LOWER SILETZ BASIN
FLOOD MITIGATION ACTION PLAN

Submitted to:

Lincoln County Planning Department
210 Southwest 2nd Street
Newport, Oregon 97365

Prepared by:

Community Planning Workshop
Department of Planning, Public Policy, and Management
1209 University of Oregon
Eugene, Oregon 97403-1209

September 2000

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September 2000

Executive Summary

Introduction

In February 1996, December 1998, and November 1999 Lincoln County experienced damaging flood events. The November 1999 flooding of the Siletz River, significantly larger in magnitude than either the 1996 or 1998 events, was gauged at a level of 28.5 feet. This was the highest gage reading in 80 years, yet this event did not reach the 100-year flood level. The highest recorded event on the Siletz River was in 1921 was estimated at 31.6 on the gage, with an estimated recurrence interval of slightly more than 100-years or one percent probability of occurrence in any year. Within the Siletz River Basin, most existing development subject to flood damage is concentrated along the lower Siletz River below Cedar Creek.

Purpose of the Plan

The lower Siletz River basin sustained major damage as a result of flooding in 1996, 1998, and 1999. These events, combined with past floods in the Lower Siletz watershed, underscored the need for the *Lower Siletz River Flood Mitigation Action Plan*. As a result of 1999 flood damage, Lincoln County 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 plan, and administrative costs.

Methodology

While Community Planning Workshop (CPW) focused on creating a plan that recognized the unique situation presented by the lower Siletz River basin, we realized that this plan would benefit from the structure of existing methodologies. A framework for the *process* of this plan was developed with the assistance of existing planning research. To avoid a "cookie-cutter" approach to planning, existing methodologies were modified to fit the unique situation presented by the plan's study area. Issues and content of the plan are specific to the lower Siletz River basin.

November 1999 Flooding

The flooding event of November 1999 caused a severe amount of monetary and emotional damage in the lower Siletz River basin. Despite the significant amount of damage, the November 1999 event was not a "100-year" flood event, nor were the floods of 1996 or 1998. The prediction and assessment of damage caused by flooding events is not a precise science. It is sufficient to say that the November 1999 flooding event caused a significant amount of destruction, and residents, property owners, and Lincoln County agencies would like to avoid this scenario in the future. Because this type of flood magnitude could occur again in the lower Siletz River basin at some point in the near future, mitigation activities are needed to reduce flood hazard risk. This plan should be viewed as the first step in the direction of comprehensive risk reduction for the lower Siletz region.

Flood Hazard Assessment

Of the various types of flood events, the Siletz River is most susceptible to riverine floods. This type of flood, the overbank flooding of rivers and streams, is 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. In coastal Oregon, winter season rