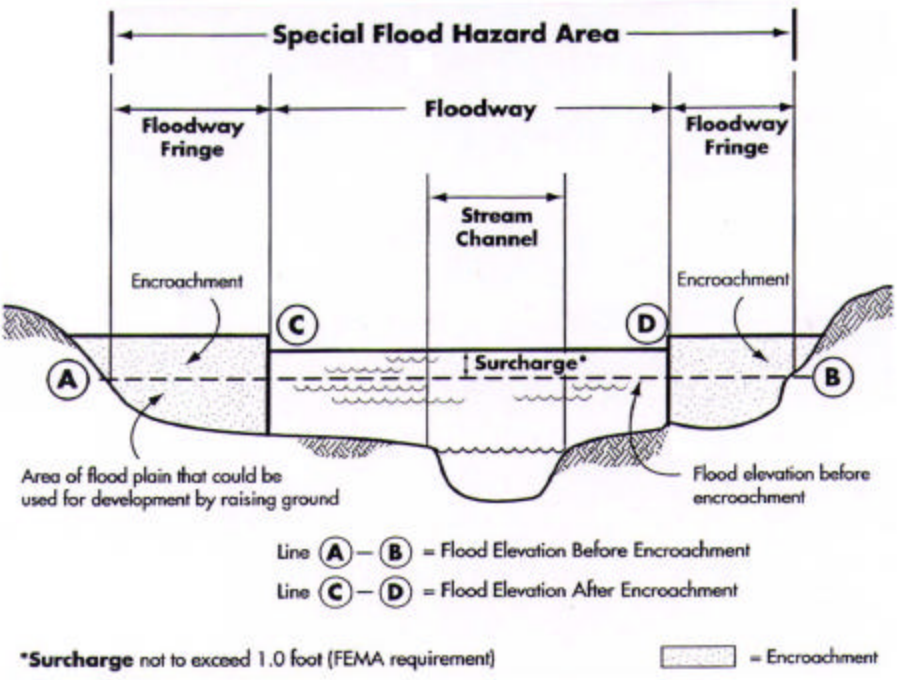
For floodplain ordinance purposes, development is broadly defined to mean "any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.[39]" The definition of development for floodplain purposes is generally broader and includes more activities than the definition of development used in other sections of local land use ordinances.

The Flood Fringe

The flood fringe refers to the outer portions of the floodplain, beginning at the edge of the floodway and continuing outward. This is the area where development is most likely to occur, and where precautions to protect life and property need to be taken.

Table 3-1 describes the schematic of the floodplain.

Table 3-1
Floodplain Schematic[40]



Base Floods and Base Flood Elevations

Flooding occurs for different reasons and at varying levels. "Base Flood" is defined by the NFIP regulations (44 CFR 59) as "the flood having a 1 percent chance of being equaled or exceeded in any given year." This flood is referred to as the 100- year flood. Determination of the 100-year flood is based on a statistical analysis of record flood flows, some dating back to the 1860's. The term "Base Flood Elevation" refers to the elevation (normally measured in feet above sea level), which the base flood is expected to reach. Base flood elevations can be set at levels other than the 100-year flood. Some communities choose to use higher frequency flood events as their base flood elevation for certain activities, using lower frequency events for others.[41] For example, for the purpose of stormwater management, a 25-year flood event might serve as the base flood elevation, while the 500-year flood event may serve as base flood elevation for the tie down of mobile homes.[42] The regulations of the National Flood Insurance Program focus on development in the 100-year flood plain.

3.3 What is the Effect of Development on Floods?

When development is located in the floodplain, it may cause floodwaters to rise higher than before development, particularly if that development is located within the floodway. Along many streams and rivers, the floodplain has two parts, the floodway and the flood fringe. The floodway of a river or stream is the channel and adjacent land areas that are reserved to carry the discharge of the base flood.[43] Development within the floodway (and floodplain) is discouraged because it may block floodwaters and cause increased flooding on other properties.[44] Displacement of only a few inches of water can mean the difference between no structural damage occurring in a given flood event, and the inundation of many homes, businesses and other facilities. Careful attention must be paid to development that occurs

within the floodplain to ensure that structures are prepared to withstand base flood events. In highly urbanized areas increased paving can lead to an increase in volume and velocity of runoff after a rainfall event, exacerbating the potential flood hazards. Care should be taken in the development and implementation of stormwater management systems to ensure that these runoff waters are dealt with effectively.[45]

Within the City of Eagle Point no structural development is permitted in the floodway. Development within the floodplain must comply with the Uniform Building Codes, Federal Emergency Management Agency requirements, and Eagle Point flood ordinance 12-213. In the past 4-5 years, new developments have decreased the flood hazard impacts through construction of engineered storm drain and detention systems. Improvements identified in the City's Draft Stormwater Management Plan will significantly decrease flood hazard problems associated with existing drainage channels. The capital improvements identified in the plan do not significantly decrease the general flooding impacts associated with Little Butte Creek. Detention systems constructed in association with new development should be implemented to decrease flooding impacts on Little Butte Creek.

3.4 How are Flood-Prone Areas Identified?

Flood insurance studies and Flood Insurance Rate Maps (FIRMs) are often used in characterizing and identifying flood prone areas.

Floodplain Maps and Flood Insurance Studies

Floodplain maps are the basis for implementing floodplain regulations and for delineating flood insurance purchase requirements. A Flood Insurance Rate Map (FIRM) is the official map produced by the Federal Emergency Management Agency (FEMA), which delineates Special Flood Hazard Areas or floodplains where National Flood Insurance Program regulations apply. FIRMs are also used by insurance agents and mortgage lenders to determine if flood insurance is required and what insurance rates should apply.[46] Water surface elevations are combined with topographic data to develop FIRMs. FIRMs illustrate areas that would be inundated during a 100-year flood and floodway areas. In some cases they may include 100-year base flood elevations (BFEs) and areas located within the 500-year floodplain.[47] Flood Insurance Studies and FIRMs produced for the National Flood Insurance Program (NFIP) provide assessments of the probability of flooding at a given location.

FEMA conducted many Flood Insurance Studies in the late 1970s and early 1980s. These studies and maps represent flood risk at the point in time when FEMA completed the studies. *They do not reflect changes within the study area that might affect flooding since the studies.* For example, many of Oregon's metropolitan areas have had significant population increases resulting in increased development during the past twenty years. Development changes the hydrology of urban streams as an increase in impervious surfaces results in greater runoff volumes and velocities. In order to address changing conditions, some communities have adopted higher regulatory standards such as Metro's balanced cut and fill requirements and Tillamook County's requirement that new homes and substantial improvements to existing homes be elevated at least 3 feet above the base-flood elevation.[48]

Although many communities rely exclusively on FIRMs to characterize the risk of flooding in their area, some jurisdictions develop their own flood hazard maps. They use high-water marks from flood events or aerial photos, in conjunction with the FEMA maps to better reflect the true flood risk for their communities.[49]

Geographic Information Systems (GIS) are increasingly becoming an important tool for flood hazard mapping. FIRMs can be imported directly into GIS, which then allows for GIS analysis of flood hazard areas. Communities find it particularly useful to overlay flood hazard areas on tax assessment parcel maps.[50] This allows a community to evaluate the flood hazard risk for a specific parcel during review of a development request. Coordination between FEMA and local technical experts is the key to making a strong connection with GIS technology for the purpose of flood hazard mapping. FEMA and the Environmental Systems Research Institute (ESRI) have formed a partnership to provide multi-hazard maps and information to the public via the Internet. ESRI produces GIS software, including ArcView© and ArcInfo©. The ESRI web site has information on GIS technology, as well as downloadable maps and other resources. The hazards maps provided on the ESRI site will assist communities in evaluating geographic information about natural hazards. Flood information for most Oregon communities is available on the ESRI web site. Visit **http://www.esri.com** for more information.

How to Read Flood Maps

Flood Insurance Rate Maps (FIRMs) are presented in a variety of formats. Many of the flood maps produced since January 1985 include floodway and floodplain management information that was not shown on older versions of flood maps. Many new Flood Maps also present simplified flood insurance risk zone designations. The most common scales are one inch = 500 feet, one inch =1,000 feet, and one inch = 2,000 feet. The jurisdictions covered may include partial or entire counties or individual cities. When a flood map cannot be presented on one page, it is produced on several pages. Those pages are known as panels. Panels depict flood hazards in a community. Each panel includes a title box that contains the name of the community, the panel number, and other information. All panels include seven items that also appear on the index. They are:

1. Community name
2. Community number
3. Panel number/community panel number/map number
4. Corporate limit or county boundary line
5. North arrow
6. Effective or revised date
7. Map scale

Elevation reference marks are found on flood maps. These marks identify points where a ground elevation is established by survey. Elevations are usually expressed in feet; for some communities, however, the elevations are shown in meters. Descriptions of the marks, including their elevations are provided. These surveyed elevations are used to determine the base flood elevation. Flood Hazard Area designations appear as dark and light tints. Dark tints indicate areas of increased flood hazards; light tints indicate areas of lesser flood hazards. Floodplain boundaries show the limits of the 100- and 500-year floodplains. Most flood maps cover only one community.[51]

Questions to ask about Floodplain Mapping

- How do I know if my flood map is up to date?
- Where can my community get more flood maps?
- Is the floodway mapped in my community?

FEMA's map distribution center can answer questions and provide additional copies of flood maps. They can be contacted at (800) 358-9616.

- How do I get my map updated?

FEMA establishes priorities for remapping. Contact FEMA Region 10's mitigation division at (425) 487-4678 for information. Individual property owners who wish to demonstrate that their property or structures are not located in a special flood hazard areas should submit a Letter of Map Amendment or a Letter of Map Revision for land that is out of the floodplain because of the placement of fill. Forms for Letters of Map Amendment and Map Revision are available on FEMA's website (www. fema. gov/nfip/forms.htm) or from the Oregon Floodplain Program coordinator (503) 373-0050. (Appendix D provides additional information on FEMA programs and acquiring updated FIRMs.)

3.5 The 100-Year Flood Myth

This long-standing myth actually has two parts, and neither is true. The first is that every flood is a 100-year flood. The second is that the 100-year flood occurs only once every 100 years. Often, floods that crest at a level well below that of the 100-year flood are incorrectly termed "100-year floods." This common misuse in flood designation leads people to the conclusion that an event that is supposed to happen only every 100 years is happening every time floodwaters spill over the riverbank. The reality is that the majority of floods consist of lesser frequency events such as the one-year, five-year or ten-year floods. The 100-year flood is not a frequent event and has only a one percent chance of being equaled or exceeded during any given year.[52] Recent decades have seen an increase in 100-year flood events. For example, the Mississippi River Basin and parts of Southern Louisiana have had at least two 100-year events in the last decade. Because flooding depends on variables that cannot be accurately predicted, determination of exactly where the 100-year flood levels are is not an exact science. Factors such as climate change and changes to the built environment can have dramatic effects and communities should periodically review flood plain boundaries.

3.6 Reviewing your comprehensive plan

The factual base of your community's comprehensive plan should reflect a current inventory of all natural hazards and a vulnerability assessment. The inventory should include a history of natural disasters, maps, current conditions and trends. A vulnerability assessment will examine identified hazards and the existing or planned property development, current population, and the types of development at risk. A vulnerability assessment will set the foundation for plan policies. Your community should ask the following in determining whether or not its comprehensive plan has adequately inventoried flood hazards.

- Are there flood hazards in your community?
- Does your comprehensive plan hazard inventory describe floods in terms of the geographical extent, the severity and the frequency of occurrence?
- Has your community conducted a community wide vulnerability assessment?

3.7 Summary of Flood Hazards in Oregon

Many different types of flood hazards exist in Oregon, and their effects can be devastating. By understanding flood hazards, communities will be better prepared and equipped to plan

for floods in the future. Once flood hazards are identified, communities can review functional plans such as those for natural resources, open space, and master plans to integrate flood hazard information. To identify flood hazards in your community and to develop an inventory of flood hazards, use the following resources:

- *Existing flood maps* and information, including FIRMs, Flood Boundary-Floodway Maps, and FEMA Flood Insurance Studies (digital flood maps on FEMA or ESRI web sites)

- *FEMA Region 10* for information about recent map revisions or amendments. (*Contact information can be found in Appendix D of this Flood Mitigation Action Plan.)*

- *Historical documents* such as "official" high water marks, aerial photos taken during flood events, newspaper articles or interview with local officials and residents on storm events and hazards over the past decade.

- *Soil maps* can show whether there are wet or "hydric" soils in your community. Wet soils may be indicative of historic flooding.

- *Other organizations* such as USGS or local watershed councils may have relevant flood data for your community. The Little Butte Watershed Council has information on local river gauges, as well as a series of aerial photographs that may be useful in updating FIRM maps in the future.

Chapter 4: Flood Hazard Assessment

4.1 Hazard Identification

Hazard identification is the first phase of flood hazard assessment, and is the process of estimating the geographic extent of the hazard, its intensity, and its probability of occurrence.[53] This process usually results in a hazard map, such as the Flood Insurance Rate Map (FIRM). Hazard maps can provide detailed information in a clear format that provides public information and can assist in making policy and land use decisions.

The FIRM map for Eagle Point outlines the area covered by this plan. FIRM maps can be attained at the Eagle Point planning office. The 100-year floodplain extends from Reese Creek Road on the north side of the Little Butte Creek southwest to Highway 62. On the southern side of the creek the floodplain extends the length of Shasta Avenue to both ends of Eagle Point's urban growth boundary.

The FIRM map for Eagle Point was completed in September of 1980. There is evidence that this map is an inaccurate representation of the 100-year floodplain, including aerial photographs[54] and flood levels outside of the 100-year floodplain during high water events.[55] Frequent high water events have changed the streambed elevation in Little Butte Creek, raising and widening flood levels and potential impacts. Moreover, increased development with the City of Eagle Point can also affect the hydrologic characteristics of the basin.

4.2 Vulnerability Assessment

Vulnerability assessment is the second phase of flood hazard assessment. It combines the information generated through hazard identification with an inventory of the existing property exposed to a hazard, helping to predict how different types of property and population groups will be affected by a hazard.[56]

Oregon Emergency Management used data from the County Assessor to estimate property values within the study area. Matching the County Assessor's data with FIRM boundaries within the affected study area assessed vulnerability. The vulnerability assessment uses data that includes all tax lots with portions that fall within the 100-year floodplain. The County Assessor estimates the market value of land and improvements on all tax lots in Eagle Point. While the assessed market value data may not reflect the true market value of properties, it is still the most reliable data available. Moreover, because it is applied consistently across all properties, inconsistencies and differences from true market value will be consistent across all properties.

As of November 2000, there are one hundred and seventy-one-tax lots and $11,016,440 of improved market value within the 100-year flood plain. Of the one hundred and seventy-one homes in the floodplain, three are mobile homes, which are historically susceptible to flood damage. In addition, six open lots in the 100-year floodplain could potentially site manufactured homes. Seventeen additional manufactured homes are currently sited in the 500-year floodplain.

Table 4-1 describes the number of structures and monetary value of land use in the 100-year floodplain. Map 4-1 shows land use in the 100-year floodplain.

Table 4-1 Total Structures in the 100-Year Floodplain and Estimated Improved Value[57]		
LANDUSE	**# of Structures**	**100-Year Floodplain**
Commercial	8	$1,742,080
Exempt-City	3	$163,250
Exempt-Frat. Org.	1	$19,550
MF Residential	4	$237,360
Mobile Home	3	$5,710
SF Residential	112	$8,438,580
Tract-improved	4	$409,910
Vacant	36	0
Grand Total	**171**	**$11,016,440**

After the 1996/1997 flood events, Eagle Point received $300,000 from the Federal Emergency Management Agency and a 25% match from the Community Development Block Grant for two elevation and two acquisition projects. As a result of elevation and acquisition projects funded by the 1997 Flood Hazard Mitigation Grant, and in compliance with Ordinance #12-213, approximately $56,876 in structure value was elevated one-foot or greater above the "100-year" base flood level. As of November, 2000, $162,600 has been spent on acquisitions. Roughly $10,796,964 in property value is left vulnerable to "100-year" flood levels after subtracting the value of the property elevations and acquisitions from the total improved value of land use in the 100-year floodplain. The figure represents the estimated dollar value of vulnerable improved property in the Eagle Point flood hazard area. This number is a baseline of the assessed risk the area faces. Map 4-2 shows mitigated properties within the Eagle Point 100-year floodplain.

Eagle Point's flood overlay zone requirements may also reduce the vulnerability of additional structures. The location of structures on tax lots is another consideration. GIS analysis identified tax lots in the 100-year floodplain with structures that are partially or completely outside of the 100-year floodplain boundaries. It is possible that these structures are not insured because they are not sited within the 100-year floodplain. Because of the possibility that the current Flood Insurance Rate Maps are not accurate, all landowners within the 100-year floodplain should consider having flood insurance. Map 4-3 shows parcels within the 100-year floodplain that have structures partially or completely outside of the 100-year floodplain. Map 4-3 also highlights properties within the 500-year floodplain. If the current FIRM maps are not accurate, these properties may face increased risk to not only 500-year flood events, but 100-year events.

4.3 Risk Analysis

Risk analysis is the third phase of a flood hazard assessment. It involves estimating the damage and costs likely to be experienced in a geographic area over a period of time.[58] Risk has two measurable components: (1) the magnitude of the harm that may result (defined through the vulnerability assessment); and (2) the likelihood or probability of the harm occurring (multiple flooding scenarios). Geographic Information System (GIS) databases facilitate this process by allowing for projections for a range of flooding events, rather than just the "100-year event". These projections can then be overlain onto existing development mapping to pinpoint areas affect by flood events. Using data specific to Eagle Point, a risk analysis of flooding events other than the standard "100-year event" can be conducted. This Flood Mitigation Plan includes recommendations for conducting risk analysis as a flood mitigation activity. **INSERT**: MAPS 4-1 – 4-3.

Chapter 5: Flood Hazard Mitigation Goals and Activities

Reducing risk from flood events can be described in terms of a series of goals, which can then be achieved through a variety of planned mitigation activities. This chapter provides information on individual flood mitigation goals and activities, existing mitigation activities within Eagle Point, and a description of the public ranking of these goals and activities, establishing community priorities for flood mitigation.

5.1 Goals and Activities

The goals and activities below are derived from the review of flood plans and planning literature (including FEMA's *Flood Mitigation Assistance: Program Overview and Guidance for Planning Grants*), and interviews with Eagle Point residents and technical specialists.

Protect Individual Properties

Property protection focuses resources on activities involving property owners, and emphasizes measures that assist in protecting homes, structures or property from high water. ***Property protection activities*** primarily protect structures in flood hazard areas. Property owners can undertake them on a building-by-building or parcel basis. These may include:

Insurance: Insurance is a mechanism that spreads the cost of losses over time and a relatively large number of similarly exposed risks. Until 1969, insurance against flood losses was generally unavailable. Under the National Flood Insurance Program (NFIP), initiated in 1968 and significantly expanded in 1973, the federal government made flood insurance available for existing property in flood hazard areas in return for enactment and enforcement of floodplain management regulations designed to reduce future flood losses. The Federal Insurance Administration's Community Rating System (CRS) encourages communities to go beyond the required standards by offering a reduction in flood insurance premiums for policyholders within communities that take approved actions to reduce flood losses. (*Appendix D provides details on CRS information.*)

Elevation: Elevating buildings to the minimum flood protection elevation is a technique used to reduce structure risk. The building is raised and set on a new or extended foundation, such as piers, posts, columns, piles, foundation walls, or properly compacted fill material. Virtually any structurally sound building can be elevated. Properly done, elevating a house places the living area above the most severe floods. NFIP requires that the lowest floor for all new construction and substantial improvements be elevated, at a *minimum* of one foot above the Base Flood Elevation, or 100-year flood level as identified on a

community's Flood Insurance Rate Map. Elevation projects that exceed the minimum flood elevation level may further reduce risk. In 1998 the City adopted Ordinance 12-213 requiring a two-foot elevation above the Base Flood Elevation.

Acquisition/Relocation: Acquisition projects resulting in structure relocation or demolition are often appropriate mitigation measures for structures facing severe repetitive flooding. Relocation can eliminate future flood losses by moving structures out of hazard areas. Relocation or demolition of structures may be constrained, however, by financial reasons, or the reluctance of homeowners to relocate.

Guide Development and Use of the Floodplain

Guiding development and use of the floodplain can prevent flood damage and reduce risk from flood damage through community organization, land use and planning. If no structures or important public facilities exist in the floodplain, there is minimal risk of damage from floods. This option is limited as some of the most desirable land for living, farming, and recreating lies in floodplains. ***Preventative activities*** attempt to keep flood problems from getting worse by addressing development collectively. Planning, land acquisition, or regulation helps to guide the use and development of flood-prone areas. Building, planning, and/or code enforcement offices administer most preventative activities. Preventative activities include:

Planning: Zoning and subdivision regulations are two examples of planning activities that can assist in reducing risk from flood events.

1) **Zoning**- a community's comprehensive plan can be implemented through zoning ordinances. A zoning ordinance is a set of regulations created to guide various aspects of land use.

   Overlay zones are independent zones that co-exist with the base-zoning district. Development is usually in accordance with the uses allowed by the base-zoning district. Parcels that fall within the overlay zone are subject to the regulations of the base zone and the additional regulations of the overlay zone.

   Incentive zoning allows developers to exceed limitations imposed upon them by regulations, in exchange for specific concessions. For example, if developers avoid developing in the floodplain, the local government might allow them to build on other portions of their land at a higher density than is allowed by the current zoning designation.[59] Transfer of Development Rights (TDRs) and Transfer of Development Credits are examples of powerful incentives to curb development in floodplains. TDRs are enabled by Oregon State Law, but have not yet been used for floodplain management in Oregon.

   Performance zoning sets standards for the allowable impact of development. The standards usually specify limits to certain environmental conditions, like the amount of traffic or pollution generated. Usually this technique is used in conjunction with standard zoning. For example, a performance standard may limit the number of times a structure can be rebuilt after multiple flood events.[60]

2) **Subdivision regulations**- these regulations govern the division of land for sale or development. Three mitigation approaches that can be included in subdivision regulations include the following:

   Cluster Development is the concentration of structures on one part of a lot to preserve the remainder of the property for open space. As in Eagle Point, cluster development usually is permitted only under planned unit development procedures. Clustering offers the potential for savings in some areas, because the sewer and water lines and streets needed to serve a cluster may be much shorter than those of a traditional subdivision. Cluster development provides the opportunity to avoid developing in hazard areas by maximizing development in non-hazard areas.

   Performance Bonds are bonds required of a subdivider or developer to ensure that specified improvements be carried out after the local government gives approval for the development. Performance bonds could be used to improve drainage practices or implement other mitigation techniques.

   A *Site Plan* is a detailed map of a proposed development site. Many subdivision and zoning ordinances require that a site plan accompany any application for a partition, variance, conditional use, zone change, or other quasi-judicial action. If a flood hazard is present, you can use the site plan to determine the location of the permitted development in relation to the hazard area.

Open Space Preservation: The purchase of property in undeveloped flood prone areas prior to its development can be an effective means of eliminating future flood hazards. Typically, undeveloped property, once purchased, is held in perpetuity as open space or greenways. This provides additional recreational opportunities and increases local property values. Land acquisition, however, is an expensive undertaking, particularly when the property in question is a "desirable" location for development.

A less expensive measure involves the purchase of conservation easements. The purchase of development rights enables communities to ensure that a greater amount of property is protected from development than would be possible if the land were purchased outright. Local governments can be encouraged to work with land conservancies to purchase flood-prone properties or conservation easements. This allows communities to derive the necessary information from experts who are familiar with land trust operations. Land trusts may also be able to provide matching funds to assist local governments.[61]

Stormwater Management: Stormwater management addresses problems associated with surface water runoff. Filling or blocking drainageways can lead to backup of runoff that can increase flood damage. Runoff is increased when natural ground cover is replaced by development and impermeable (water-resistant) surfaces. Jurisdictions can adopt stormwater management regulations that require developers to build retention or detention basins along development projects. These basins can minimize runoff by storing it and not allowing runoff rates to exceed the pre-development runoff rate. Developers and builders can incorporate stormwater management through landscaping, swales, trenches, and other methods. These techniques can have aesthetic appeal and act to absorb or curtail runoff. Additional methods in more urbanized areas include providing adequate street drainage and culvert size to accommodate high levels of storm runoff.

Preserve or Restore Natural Areas to Establish the Natural Functions of the Floodplain

Watershed planning activities act as a safeguard for flood protection and can help to protect and enhance fish and wildlife populations. ***Watershed planning activities*** preserve or restore natural areas or the natural functions of floodplain and watershed areas. Conservation agencies or organizations may help implement watershed planning activities. Watershed planning activities include:

Erosion and sediment control: Streambank stabilization and retention of sediment are two methods addressing erosion and sediment control. Streambank stabilization can be achieved by planting native vegetation along exposed riparian banks. Plants protect the soil surface from direct erosion by rainfall and runoff and plant roots hold the soil together and provide resistance to water flow. Plants also absorb and utilize a good deal of water, increasing infiltration into the soil and reducing water levels. Vegetation also filters out sediment and pollution, which could collect or accumulate downstream. In riparian areas that have been denuded of vegetation, high water can wear away a greater amount of soil. Erosion and sediment control can be achieved by allowing for a setback of development.

Sediment retention can be achieved on agricultural lands through conservation tillage, terraces, crop rotation, filed borders, debris basins, sediment check dams, and strip cropping or permanent vegetation buffers. These methods act to trap sediments and use them, rather than allowing them to be washed off the surface.

Wetlands protection: Wetlands can store large amounts of water and slow water velocity, as well as filter sediment out of waterways by providing an area where excess runoff can accumulate and settle. This nourishes plant life and enhances fish habitat. When wetlands are filled or impacted by development or land use, water storage capacity and sediment filtration is diminished, leading to accelerated flows, increased scouring of stream banks, and sediment deposition in other areas. Wetlands also provide vital habitat for fish and wildlife that is difficult to replace. Wetlands are crucial for many species of birds, both resident and migratory, and provide rearing grounds for many fish species, including anadromous fish.

Wetlands are most useful for flood reduction when left in their natural state. Less successful are attempts to artificially create wetlands. Although flood storage capacity may be expanded, it is very difficult to create the natural hydrologic functions that exist within wetlands.

Enhance Emergency Services

Emergency service activities focus resources on warning of impending flood conditions and emergency response after flooding events have occurred. ***Emergency service activities*** are taken prior to and during a flood to minimize its impact. County and City emergency management staff and emergency response personnel administer these measures. Emergency service activities include:

Flood Warning: Flood warning systems give community residents notification of impending flood danger. The National Weather Service provides flood forecast and warning data used by many communities that have local warning systems.

Through a network of satellite monitoring equipment and volunteer weather spotters, the National Weather Service tracks storm activity, rainfall, and storm potential. This information is analyzed along with data from river gauges, snowmelt potential information, and ground conditions to ascertain risk. Based on information gathered, flood watches and flood warnings are issued when a flood has started or is expected to occur. This information is transmitted via satellite or telephone to agencies and individuals, including county emergency management offices. Flood warnings can be disseminated by sirens, radio, TV, public address announcement, telephone trees, and door-to-door contact.


LOCAL

Neighbors help out in flood recovery

Flood Response: An action to minimize damage during a flood event is a final measure against flood damage. An emergency response plan identifies responsibilities in the event of a flood and provides a framework for organized relief efforts, flood fighting, and additional damage prevention. Local civil defense, police, and fire departments, public works agencies, and public health personnel typically carry out flood response. When necessary, these groups are assisted by state and federal agencies. Emergency activities during and immediately after a flood may include removing people and property from areas about to be flooded; sandbagging around individual structures and constructing emergency dikes to direct water away from vulnerable areas; search and rescue; and any additional steps to protect the health and safety of residents.

Increase Public Awareness

Risk from flood events can also be reduced through increased public awareness. Residents and property owners knowledgeable about mitigation activities, floodplain functions, emergency service procedures, and potential hazards will be more supportive of risk reduction efforts. ***Public information activities*** advise property owners, potential property owners, and visitors about the hazard, property protection and human safety measures, and the natural and beneficial functions of local floodplains. A variety of organizations and agencies can implement public information activities. Public information activities include:

Information Dissemination: Information dissemination provides community residents with knowledge about the flood hazard in their area and possible activities for mitigation. Important information related to flood mitigation includes:

- Flood Insurance Rate Maps (FIRMs)
- National Flood Insurance Program information
- Floodplain zoning information
- Historic and potential flooding information
- Brochures on the natural function of floodplains


Photo by Andre LeDuc

Outreach projects: A valuable exchange of information can occur when agencies and organizations reach out to provide technical assistance to those affected by flooding. Some opportunities for such assistance might include the following:

- Finding available resources for mitigation projects
- Erosion and sediment control project assistance
- National Floodplain Insurance Program workshops

Real estate disclosure: Requirements for disclosing hazard risk in real estate transactions are designed to inform current homeowners and potential homebuyers about existing hazards and provide an additional measure in reducing future risk from flood events.

Risk Analysis: Geographic Information System (GIS) technology can be used to analyze the risk of various flood events. This kind of analysis depends on the availability of data relating to building location, value and flood recurrence. Performing multiple risk analyses helps to increase understanding of a river's flooding potential.

5.2 Current Eagle Point Flood Mitigation Activities

This section describes current mitigation activities within Eagle Point. The activities are organized within five goal areas as described in the previous section. These activities were described during stakeholder interviews with City staff, emergency management, and citizens from Eagle Point and Jackson County.

Property Protection Activities

Elevation – Using funds from the FEMA Hazard Mitigation Grant received as a result of the December 1996/January 1997 flooding, two homes have been elevated in Eagle Point.

Acquisition - Using FEMA Hazard Mitigation Grant Funds received as a result of the December 1996/January 1997 flooding, the City of Eagle Point bought two homes.

Insurance – Eagle Point is a participant in the National Flood Insurance Program (NFIP). As a result of county efforts to guide sound development in the floodplain, City residents have the opportunity to purchase flood insurance coverage. Flood insurance can be reduced through increased risk reduction activities by participation in the NFIP's Community Rating System (CRS). Eagle Point is not currently enrolled in the CRS program, though Jackson County does have a countywide CRS rating. (*See Appendix D for more information*).

Preventative Activities

The City of Eagle Point addresses its National Floodplain Insurance Program requirements through overlay zone floodplain regulations, and is further discussed below as an existing mitigation activity. The natural hazard component of Eagle Point's comprehensive plan states their goal of minimizing "the potential for harm to the City's citizens and for property loss as a result of natural hazards occurring in the area." Related flood policies include:

- The approval of any development shall be contingent upon the adequate consideration of natural hazards found to exist on the site proposed for development.
- In all cases, land development shall be encouraged to take into consideration the natural topography, drainage pattern, and soil characteristics of the site being proposed for development.
- Development in areas of the City subject to flooding hazards shall be in accordance with City Ordinance 12-213, An Ordinance Establishing Regulations to Prevent Flood Damage in the City of Eagle Point, Oregon.

The City also has a flood plain overlay district as a zoning category in its new zoning ordinance that will provide additional protection against flood hazards. The area affected by the overlay zone includes all areas within the "100-year" flood boundary as identified on the Federal Emergency Management Agency's Flood Insurance Rate Maps. The overlay zone provides for a floodplain development permitting process and outlines construction and design requirements for new development and substantial improvements. The zone also provides for flood mitigation in subdivision proposals.

Open space preservation – The two homes acquired by the City of Eagle Point after the 1996/1997 floods have been designated for open space.

Stormwater management – A Storm Drain Management Plan for Eagle Point was developed in April, 2000 and remains under review.

Emergency Service Activities

Flood forecasting/warning – Eagle Point operates a flood warning system through notification of residents in the 100-year floodplain by phone (by the emergency services office) and door-to-door notification (by police and fire department services). The system relies on real time satellite National Weather Service information acquired through the Data Transmission Research Corporation. Jackson County Emergency Management is currently working on developing a flood notification system for Fish Lake Dam. Jackson County is also working with OECDD to assist the senior and disabled population in developing evacuation, assistance and recovery plans, and to form neighborhood networks. Locally, the Eagle Point Emergency Manager is coordinating with Jackson County on an emergency transportation routing plan for emergency situations. Local emergency management also provides sand and sandbags for the members of the community who need them, who are then responsible for filling and transporting the bags.

Emergency Flood Response – Eagle Point Emergency Management provides sand, bags and notification when people need to evacuate. The emergency management office opens the sandbagging area and people can come in to bag sand. The Eagle Point Emergency Manager also has a confidential list of elderly and disabled citizens living in the floodplain and will notify that group of people in the event of an emergency, help them bag their sand, as well as personally evacuate them if necessary.

Public Information Activities

Information dissemination – After the 1996/1997 flood events, the Little Butte Watershed Council helped organize several public meetings with representatives from state and local agencies to inform residents of response and recovery activities.

Potential Mitigation Activities

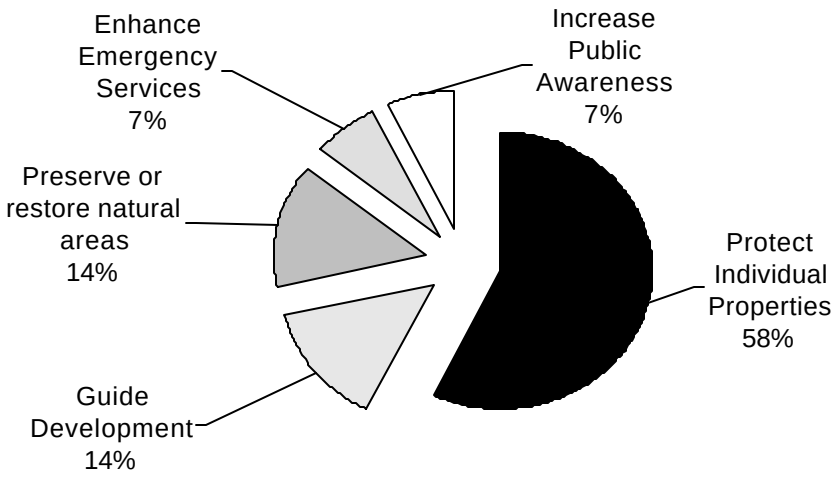
Activities suggested during interviews with City staff and citizens of Eagle Point in September of 2000 included:

- Acquire accurate FIRM MAPS
- Acquire stream gauges to provide flood forecasts
- Community Initiated Ordinances
- More acquisitions and elevations for homes in the flood plain
- Public education to make new and prospective homeowners aware of the flood issue.
- Divert flood waters
- Inform the public that flood insurance covers costs of lower mitigation options
- Inform people that they aren't supposed to close off their basements

5.3 Public Prioritization

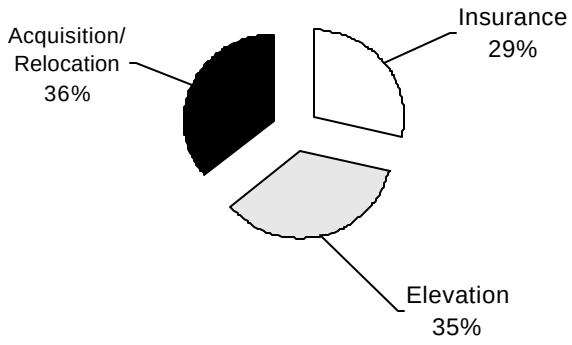
Flood mitigation goals and activities were ranked during a public meeting on September 28th, 2000 at the Eagle Point City Hall. (Appendix B provides the comments from the public meeting.) Public participation in ranking mitigation goals and activities helped to identify community priorities through a comprehensive planning process including the residents of Eagle Point. Figure 5.1 illustrates the prioritization of participant's first choice in terms of flood mitigation goals.

Figure 5.1
Ranking of the Goals



Information on public priorities in terms of flood mitigation goals and activities is designed to inform future decisions regarding the allocation of resources and funding to flood mitigation projects. The percentage values of the ranked goals and activities reflect the data gathered during the public meeting. Because some meeting participants did not rank all activities equally, or only listed first and second choices, not all responses total 100 percent.

Figure 5.2
Protect Individual Properties



Figures 5.2 through 5.6 describe public priorities for individual activities within each goal category. Percentages are taken from participant's first choice for ranking activities. After the ranking process, Community Planning Workshop facilitated a discussion between the public meeting participants and representatives of Eagle Point planning office and emergency management. Topics addressed include flood insurance, allocation and use of the Hazard Mitigation Grant Program funds that went primarily to the elevation of two homes and acquisition of two homes in

the 100-year floodplain. The Eagle Point emergency manager described the elderly and disabled emergency service assistance program, as well as the Jackson County Emergency Preparedness Plan that was made available to everyone in attendance.

Figure 5.3
Guide Development

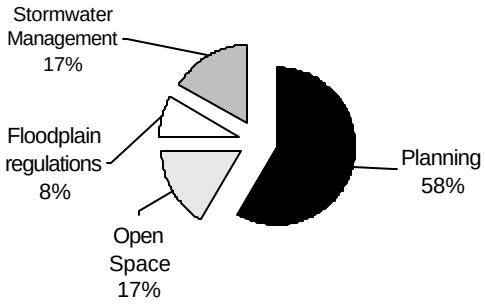


Figure 5.4
Preserve or Restore Natural Areas

Figure 5.5
Enhance Emergency Services

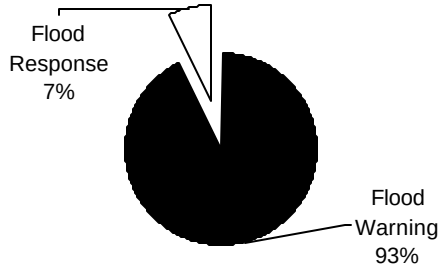
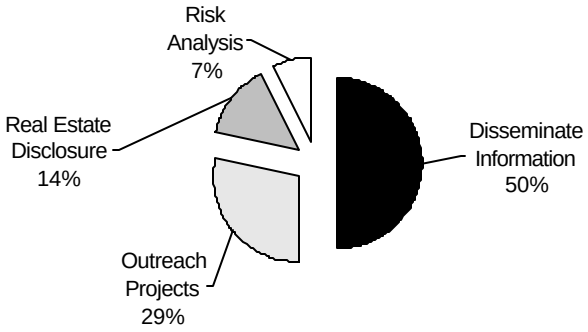


Figure 5.6
Increase Public Awareness



Chapter 6: Recommendations

This section provides recommendations regarding mitigation action items in Eagle Point. Recommendations consider local, state and federal resources, the public input, and the vulnerability assessment. They are organized by the order of goals and activities ranked at the Eagle Point public forum.

Eagle Point Public Priority

Activities that were ranked at the September 28, 2000 public meeting are listed here with the percentage of participants who chose that activity as their top priority for flood mitigation for each goal.

Recommendations

Recommendations for each goal section are marked by initials and the number of the recommendation such as R-1 (recommendation #1). Specific categories for recommendations are:

- Property Protection Action Item Recommendations (PP #)
- Preventative Activity Action Item Recommendations (PA #)
- Watershed Planning Action Item Recommendations (WP #)
- Emergency Service Action Item Recommendations (ES #)
- Public Information Action Item Recommendations (PI #)

Partners

Partners can act as lead organizations or assist in implementing specific action items. Partners from local, state and federal organizations are considered within this section.

Tools for Implementation

Tools for implementation are resources that can assist during implementation of action items. These tools consist of state and federal document resources, and local policy and planning measures.

Constraints to Implementation

Some action items may not be feasible due to economic, administrative or environmental burdens. Identifying possible constraints early in the planning process may help to recognize potential solutions.

Goal 1: Protect Individual Property

Almost equal priority was given to the three property protection activities at the public meeting. This fact, coupled with the 58% of public meeting participants who ranked property protection as their first choice shows that elevation, acquisition and insurance programs are equally important to the residents of Eagle Point.

Eagle Point Public Priority

1. Acquisition - 36%
2. Elevation - 35%
3. Insurance - 29%

Property Protection Action Item Recommendations (PP-#)

PP-1: Avoid developing in flood hazard areas.

PP-2: Consider applying for the Federal Emergency Management Agencies (FEMA) Flood Mitigation Assistance (FMA) program funds. FMA grant programs can provide assistance for elevation and acquisition projects. *(Appendix D provides detailed information on FEMA's FMA program.)*

PP-3: Consider applying for eligibility for FEMA's Community Rating System, which provides reduced insurance premium incentives for homeowners with flood insurance or who have undertaken other mitigation activities such as elevation. (*Appendix D provides information on the Community Rating System*.)

Partners

- Eagle Point Planning Office
- Eagle Point Emergency Management
- Jackson County Emergency Management
- Ann Beier, State Floodplain Manager and NFIP State Coordinator

Tools for Implementation

- Review FEMA guidelines for the Flood Mitigation Assistance program and the National Flood Insurance Program's Community Rating System.

Constraints to Implementation

Staffing at the City of Eagle Point is a serious consideration, as the administrative burden of programs like the Community Rating Survey and administering emergency management and mitigation funds may be outside of the capacity for current City staff. In applying for funding from these programs, investigate ways to reduce administrative burden on current staff by using consultant services.

Goal 2: Guide Development and use of the floodplain

Public Priority

1. Planning *(*58%)
2. Open space preservation (17%)
2. Stormwater management (17%)
3. Floodplain regulations (8%)

Preventative Activity Action Item Recommendations (PR-#)

PR-1: Develop revised Flood Insurance Rate Maps (FIRM). An accurate FIRM map for the 100-year floodplain in Eagle Point is an important factor in determining vulnerability of Eagle Point. FIRM maps can be created by following FEMA guidelines and specifications for study contractors. *(Appendix D provides information on FEMA programs.)*

PR-2: Consider using land acquired from the HGMP program as open space and parks. Land acquired through hazard mitigation grant programs must adhere to federal guidelines, such as not allowing the construction of buildings or impervious surfaces. However, acquired land can serve an important purpose. In some parts of the country, open space along waterways and passive recreation in floodplain areas are known to enhance the value of a community.[62]

PR-3: Review and evaluate the draft storm water management plan for flood elements and relevant flood mitigation activities.

PR-4: Develop stormwater detention on new subdivisions using existing wetlands where available.

PR-5: Use Geographic Information System (GIS) technology by mapping future high-water events to establish a more accurate flood hazard database.

Partners

- Little Butte Creek Watershed Council
- Eagle Point Planning Office
- Eagle Point Emergency Management
- Jackson Emergency Management
- Federal Emergency Management Agency

Tools for Implementation

- Little Butte Creek Aerial Survey *(Contact the Little Butte Watershed Council.)*
- Review guidelines for developing new FIRM maps.
- Consider forming appropriate partnerships or raising funds to make these maps.

Constraints to Implementation

Planning for natural hazards requires attention and implementation of local ordinances that may prohibit certain development in the 100-year floodplain. However, these regulations do not apply to areas outside of the 100-year floodplain. Many residents and specialists have commented on the inaccuracy of the FIRM maps, which limit the ability to conduct a true vulnerability assessment or risk analysis. In addition, residents that live in areas of risk may not have the benefits of floodplain regulations. Limited FEMA funding may prohibit acquiring federal funding for new FIRM maps. Landowners, developers, and local officials must also take responsibility to identify and maintain natural and constructed drainage ways.

Goal 3: Protect and Restore Natural Functions of the Floodplain

Public Priority

1. Erosion and sediment control (50%)
1. Wetlands protection (50%)

Watershed Planning Action Item Recommendations (WP-#)

WP-1: Conduct a wetlands inventory. Specifically:

1. Identify wetlands that capture surface flows before they reach the river system.[63]
2. Identify wetlands that capture and reduce peak surface flows within the floodplain. [64]
3. Identify wetlands that capture and reduce runoff from residential, agricultural, and disturbed lands. [65]

WP-2: Target wetland restoration to use wetlands as stormwater detention systems.

WP-3: Work with Little Butte Watershed Council to enhance the natural floodplains.

Partners

- Little Butte Watershed Council
- Eagle Point Planning Office
- Eagle Point Emergency Mangement
- Jackson County Emergency Management
- Eagle Point Irrigation District
- Medford Water Commission
- Department of Environmental Quality (DEQ)
- Oregon Watershed Enhancement Board
- Oregon Division of State Lands *(See Appendix D for information on the Local Wetlands Inventories.)*

Tools for Implementation

- Department of Environmental Quality (DEQ) grant application materials
- Little Butte Watershed Council as information and grant resource
- Division of State Lands (DSL) grant application materials
- Wetland Functions: Wetlands can store waters that otherwise would intensify downstream high flows. In concert with other floodplain management activities, wetland restoration may reduce property damage, crop loss, and soil erosion by minimizing the effects of current and future development. [66]

Constraints to Implementation

Staff time and resources need to be coordinated with Little Butte Watershed Council

Goal 4: Emergency Services

Public Priority

1. Flood forecasting/warning (93%)
2. Emergency flood response (7%)

Emergency Service Action Item Recommendations (ES-#)

ES-1: Disseminate information on "registration for seniors and persons with disabilities."

ES-2: Coordinate river gauge information between the Little Butte Watershed Council, Jackson County Emergency Management and the National Weather Service to make effective use of the river gauges in notifying the City of Eagle Point of potential flooding.

ES-3: Review and update the Eagle Point Emergency Operations Plan

Partners

- Eagle Point Emergency Management
- Jackson County Emergency Management
- National Weather Service
- Little Butte Watershed Council
- Eagle Point Planning Office
- Oregon Emergency Management

Tools for Implementation

The use of a river gauge will help forecast future flood events. There are seven river gauges in the Little Butte watershed and three in the vicinity of Eagle Point. The City of Eagle Point and Jackson County have an opportunity to collaborate with the watershed council in using information from the river gauge in flood forecasting and warning. Steps to insure effective use of the river gauge include the following:

1. Determine if the river gauges are compatible with databases and systems used by the National Weather Service. If so, engage the National Weather Service system so that Jackson County will be able to use that information in notifying Eagle Point during future flood events.

2. Coordinate monitoring of the river gauge between the watershed council, Eagle Point emergency management and Jackson County Emergency Management.

3. Coordinate education and outreach happening at the river gauge station with Eagle Point Emergency Management.

The *Jackson County Emergency Preparedness Plan for Families* produced by the Jackson County Emergency Management Advisory Council can be a valuable resource for residents of Eagle Point.

Constraints to Implementation

Financial costs and administrative burden of workshops, outreach programs and materials may limit dissemination of information to the public.

Goal 5: Increase Public Awareness

Eagle Point Public Priority

1. Information dissemination – 50%
2. Outreach projects – 29%
3. Real estate disclosure – 14%
4. Risk analysis. –7%

Public Information Action Item Recommendations (PI-#)

PI-1: Develop and conduct workshops for community members on NFIP programs, mitigation activities and potential assistance.

PI-2: Disseminate the Jackson County Emergency Preparedness Plan for Families to all Eagle Point residents using means that will ensure residents understand the value and use of the document. (Potentially visiting school programs, churches, community meetings and explaining the document while it is being distributed.)

Partners

- Eagle Point Planning Office
- Eagle Point Emergency Management
- Eagle Point Public Works
- Jackson County Emergency Management
- Little Butte Watershed Council
- Medford Water Commission
- Irrigation Districts
- Eagle Point School Districts
- Oregon Emergency Management

Tools for Implementation

- FEMA documents
- The Eagle Point Flood Mitigation Plan
- *Planning For Natural Hazards: The Oregon Technical Resource Guide*

Constraints to Implementation

Funding for workshops and information dissemination.

Chapter 7: Implementation and Evaluation

7.1 Plan Implementation

The Eagle Point Flood Mitigation Action Plan contains recommendations to meet flood mitigation goals as outlined by the Federal Emergency Management Agency. These recommendations take into account the public prioritization process of flood mitigation goals and activities held in Eagle Point on September 28, 2000. Each of the recommendations is supplemented by appropriate information related to the potential constraints, as well as partners and/or resources available at the federal, state and local level to assist in implementation. The public participation process strengthens the value of this Flood Mitigation Action Plan and may assist as applications for flood mitigation funding are submitted to state and federal organizations. This Flood Mitigation Action Plan can be used in the following ways:

1. As a catalyst for agency coordination and public involvement;
2. To identify and prioritize future mitigation projects that the City can implement when funding becomes available.
3. To qualify for the National Flood Insurance Program's Community Rating System; and
4. As a source of ideas for long-term flood mitigation activities.

This plan should be adopted by the City of Eagle Point for use as a framework plan to address the City's flood hazards. As Eagle Point is completing periodic review of its Comprehensive Plan in 2001, there is further opportunity to integrate this Flood Mitigation Action Plan into the comprehensive plan, addressing elements of the Department of Land Conservation and Development's land use Goal 7 requirements.

Developing the Flood Mitigation Action Plan framework for implementation, included at the end of this chapter, will provide additional opportunity to identify lead and participating organizations, a timeline for implementation, total cost of the action items and potential funding sources.

Act as a catalyst for agency coordination and public involvement

This plan recommends partnerships between local and regional government agencies, and local organizations and citizens. In addition, sections of this plan can be used directly for public education and outreach. **Chapter 2: Flood Hazard Background** can inform community members on flood hazard functions, policy, risk reduction strategies, and statewide resources to assist in mitigation efforts. **Chapter 4: Flood Mitigation Goals and Activities** describe five goals and a number of specific activities that can assist communities in reducing their risk from natural hazards.

Attract funding for mitigation projects

Eagle Point can use this plan as documentation of current mitigation activities and a needs assessment to justify applying for grant programs such as FEMA's Flood Mitigation Assistance Program (FMA) or to apply for updated Flood Insurance Rate Maps. This plan specifically addresses criteria that can assist communities in gaining eligibility for FEMA Flood Insurance and Flood Mitigation Programs.

Qualifying for the Community Rating System

Jackson County is currently a CRS county and can assist Eagle Point in receiving a community rating.[67] Communities are given points by the NFIP based on the planning process they go through in drafting overall flood response plans and flood mitigation plans above and beyond the minimum requirements for the NFIP. The CRS advocates a comprehensive planning process that includes a broad base of public support.

Act as a source of ideas for long-term flood mitigation activities.

This Flood Mitigation Plan includes comments and suggestions by local community members as well as City planning staff and emergency managers. As Eagle Point continues to grow and develop, ideas documented in this plan can be built upon to ensure that growth does not contribute to risk, and that through community outreach and sound land use planning, risk from flooding in Eagle Point will ultimately diminish.

7.2 Evaluating Flood Mitigation Goals and Activities

Mitigation can only happen at the local level, and feasible recommendations are those that can be implemented by the community. This section provides strategies for evaluation of action items prior to implementation, as well as long-term evaluation techniques to determine the effectiveness of mitigation programs.

Benefit-cost analysis

The Federal Emergency Management Agency recognizes benefit-cost analysis as a beneficial means of evaluating projects. In *Land-Use Planning in Oregon*, Mitch Rohse describes benefit-cost analysis as:

> *"A method for comparing the costs and benefits of various alternatives in order to find which is the most efficient. The results of such analysis are usually presented as benefit-cost ratios. The benefit-cost ratio lower than one indicates a project whose costs will exceed its benefits. The greatest theoretical limitation of such analysis is that it requires quantification of all components. The analyst thus may be faced with the prodigious task of placing a dollar value on a scenic view, a human life, or the benefit of some project at a point fifty years in the future. The analysts have been equal to the task, however: such intangibles are routinely quantified."*[68]

Benefit-cost analysis can be useful whenever costs of project implementation and operation, as well as the resulting benefits, can be quantified and compared.

Evaluating Flood Mitigation Plan Action Items

As benefits from mitigation projects cannot always be quantified, cost analysis can be included as criteria within a larger framework. To determine the most feasible and appropriate action item for a community, strategies can be developed to evaluate each of the action items and understand the necessary steps for implementation of the recommendations provided in this Flood Mitigation Action Plan. CPW has developed a methodology to evaluate the flood mitigation goals and activities. The methodology uses 5 criteria to evaluate the alternatives: (1) cost, (2) administrative burden, (3) implementation, (4) monitoring and evaluation, and (5) community priority. Planning officials, agencies and organizations wishing to implement goals and activities recommended in the Eagle Point Flood Mitigation Action Plan can use the following step-by-step process. This evaluation can

also be used to compare potential projects to local resources and capacity to determine project feasibility.

Evaluating Flood Mitigation Plan Action Items, continued

Step 1: Project Costs

Calculate the start-up and operational costs of the goal/activity. The cost criteria are based on the budget required by the goal/activity for start-up and operations.

Step 2: Administrative Burden

Calculate the number of hours required by City staff to implement the goal/activity. Administrative burden is the number of hours required by City staff to implement and maintain the goal and activity programs.

Step 3: Implementation

List the community partners and resources needed to implement the goal/activity. Implementation criteria are based on the tasks required by City staff, community members, and outside agencies to implement the goal/activity. Description of the implementation criteria includes a breakdown of human and material resources needed and a timeline for project development and implementation.

Step 4: Monitoring and Evaluation

Calculate the number of hours required and the resources needed to monitor and evaluate the goal/activity. Monitoring and Evaluation are the number of hours required by City staff to monitor the success of the goal/activity and its effectiveness in the community.

Step 5: Community Priority

Review the priority of the goal/activity given by the community during the Eagle Point public meeting held in August 2000. *The community priority rating is based on the ranking conducted during the public meeting.* This information may need to be updated depending on the duration of time between the completion of the plan and the implementation of the goals and activities.

Evaluating the Criteria

This rating matrix can be used to assess cost and implementation measures for all the action items in this plan. After the action items have been evaluated, each of the criteria can receive a rating of low, medium, or high. These criteria can be used to help determine the most feasible action item for immediate implementation. This matrix can also be a useful tool in identifying the steps in project development. Table 7-1 shows an example of evaluating a public information action item before implementation.

Table 7-1 Evaluating Flood Mitigation Plan Action Items		
Public Information Action Item: Disseminate the Jackson County Emergency Preparedness Plan for Families to all Eagle Point residents in the 100-year floodplain		
Criteria	**Rating** 1=Low 2=Med 3=High	**Total Cost/Resources Needed**
Cost	1	**Start-up and operational costs:** 171 Copies of the Jackson County Emergency Preparedness Plans for Families[69] for distribution.
Administrative Burden	2	**Hours spent by City staff to implement the program(s)**: Staff time to meet with local groups and distribute the information
Implementation	2	**Community coordination and resources needed:** Coordination with schools, churches, health centers, community groups
Monitoring and Evaluation	2	**Hours spent to monitor and evaluate goals/activities**: 3 months after distribution of the plan, send out a one-page survey to assess the usefulness of the plan.
***Community Priority**	3	**Rating given during the public meeting**: Information dissemination was the highest ranked activity for public information activities during the September 28th Eagle Point Flood Mitigation Action Plan meeting.

* A ranking process at the September 28th, Public Forum established ratings for community priorities.

Flood Mitigation Action Plan – Framework for Implementation

Conducting a strategic planning process to complete the Flood Mitigation Action Plan framework for implementation will provide additional opportunity to identify partner organizations, a timeline for implementation, total cost and potential funding sources for each of the action items.

Partners for this planning process could include:

- Little Butte Watershed Council
- Medford Water Commission
- Jackson County Emergency Management
- Eagle Point Public Works
- Eagle Point Planning Office
- Eagle Point Emergency Management
- Irrigation Districts
- Eagle Point School Districts
- Oregon Emergency Management

Appendix A: Summary of Interviews

CPW conducted interviews in the first phase of developing the Eagle Point Flood Mitigation Action Plan to gather background information and gain the perspective of City staff, county agencies, and local citizens on the flooding issue in Eagle Point. Questions were focused in two areas: 1) background and historical flooding and issues, and 2) current and potential mitigation activities. This appendix provides a summary of responses given to each of the interview questions. For purposes of confidentiality, comments and responses are not associated with the names of the stakeholders interviewed.

Stakeholders interviewed during this process included representatives from:

- Little Butte Watershed Council
- Medford Water Commission
- Jackson County Emergency Management
- Eagle Point Public Works
- Eagle Point Planning Office
- Eagle Point Emergency Management
- Eagle Point Irrigation District
- The Upper Rogue Independent Newspaper

Information and content below is from stakeholder interviews. They are personal statements and opinions offered by the interviewees and are not necessarily factual.

Background and Historical Flooding

What seems to be the biggest contributor to stream flooding in Eagle Point?

- The upper watershed creates a huge rise in flooding to the lower watershed. If weather patterns in the upper watershed are harsh, the lower watershed rises within a matter of hours. Even a beautiful day in the lower watershed can become flooded if the weather patterns in the upper watershed are harsh. The creek, which may have historically been dredged or straightened, may also aggravate flooding and now it is trying to find it's natural course. Contact the Jackson County Historical Society for more information.

- The endangered species act has also contributed to flooding. The Endangered Species Act sets limits on the amount of debris that can be cleared from a stream, causing debris jams and subsequent debris flows when debris dams break.[70]

- South fork of the Little Butte – storm pod in the cascades. Flashy stream April 18th of 1998. North fork is regulated – the headwaters at Fish Lake. The 1997 flood data is erroneous (FEMA/Jackson County Data.) Eagle Point Historical Data is very important.

- Channel being contained, filled in – the flow has been restricted. No flood control above Eagle Point. Logging has probably reduced the retention time and the amount of water soaked up by the earth.

- Upstream there are many little tributaries. Salt Creek, Lake Creek and Lick Creek. There is field run off from ranches. The City storm drain system is also contributing - as the City develops and impervious surfaces are created – all the water runs off to the streams. There is no control on the creek – storm water goes to the Little Butte.

- Heavy rainfall, large drainage upstream – 600,000 acres is draining into the Little Butte Creek. If there is failure of the Fish Lake Dam, Eagle Point has 3 hours and 10 minutes to evacuate the City. The dam last broke in 1918. Snow followed by rain (fast snowmelt) is the biggest cause of flooding. There are no measurements of the flood levels. They didn't have to sand bag in 2000. The City is really short staffed – there should be thirty-four employees and they have seventeen. They measure flood levels with a stake in the ground. Water levels are staked when rising and progressively mark levels as water continues to rise or recede.

- Land use impacts the stream.

- Lots of water. For the most part people don't impact the stream. The watershed is large and it's hard to know the affect what is happening upstream has on the Creek.

- Businesses didn't experience flood damage. There were less than a dozen NFIP claims of damage to homes. Elevation of two homes was a result of the flood. There was damage to public infrastructure, and costs of trucks to the City.[71]

- Runoff-from the mountains goes right through town upstream. Watershed groups cut a bunch of trees near Lake Creek and when the debris dams busted, the flooding wiped out land. A few hours of rain in the upper watershed comes off like a Trojan. Impact becomes greater with time passing. More storm drains, new developments, different irrigation ditches, and the higher areas affecting the lowers areas. Hydropower plants, and water in the winter affects the Little Butte with increased run-off. Rains start coming, we spill and pick up mountain flow, and the natural draw goes to the creek. Ditches are for another irrigation company. Storms dump the water in the Rogue River.

What is the history of flooding events in Eagle Point? What have been the causes and characteristics of past floods?

- More than one inch of rain in twenty-four hours creates flood events. The flood in 1997 included debris dams in the South Fork that caused several jams and contributed to the flooding. Are there potentially erosive soils? It seems that the channel tries to redirect itself and carves the streambank. This issue has been brought up at public meetings. Impervious surfaces are not necessarily a contributor to flooding.

- There have been five flood events since 1995. One in 1995, one in 1996/97 and three in 98.

- Eagle Point applied with Oregon Emergency Management for grant money – Rogue Valley Council of Governments and the county have worked with Eagle Point to assess past flood damage. Red Cross did a survey that lists addresses of homes damaged. FEMA has the federal dollar damage amount.

- Forest Service Study – impact study would be important to look at houses up on the street. The stream may have been channelized after the 1963 and 1964 floods. Army Corps of Engineers didn't know anything about it, but the National Resources Conservation Services may have worked on it but have kept no historical damage. There was so much damage on the South Fork - twenty bridges washed out and autos were lost in the 1996/1997 floods.

- There were raw numbers early on – state assistance doesn't catalogue the initial damage. If they don't have insurance it's lost economic income. Insidious part of the disaster. Homeowners often keep the damage to themselves.

How does development in Eagle Point affect stream flooding?

- Irrigation and stormwater management seem to affect the stream, but unsure of the technical impact. Sprawl and rapid growth are most likely increasing flooding levels. It's not going to get lower. Is it possible to estimate it by taking aerial photos and comparing them to the FEMA maps (or try and get FEMA to fund new maps.)?

- Additional information can be found with the Forest Service, Fish and Ranger District or the main hydrologist. Decomposing, steep gradient, landslide creates a check dam. Water was high New Year's Day; people said the water was pulsating. The check dam broke and there was a major debris flow 3 miles from the Rogue confluence.

- Development is not involved too much. Drinking water supply downstream is used by Medford. There is a volunteer monitoring program for water quality and stream flow gauging stations. The gauge is below Eagle Point on highway 62 but it is too far down for forecasting. It is good information on stream flow for historical record.

- The City is careful not to run any more storm drains on the upper end. There is twenty-six inch drainage. Routing drains downstream of the City nowadays. The planning process is very cognizant of the fact that the stream rises so quickly and impacts everything.

- New development and impervious surfaces, specifically the Butte Crest subdivision around the high school is causing more run-off to go into the Little Butte.

Current and Potential Mitigation Activities

How is your organization currently working in flood mitigation?

- Jackson County Emergency Management works with the Hazard Mitigation Grant Program. They are currently working on a flood notification system for Fish Lake Dam. Floods happen because of the weather – look into how notification would take place and tie it into the Emergency Warning System. A grant from OECDD to work with the senior and disabled population – helping them to form neighborhood networks, evacuation, assistance and recovery. Jackson County has a countywide CRS rating. The Eagle Point Emergency Manager and is coordinating with Sandy on an Emergency Transportation Routing Plan. Eagle Point also provides sandbagging and resources for the community during flood events. Public works is also involved in disaster exercises and response planning.[72]

- There is a need to do something about the storm drains. Takings issues will be an issue for the City if there are channelizing activities. The City should do something about the problems before it is mandatory.

- Eagle Point is the only city in the watershed. Consider partnerships with National Marine Fisheries Service. Eagle Point should be on the cutting edge with new storm drains. Not just straight mitigation – look into developing retention ponds, catchments, etc. Floods are going to happen sooner or later.

- During flood events there is sandbagging and streets are closed. Sand and bags are always available and during flood events the City can activate the volunteer fire department. There is a system to determine need for sandbags – the City knows who is eligible through past experiences and FIRM maps.

- Public education and tourist information – there will be a house for the equipment for the stream gauge.

- On the planning end, subdivisions have mapped out the basins to know where the water is going. Diverted water from Buchanan ditch to the Creek. Ditch floods out of the neighborhoods. Storm drain master plan to mitigate water from one area to another and oversize the storm drains.

- City of Eagle Point flood maps, entire storm drain system master plan. They are financing it through a storm utility fee. Storm drain system development charges for future expansion. There are currently no operating funds. Maintaining stream flows. Upper Rogue Watershed Commission, Medford engineering company.

- Emergency management provides sand, bags and notification when people need to evacuate. They open the sandbagging area and people can come in to bag sand. They have a list of elderly and disabled citizens living in the floodplain, help them bag their sand, as well as personally evacuate them in times of emergency. Jackson County has produced a little booklet that Eagle Point helped to pay for. – Emergency Preparedness Plan – checklist. They will provide this at the meeting.

- There is no control on the flooding and no way to monitor it without a gauge.

- Eagle Point Planning Office implements the flood hazard ordinance and the requirements for development in the floodplain. There is very little land left for development in the floodplain, so most of the work comes in monitoring activities of current residents (i.e. prohibiting fencing, construction, and gardens on the riverfront.) The planning office has to do pro-active and re-active education for homeowners in the floodplain. Homeowners are beginning to see the benefits of complying with flood zone regulations in the lowering of their insurance rates.

What would reduce risk from flooding?

- Irrigation ditches
- Stormwater drainage
- Retention Ponds – change the timeframe of the flood
- Don't put a storm water management system in that has to be replaced. Deal with the impervious surfaces and the waters for it in a way that traps the water.
- Wetlands Development.
- The community needs to take initiative. Don't just let stormwater run away.
- Piping Little Butte – switch it around the City.
- Buy-outs – open space, place for water to go.
- Mapping!
- Accurate maps!
- More information on low cost mitigation strategies like wrapping.

- Better systems for notifying people, sandbagging and wrapping homes.
- Trying to divert the water.
- Let people know that flood insurance covers costs of lower mitigation options.
- Letting people know that they aren't supposed to close out their basements.
- Stream gauge
- Community Initiated Ordinances.
- More motivation for buy-out or elevation.
- Lots of nice homes on Little Butte – people want to stay there so we need to educate them.
- A lot is happening in terms of ordinances, planning and education in Eagle Point.
- Love to see buy-outs for open-space, parks in floodplain areas. Trailer parks in Beaver Creek were wiped out. The creek has been channeled and now there is no place to go. Happened after the 1964 floods by NRCS – they reclaimed the lands.
- Flood control structure? Eliminate dams on the Butte – structural mitigation is not an option on the Little Butte.
- In the fall, the leaves come down. General public concern is there over domain in times of emergency. People are worried about liability in times of emergency. The City could make clear that gutters should be cleaned out. Don't know the town mechanisms. People put diversions in the canals during the summer. City personnel should be aware of any diversions on storm drains or irrigation. Pull the diversions down – make homeowners aware of this. Protect storm drains, natural spills; make sure they're clear.
- Make new and prospective homeowners aware of the flood issue. Public education! (Specifically when private parties are selling to private parties.) If there is no lender there is less disclosure.
- Stream gauges to monitor creek levels. There is a severe amount of acreage draining into the Little Butte. No more building by the river. The City knows what is susceptible and knows to stay out of the flood paths way. Sand and bags are available, shelters, evacuation plan.
- Awareness! Information is made available. Here in town and in agricultural areas. Need strong planning in regards to surface areas. Pros and cons to development. Where there is more development, they pipe ditches. But then more surface water keeps coming and the water has nowhere to go when it seeps into ditches.
- Deal with the messy old irrigation ditches. People aren't using it for agricultural purposes. People are in City lots and watering their lawns with the water. Work with Oregon Water Resources. As Eagle Point grows, water is going to become more and more of a problem. Don't have enough water for all the people that are coming. There is either no water or an excess of water. Bear Creek has never been a year-round creek. A real mess. Bear Creek work with Little Butte. Medford may lose Klamath water, which may make them more dependent on the Little Butte.
- No stream gauge on the creek. Weather service was going to reactivate so there is no forecast on flooding, no way to project, and no history. Having flood forecast capability would be immensely helpful. Gauges and maintenance could exceed $5000/year.

- There is information on total amount of assistance provided for residents and businesses (for Jackson County).
- Eagle Point has the advantage of being a small city – people attend public meetings, go door to door, have workshops.
- The dam in Eagle Point for irrigation has no ability to moderate a flood. The whole main street could be under water – there is an enormous potential economic loss (how do we evaluate this?) Look at demographics of downtown and the business sector at high risk.
- One woman (who lives in Alaska) and owns a home on the Little Butte obtained permits from the Division of State Lands and the Army Corps of Engineers to place riprap in the stream and protect her home from future flooding.
- Flood zones need to be remapped! Every year the creek does something different. I imagine that there is now three feet of silt built up from the last time the river was mapped.

Appendix B: Public Meeting Comments

Flood mitigation goals and activities were prioritized during a public meeting in Eagle Point for residents of the 100-year floodplain and other interested citizens. Persons attending the meeting had the opportunity to submit any additional activity ideas or concerns by writing on the backs of their prioritization cards. In addition, comments from the discussion that occurred after the ranking process are also included in this section.

Participants:

Maybell Gray – Local Citizen
Jim Reynolds – National Weather Service
Jeanne Jordan – Local Citizen
Arlene McCoy – Local Citizen
Al Starr – Local Citizen
Lu Anthony – Little Butte Watershed Council
Margie Johnson – Local Citizen
Latta Mae Colvan – Local Citizen
Jim Askwith – Local Citizen
Sharon Askwith – Local Citizen
Christine Pratt – Local Citizen
Earl Wood – City Councilor
Carolyn Baker – Local Citizen
Nancy Leonard – Upper Rogue Independent
John Payne – Local Citizen, FEMA grant participant
Richard Tree – Local Citizen, FEMA grant participant
Dave Strand – Eagle Point Emergency Manager
Bob Kimmel – Local Citizen
Sandy Eccker – Jackson County Emergency Management
Barb Shipley – Eagle Point City Recorder
David Hussell – Eagle Point City Administrator
David McFall – Eagle Point Mayor
Bunny Lincoln – Eagle Point Principal Planner

Information and content below is directly from the September 28th public forum in Eagle Point. They are statements offered by participants of the forum and are subjective to personal memories and opinions.

Notes from the goal and activity ranking process (statements written by participants on the back of the ranking cards):

Preserve or restore natural elements of the floodplain

- Release of dam water is a concern (dam failure)

Enhance Emergency Services

- Keep Long Mountain water out of Eagle Point
- Clean drain ditches on the south end of Eagle Point
- People are asleep at night.

Guide Development in the floodplain

- Is this a waste of time or will there be some positive outcome?

Increase Public Awareness

- City has allowed homes to be moved onto property in the floodplain after being warned about the situation.
- Finish Elk Creek Dam
- Real estate disclosure lowers property value's
- Concerned about ability to sell our property in the future

Protect Individual Property

- I do not agree with the idea that we need the Federal Government to come in and solve our problems because it costs too much and we lose our property rights.
- FEMA is a joke! Not just here but in other parts of the country.

Additional Goals

- Build dam
- Finish Elk Creek Dam

Additional Issues:

- Old lagoon – it can be used as a diversion – why can't we do this? Near Nick Young Pool
- Warning systems – would like to know more

Comments following the ranking process:

- There should be a moratorium on building until flooding issues are resolved.
- Who has responsibility for cleaning the ditch that farmers and ranchers use (that are directed right through the City)? There is a need to find a way to determine responsibility for the ditches – maintenance issues are still a problem.
- Over the years the sediment has collected into Butte Creek – no one has dredged it – why not?
- Theory – in 1963 and 1964 flood ponds reached capacity and they dumped/released water, which produced a second crest. Monitoring may help address this.
- Concerned that we are limited to FEMA goals – we can only vote on these?
- In the 1962/63 floods – we saw how high the water was. What is the culpability of the City that allows dams in an area that used to drain well? Who is responsible for their effect on areas that were not affected by flooding in the past? (Example is the Kaiser house.)
- Why can't there be a pump station in the old lagoons.
- When can we get new FEMA maps? We're using 1980 maps.
- What are we going to do with the wetland protection? Are we doing anything in this area? We need a wetland plan – have we contacted DEQs wetland program?
- What qualifies people for elevation?
- Drainage problems in Edith Circle – drainage ditches – new development and relocation. Yearly flood from drainage.
- Anything that will help.
  Never saw information on elevation and acquisition programs
- How is the dam release monitored?

- What about the dam issue?
- Being able to sell the property is a real issue for homeowners
- Don't clean out the drainage ditch. "Who wants to buy a home if they know it's going to

- Drainage behind Edith Circle – has never been cleaned up – there was once a stove and a fridge, cattails it all backs up and over into lots.
- City of Eagle Point has a $3 service fee on the water bill – where does that extra charge go? For culverts? Where?
- Moratorium on building until this problem is resolved – backflow increases flooding.
- Development that has occurred in both areas addressing water that comes down – subdivision developments are redirecting into required storm drains – goes to the Little Butte Creek. Water Hazards on the golf course – 820 houses are expected to be developed in that area. Taking care of new developments improve storm water management.[73]
- How can we recommend on growth issues – fills Little Butte. Where does it go? Butte crest 2-3 years of activities.
- Problem is growth. Potentially dredge the creek? How to deal with creek? Redirecting so it does not impact existing systems.
- Irrigation ditches – farmers and ranchers why does it come through town.
- Need responsibility for cleaning them out (Task Plan!!!) The SMP fee structure? Is the $3 going to clean out the storm drains?
- Controlled/owned by property owners.
- Two irrigation companies in Little Butte and Eagle Point – customers are served. Have to provide for those
- How do we make people responsible for their actions?
- City Council and irrigation
- Recommendations for lots of information dissemination
- NFIP/acquisition/elevation programs.
- Long-term issues
- Sediment and silt – how much shallower is the stream because of sediment?
- MAPS – hydrological analysis needs to be done.
- 1962 and 1964 floods – ranches in the headwaters – acres crested – monitoring is a critical stage in impoundment 62/64 floods.
- Monitoring/gauges – hook up with Jackson County Emergency Management and the Little Butte Watershed Council.
- The Eagle Point Emergency Manager has a file for emergency services
- Provide enough time for people to really cull the information.
- 1962 flood 202 South Shasta – water slouses through.
- What is the culpability of the City – why are dams built where water used to flow efficiently?

- Natural drainage areas damned by a developer – created interruption of water – what happens and how? Large volumes of water coming together.
- Used to be a free flowing area – used to be a natural creek.
- Private property – permit through the authorities – DEQ?
- Check with Little Butte Watershed Council regarding mapping. Will those maps help FEMA to get new FIRM maps in town?
- Research the permitting authorities for fill
- Mapping is a huge issue – hydraulic analysis the dynamics have changed.
- Sky Blue subdivision 30" culvert - South Shasta area.
- H2O pumped to old lagoons? Are there funds available?
- FEMA is starting to offer more funds for assistance now.[74]
- Disincorporate and get urban renewal funds?
- Good constructive ideas that can be implemented
- 1980 maps – this community is ready to go.
- Southern Oregon University students could be a good resource
- $300,000 – remove people and property
- Dependent on FEMA problem – eligibility? Can we keep people out of harms way?
- Can this plan provide us with direction?
- Keep files of flood elevation certificate
- Establish where your house sits? The best that the City can do is with the existing flood maps.

Appendix C: Glossary

100-year flood
A flood event that is estimated to have one percent chance of occurrence each year.

Base Flood Elevation (BFE)
The elevation of the base flood crest. For the plan's study area this is the level reached by a 100-year flood event.

Conservation easement
A legal agreement, similar to a deed restriction, which attaches to a property deed and is publicly recorded. Easements can be tailored to meet the needs and desires of landowners, while providing flood mitigation benefits to the community as a whole.

Federal Emergency Management (FEMA)
The federal agency administering the National Flood Insurance Program and various flood mitigation programs. For more information on these programs refer to Appendix D.

Flood Insurance Rate Map (FIRM)
A map provided to communities as part of the National Flood Insurance Program. It delineates a particular area where floodplain regulations apply.

Floodplain
Defined by planners and engineers, a floodplain refers to any area that is subject to flooding.

Floodplain management
This term generally refers to the administration of floodplain development regulations.

Geographic Information System (GIS)
A computerized informational system that allows for rapid manipulation and presentation of geographic data. This data can include any information capable of being directly related to geographic features such as zip codes and census tract information.

Improved value
Property value assessed in addition to monetary value of the "raw land". It is often easier to understand this concept as "built value".

Land trust
A nonprofit organization dedicated to protecting privately owned natural and historical resources. Sanctioned by the Internal Revenue Service (IRS), land trusts operate under strict guidelines. Conservation easements are often administered by land trusts.

Mitigation
Sustained long-term measures designed to reduce or eliminate impact from natural hazards.

Riparian- A term referring to the area adjacent to stream or river channels.

Watershed- A geographic "basin" that drains into a stream or river. "Watershed" is a generic term, and a large river watershed (like the Siletz watershed) has many smaller watersheds within it (like the Cedar Creek watershed).

Appendix D: Resources and Flood Mitigation Programs

Local Resources

City of Eagle Point

Contact: David Hussel, City Administrator
Bunny Lincoln, Principal Planner
Barb Shipley, City Recorder
Gary Shipley, Public Works
Dave Strand, Emergency Manager
Address: 17 Buchanan Ave. South, P.O. Box 779, Eagle Point, Oregon 97524
Phone: (541) 826-4212

Little Butte Watershed Council

Contact: Lu Anthony
Address: 1094 Stevens Road, Eagle Point, Oregon 97524
Phone: (541) 826-2908

Jackson County Emergency Management

Contact: Sandra Eccker
Address: Jackson County Courthouse, 10 South Oakdale, Medford, Oregon 97501
Phone: (541) 774-6821

National Weather Service

Contact: James Reynolds
Address: 4003 Cirrus Dr., Medford, Oregon 97501
Phone: (541) 776-4303

State Resources

Department of Land Conservation and Development (DLCD)

DLCD administers the State's Land Use Planning Program. The program is based on 19 Statewide Planning Goals, including Goal 7, related to natural hazards. DLCD also serves as Oregon's federally designated agency to coordinate floodplain management in Oregon. DLCD maintains contact with flood prone communities throughout the state in order to help them meet the requirements of the NFIP and to ensure that they are prepared in case of flood. DLCD offers information on the NFIP, CRS and other FEMA - related programs. They also offer training courses on various flood mitigation programs.

Contact: Department of Land Conservation and Development
Address: 635 Capitol St. NE, Suite 200, Salem, OR 97301-2540
Phone: (503) 373-0050
Fax: (503) 378-6033
Website: http://www.lcd.state.or.us
Oregon Floodplain Coordinator: (503) 373-0050 ext. 255

Oregon State Police-Office of Emergency Management (OEM)

OEM administers FEMA's Hazard Mitigation Grant Program, which provides monies for acquisition, elevation, relocation, and demolition of structures located in the floodplain.

provides assistance for NFIP insured structures only. OEM also helps local jurisdictions to develop local hazard mitigation plans. OEM is heavily involved in flood damage assessment and works mainly with disaster recovery and hazard mitigation programs. OEM provides training for local governments through workshops on recovery and mitigation. OEM also helps implement and manage federal disaster recovery programs.

Contact: Office of Emergency Management
Address: 595 Cottage Street NE, Salem, OR 97310
Phone: (503) 378-2911
Fax: (503) 588-1378
Website: http://www.osp.state.or.us/oem/
OEM Hazard Mitigation Officer: (503) 378-2911 ext. 247
Recovery and Mitigation Specialist: (503) 378-2911 ext. 240

Oregon Division of State Lands (DSL)

DSL is a regulatory agency, responsible for administration of Oregon's Removal-Fill Law. This law is intended to protect, conserve and allow the best use of the state's water resources. It generally requires a permit from DSL to remove, fill or alter more than 50 cubic yards of material within the bed or banks of waters of the state. Exceptions are in State Scenic Waterways and areas designated essential salmon habitat, where a permit is required for all instream activity, regardless of size. DSL and the U.S. Army Corps of Engineers may issue these permits jointly. Contact the DSL with specific questions regarding this permit process.

The Wetlands Program - Local Wetlands Inventories

Local Wetlands Inventories (LWIs) supplement the National Wetlands Inventory in urban areas. In 1990, DSL adopted guidelines and rules for conducting LWIs within urban growth boundaries. LWIs are conducted by wetlands consultants for cities completing wetlands planning under Statewide Goals 5 (Natural Resources) or 17 (Coastal Shorelands). Wetlands program staff work closely with cities and consultants to ensure that the LWIs are thorough and conducted according to standards. LWIs may be viewed at the City planning department or at DSL.

Contact: Division of State Lands
Address: 775 Summer Street NE, Suite 100, Salem, OR 97301-1279
Phone: (503) 378-3805
Fax: (503) 378-4844
Website: http://statelands.dsl.state.or.us/
Assistant Director: (503) 378-3805, ext. 279
Eastern Region Manager: (541) 388-6033
Western Region Manager: (503) 378-3805, ext. 244

Oregon Watershed Enhancement Board (OWEB)

OWEB is a potential funding source for communities wanting to do flood mitigation projects and other watershed activities/improvements. The mission of the Oregon Watershed Enhancement Board is to promote and implement programs to restore, maintain and enhance watersheds in the State of Oregon in order to protect the economic and social well being of the state and its citizens. Contact OWEB directly for more information on its grant programs.

Contact: Oregon Watershed Enhancement Board
Address: 255 Capitol St. NE, Salem, Oregon 97310
Phone: (503) 378-3589
Fax: (503) 378-3225
Website: http://www.4sos.org/group/gweb.html
Program Manager: ext. 831

State Division of Building Codes, Department of Consumer and Business Services

The Oregon Building Codes Division (BCD) adopts statewide standards for building construction that are administered by the state and local municipalities throughout Oregon. To find out more information about codes that affect development in floodplains contact BCD or your local building department.

Contact: Building Codes Division
Address: 1535 Edgewater Street NW, P.O. Box 14470, Salem, OR 97309-0404
Phone: (503) 378-4133
Fax: (503) 378-2322
Website: http://www.cbs.state.or.us/bcd/

Oregon Department of Environmental Quality

The Department of Environmental Quality (DEQ) is responsible for protecting and maintaining Oregon's environmental quality, predominately through programs delegated by the U.S. Environmental Protection Agency (USEPA) to the state. Of particular interest to local government for floodplain management purposes are regulations recently issued by USEPA and administered by DEQ for urban stormwater management. In addition to meeting water quality goals, proper stormwater management can help local governments address flood hazards. DEQ also may assist communities in watershed restoration efforts and other activities beneficial to floodplain management. Information on regional office location can be obtained through DEQ's Portland Office.

Contact: Water Quality Division
Address: 811 SW 6th Ave., Portland, OR 97204-1390
Phone: (503) 229-5279
Fax: (503) 229-6993
Website: http://www.deq.state.or.us

State of Oregon Water Resources Department (WRD)

WRD manages the state's Dam Safety Program. Dam failures, though uncommon, can result in catastrophic flooding. WRD can provide technical assistance to local governments on issues of dam safety.

Address: 1158 12th St. NE, Salem, OR 97301-4172
Phone: (503) 378-8455
Fax: (503) 378-2496
Website: http://www.wrd.state.or.us

Oregon Department of Fish and Wildlife (ODFW)

ODFW can provide assistance to local governments in evaluating the effects of floodplain and floodway development on fish and wildlife species and habitat. In particular, your

community should contact area Fish and Wildlife staff to help review floodway development permits. To obtain information on area office location, use the following contact information.

Address: 2501 SW First Ave., Portland, OR 97207
Phone: (503) 872-5268
Website: http://www.dfw.state.or.us

Federal Emergency Management Agency Resources and Programs

FEMA provides maps of flood hazard areas, various publications related to flood mitigation, funding for flood mitigation projects, technical assistance, and also operates the National Flood Insurance Program. FEMA's mission is "to reduce loss of life and property and protect our nation's critical infrastructure from all types of hazards through a comprehensive, risk-based, emergency management program of mitigation, preparedness, response and recovery". FEMA Region X serves the northwestern states of Alaska, Idaho, Oregon and Washington.

Contact: FEMA, Federal Regional Center, Region 10
Address: 130-228th St. SW, Bothell, WA 98021-9796
Phone: (425) 487-4678
Website: http://www.fema.gov
To obtain FEMA publications, Phone: (800) 480-2520
To obtain FEMA maps, Contact: Map Service Center
Address: P.O. Box 1038, Jessup, Maryland 20794-1038
Phone: (800) 358-9616
Fax: (800) 358-9620

Flood Insurance Study: Guidelines and Specifications for Study Contractors (1995)

This edition of the Flood Insurance Study Guidelines and Specifications for Study Contractors reflects the changes in mapping policy and technical procedures that have been adopted by the Federal Emergency Management Agency since the Guidelines were last issued in March 1993. Study contractors and State or Federal agencies planning to perform Flood Insurance Study work for FEMA should become thoroughly familiar with these Guidelines. To obtain the Flood Insurance study publication or for more information contact Larry Basich, FEMA region X engineer, at 425-487-4703.

National Flood Insurance Program (NFIP)

The function of NFIP is to provide flood insurance to homes and businesses located in floodplains at a reasonable cost, and to encourage the location of new development away from the floodplain. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce that risk, primarily through guidance of new development in floodplains.

Congress created the NFIP in 1968 to minimize response and recovery costs and to reduce the loss of life and damage to property caused by flooding. The Federal Emergency Management Agency (FEMA) administers the NFIP. The two fundamental objectives of NFIP are to:

1) Ensure that new buildings will be free from flood damage; and
2) Prevent new developments from increasing flood damage to existing properties.[75]

The primary benefits of the NFIP are to:

1) Provide flood insurance coverage not generally available in the private market;
2) Stimulate local floodplain management to guide future development;
3) Emphasize less costly nonstructural flood control regulatory measures over structural measures; and
4) Reduce costs to the federal government by shifting the burden from the general taxpayer to floodplain occupants.

Community Participation in NFIP

Community participation in NFIP requires the adoption and enforcement of a floodplain management ordinance that controls development in the floodplain. This type of ordinance has been accepted by LCDC as sufficient to comply with Statewide Planning Goal 7 for flood hazards. To ensure that a community is in compliance with NFIP and Oregon state law, a jurisdiction is required to do the following:

1) Require development permits for all proposed construction and other development within the community's designated 100-year floodplain;
2) Review permits to be sure that sites are reasonably safe from flooding;
3) Review subdivision proposals to determine whether the project is safe from flooding and provides adequate drainage;
4) Require residential structures to have the lowest floor (including basement) elevated at least to one foot above Base Flood Elevation (BFE);
5) Require non-residential structures to have the first floor elevated or flood proofed to one foot above BFE;
6) Require manufactured homes to be elevated and anchored;
7) Require water supply systems to be designed to eliminate infiltration of flood waters;
8) Require new replacement sanitary sewage systems be designed to minimize or eliminate infiltration of flood waters;
9) Ensure flood carrying capacity of altered or relocated watercourses is maintained;
10) Maintain records of all development permits;
11) Verify and document elevations of new or substantially improved structures; and
12) Properly address development in coastal "Velocity Zones".[76]

Elevation Certificates

The Elevation Certificate is a form published by the Federal Emergency Management Agency required to be maintained by communities participating in the National Flood Insurance Program (NFIP). The NFIP requires local governments to obtain certificates for all new construction in floodplains and to keep the certificates on file. Elevation certificates are used to:

1) Record the elevation of the lowest floor of all newly constructed building located in the floodplain.
2) Determine the proper flood insurance rate for floodplain structures
3) Local governments must insure that elevation certificates are filled out correctly for structures built in floodplains. Certificates must include:
    a) The location of the structure (tax parcel number, legal description) and use of the building.
    b) The Flood Insurance Rate Map panel number and date, community name and source of base flood elevation date.
    c) Information on the building's elevation.
    d) Signature of a licensed surveyor or engineer.

System

The Community Rating System (CRS) is operated under the National Flood Insurance Program (NFIP). NFIP provides flood insurance to homes and businesses located in floodplains at a reasonable cost, and to encourage the movement of development away from the floodplain. The program is based upon mapping areas of flood risk, and requiring local implementation to reduce that risk, primarily through restrictions on new development in floodplains.

CRS recognizes community efforts that go beyond the minimum standards of the National Flood Insurance Program (NFIP). This recognition is in the form of reduced flood insurance premiums for communities who adopt such standards. CRS encourages community activities that reduce flood losses, facilitate accurate insurance rating, and promote flood insurance awareness. There are over 900 communities participating in CRS nationwide. Some of the benefits of CRS are listed below.

CRS Benefits

- Flood insurance premium reductions, ranging from 5% to 45%. The higher the CRS rating a community achieves, the greater the premium discount.
- Floodplain management activities enhance public safety and reduce damages to private property and public infrastructure.
- Communities can evaluate the effectiveness of their floodplain management program against a national benchmark.
- Implementation of some CRS activities make communities eligible for other funding sources.

Participation in CRS is voluntary. There are minimum requirements in order to participate.

- Your community must be in compliance with the rules and regulations of NFIP.
- The community's chief executive (mayor, County Board of Commissioners) must appoint a CRS coordinator.
- Communities must require and keep all NFIP elevation certificates on file.
- Communities with 10 or more repetitive losses must develop and implement a floodplain mitigation plan.

The CRS rating system is based on the ranking of community activities within four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness. Communities engaging in these types of activities receive points according to a schedule developed for the CRS. CRS ratings are assigned based upon the number of points earned. The majority of CRS communities are in Class 8 or Class 9. A Class 8 rating earns about a $40 savings in flood insurance premium per insurance policy, per year. Only 3 communities out of 900 have achieved Class 5 status. The system is summarized in Table D-1, below. CRS handbooks are available from your local FEMA representative or by calling 1-800-427-4661.

Table D-1 Summary of Points and Insurance Rate Discounts under CRS		
Credit Points	**Class**	**Premium Reductions**
0-499	10	0
500-999	9	5%
1000-1499	8	10%
1500-1999	7	15%
2000-2499	6	20%
2500-2999	5	25%
3000-3499	4	30%
3500-3999	3	35%
4000-4499	2	40%
4500+	1	45%

Oregon CRS Communities

As of January 2000, sixteen (as described in table D-2) Oregon jurisdictions are participating in the CRS program.[77] The requirements of Statewide Planning Goal 7 and the State Building Codes make it relatively easy to achieve a Class 9 CRS rating. Communities are required to create and implement policies that address flood hazards. Achieving a higher CRS rating, however, requires a greater effort from communities. Local communities, particularly smaller communities with limited resources, must weigh the costs and benefits of putting forth this effort. It is important to consider the realities of available resources, the number of structures at risk, and number of insurance policies in the community, when deciding whether or not to participate in voluntary flood mitigation programs such as CRS.

Even if a jurisdiction is not ready to officially apply to be a part of CRS, the CRS flood mitigation planning standards are very useful for assessing local needs with regard to floodplain management and hazards planning in general. In addition, if a community begins to use CRS methodologies now, it will only expedite the process later when a CRS application is filed.[78]

Table D-2 Summary of Oregon Community CRS Ratings	
Oregon Communities	**CRS Rating**
Albany	8
Ashland	8
Cannon Beach	7
Central Point	8
Corvallis	8
Douglas County	8
Eugene	8
Grants Pass	9
Jackson County	8
Medford	9
Polk County	9
Rogue River	8
Roseburg	8
Scappoose	8
Stanfield	9
Talent	8

Jackson County is currently a CRS community and can assist Eagle Point in receiving this rating. Communities are given points by the NFIP based on the planning process they go through in drafting overall flood response plans and flood mitigation plans above and beyond the minimum requirements for the NFIP. The CRS advocates a comprehensive planning process, which includes a broad base of public support. Table D-3 illustrates the criteria established by FEMA for earning CRS points.

Table D-3
Community Rating System credits

Step	Maximum Points
a. Organize to prepare the plan	10
b. Involve the public	48
c. Coordinate with other agencies	18
d. Assess the hazard	10
e. Assess the problem	30
f. Set goals	2
g. Review possible activities	39
h. Draft an action plan	50
i. Adopt the plan	2
j. Implement, evaluate and revise	10
Total	**210**

FEMA Region X's Policy on Fish Enhancement Structures in the Floodway

The Federal Emergency Management Agency (FEMA) regulates development in the floodway. The regulations require that a community prohibit encroachments (including fill, new construction, and other development) within the floodway unless it is demonstrated by engineering analysis that the proposed encroachment will not result in any increase in flood levels during the occurrence of a 100-year flood event.

The recent designation of several northwest salmon and steelhead runs as threatened or endangered has resulted in an increased effort to restore fish habitat. Restoring habitat often involves placing structures in stream. These structures, including fish weirs, log drops, root wads and small rock deflectors are "encroachments" when placed in mapped floodways. A literal interpretation of the FEMA floodway standard may require a relatively expensive "no-rise" analysis that might exceed the cost of the habitat enhancement project.

In order to encourage habitat enhancement projects while still providing communities with information needed to make appropriate floodplain management decisions, FEMA Region X will allow communities to rely on the judgment of a qualified professional regarding the impact of fish enhancement structures on flood elevations. Qualified professionals include hydrologists and hydraulics professionals and staff of fisheries, natural resource or water resource agencies. This will minimize the cost of getting a "no-rise" analysis. However, the community, while making use of the professional's advice, must still make the ultimate decision on whether to allow the habitat enhancement structure.

For more information on the policy on fish enhancement structures in the floodway, contact FEMA Region X at 425-487-4682.

Hazard Mitigation Grant Program (HMGP)

The HMGP administered by the Federal Emergency Management Agency (FEMA) provides grants to states and local governments to implement long-term hazard mitigation measures

after a federal major disaster declaration. It is important to stress that the HMGP is available only after a federal disaster declaration has been made. When such an event occurs, and these monies become available, they can be used to implement important and innovative flood mitigation projects. The purpose of the program is to reduce the loss of life and property due to natural disasters and to enable mitigation measures to be implemented immediately, during disaster recovery. FEMA can fund up to 75 percent of the eligible costs of each project. Eligible applicants are state and local governments, special districts, Native American nations and organizations, and certain private non-profit organizations. Individual homeowners and businesses may not apply directly to the program, but a community may apply on behalf of homeowners and businesses. An example of an HMGP project would be the purchasing of property located in the floodplain to prevent future damage.[79] The Oregon State Police- Office of Emergency Management (OEM) is the state agency responsible for administering the HMGP.

Flood Mitigation Assistance Program (FMA)[80]

FEMA's Flood Mitigation Assistance provides funding to assist States and communities in implementing measures to reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes, and other structures insurable under the National Flood Insurance Program. Flood Mitigation Assistance was created as part of the National Flood Insurance Reform Act of 1994 (42 U.S.C 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program. Flood Mitigation Assistance is a pre-disaster grant program.

FMA Planning Grants - Planning is the foundation of Flood Mitigation Assistance. Approved plans make a community eligible to apply for Flood Mitigation Assistance project grants. Communities that have Flood Mitigation Plans can request approval of their plans from their Flood Mitigation Assistance State Point of Contact (POC) and FEMA. Plans must assess the flood risk and identify actions to reduce the risk.

FMA Project Grants - States and communities can apply for project grants to implement measures to reduce flood losses. Projects that reduce the risk of flood damage to structures insurable under the National Flood Insurance Program are eligible. Such activities include:

- Elevation of insured structures.
- Acquisition of insured structures and real property.
- Relocation or demolition of insured structures.
- Dry floodproofing of insured structures.
- Minor, localized structural projects that are not fundable by State or other Federal programs.
- Beach nourishment activities.

Who is eligible? Any State agency, participating NFIP community, or qualified local organization is eligible to participate in the Flood Mitigation Assistance program. Communities that are suspended or on probation from the National Flood Insurance Program are not eligible. Individuals wishing to participate in the Flood Mitigation Assistance program should contact their community officials.

What are the project grant eligibility criteria?

A project must, at a minimum, be:

- Cost effective.
- Cost beneficial to the National Flood Insurance Fund.

- Technically feasible.
- Physically located in a participating NFIP community or must reduce future flood damages in an NFIP community.

A project must also conform with:

- The minimum standards of the NFIP Floodplain Management Regulations.
- The applicant's Flood Mitigation Plan.
- All applicable laws and regulations, such as Federal and State environmental standards or local building codes.

How does Flood Mitigation Assistance work?

FEMA distributes Flood Mitigation Assistance funds to States, which in turn provide funds to communities. The State serves as the grantee and program administrator for the Flood Mitigation Assistance. The State:

- Sets mitigation priorities.
- Provides technical assistance to communities applying for Flood Mitigation Assistance funds.
- Evaluates grant applications based on minimum eligibility criteria and State priorities.
- Awards planning grants.
- Works with FEMA to approve projects and awards funds to communities
- Ensures that all community applicants are aware of their grant management responsibilities

What are the cost-share and funding limits?

FEMA may contribute up to 75 percent of the total eligible costs. At least 25 percent of the total eligible costs must be provided by a nonfederal source. Of this 25 percent, no more than half can be provided as in-kind contributions from third parties. There are limits on the frequency of grants and the amount of funding that can be allocated to a State or community in any 5-year period.

Oregon Flood Mitigation Assistance (FMA) program

The Oregon FMA program provides grants to communities for projects that reduce the risk of flood damage to structures that have flood insurance coverage. This funding is available for flood mitigation planning and implementation of mitigation measures only. The Oregon State Police- Office of Emergency Management (OEM) is the administrator of the FMA program and is responsible for selecting projects for funding. The State then forwards selected applications to FEMA for an eligibility determination. Although individuals cannot apply directly for FMA funds, their local government may submit an application on their behalf. [81]

Other Federal Resources

Army Corps of Engineers

The U.S. Army Corps of Engineers is responsible for the protection and development of the nation's water resources, including navigation, flood control, energy production through hydropower management, water supply storage and recreation. The Corps administers a permit program to ensure that the nation's waters are used in the public interest, and requires any person, firm, or agency planning work in the waters of the United States to first obtain a permit from the Corps. Permits are required even when land next to or under

the water is privately owned. It is a violation of federal law to begin work before a permit is obtained and penalties of fines and/or imprisonment may apply. Examples of activities in waters that may require a permit include: construction of a pier, placement of intake and outfall pipes, dredging, excavation and depositing of fill. Permits are generally issued only if the activity is found to be in the public interest. In Oregon, permits for development are issued jointly by the Oregon Division of State Lands (DSL) and the U.S. Army Corps.

Contact: U.S. Army Corps of Engineers-Portland
District, Floodplain Information Branch
Address: P.O. Box 2946, Portland, OR 97208-2946
Phone: (503) 808-4874
Fax: (503) 808-4875
Website: http://www.nwp.usace.army.mil/

National Weather Service

The National Weather Service mission is to provide weather and flood watches and warnings, and public forecasts and advisories primarily for the protection of life and property. The Weather Service collects, interprets and disseminates up-to-date hydro-logic data including information of the magnitude and frequency of past and expected water flows. The Weather Service website provides current forecasts and warnings as well as a link to the Emergency Managers Weather Information Network. Oregon has three weather service stations: Portland, Pendleton, and Medford. The Boise station serves southeastern Oregon.

Contact: National Weather Service
Address: 5241 NE 122nd Avenue Portland, OR 97230 (503) 326-2340
Website: http://www.nws.noaa.gov

Emergency Watershed Protection Program (EWP)

EWP is a Natural Resource Conservation Service (NRCS) program designed to relieve imminent hazards to life and property caused by floods, fires, windstorms and other natural occurrences. EWP provides funds for projects such as removing debris from stream channels, reshaping and protecting eroded banks, correcting damaged drainage facilities, repairing levees and structures, and purchasing floodplain easements. If your community suffers severe damage from a natural disaster it may qualify for assistance under the EWP program. Public and private landowners are eligible for assistance but must be represented by a project sponsor. City and county governments, general improvement districts and conservation districts are the most common sponsors of EWP projects. Sponsors are responsible for providing land rights to do the repair work and securing permits, as well as furnishing the local cost share and accomplishing the installation of work.[82]

Contact: Natural Resource Conservation Service, Oregon State Branch
Address: 101 S.W. Main Street, Suite 1300, Port-land, OR 97204-3221
Phone: (503) 414-3200
Fax: (503) 414-3103
Website: http://www.or.nrcs.usda.gov/Welcome.html

FINAL DRAFT

Eagle Point Flood Mitigation Action Plan - Implementation Framework							
Goal	**Recommendation**	**Lead Organization**	**Participating Organizations**	**Timeline**		**Cost**	**Potential Funding Sources**
				Start	**Finish**		
Protect Individual Property	PP-1: Avoid developing in flood hazard areas.						
	PP-2: Consider applying for the Federal Emergency Management Agencies (FEMA) Flood Mitigation Assistance (FMA) program funds. FMA grant programs can provide assistance for elevation and acquisition projects.						
	PP-3: Consider applying for eligibility for FEMA's Community Rating System, which provides reduced insurance premium incentives for homeowners with flood insurance or who have undertaken other mitigation activities such as elevation.						
Guide Development and use of the floodplain	PR-1: Develop revised Flood Insurance Rate Maps (FIRM).						
	PR-2: Consider using land acquired from the HGMP program as open space and parks. Land acquired through hazard mitigation grant programs must adhere to federal guidelines, such as not allowing the construction of buildings or impervious surfaces.						
	PR-3: Review and evaluate the draft storm water management plan for flood elements and relevant flood mitigation activities.						
	PR-4: Develop stormwater detention on new subdivisions using existing wetlands where available.						
	PR-5: Use GIS technology by mapping future high water events to establish a more accurate flood hazard database.						

Preserve and enhance natural functions of the floodplain	WP-1: Conduct a wetlands inventory.						
	WP-2: Target wetland restoration to use wetlands as stormwater detention systems.						
	WP-3: Work with Little Butte Watershed Council to enhance the natural floodplains.						
Enhance Emergency Services	ES-1: Disseminate information on "registration for seniors and persons with disabilities."						
	ES-2: Coordinate river gauge information between the Little Butte Watershed Council, Jackson County Emergency Management and the National Weather Service to make effective use of the river gauges in notifying the City of Eagle Point of potential flooding.						
	ES-3: Review and update the Eagle Point Emergency Operations Plan.						
Increase Public Awareness	PI-1: Develop and conduct workshops for community members on NFIP programs, mitigation and potential assistance.						
	PI-2: Disseminate the Jackson County Emergency Preparedness Plan for Families to all Eagle Point residents using means that will ensure residents understand the value and use of the document.						

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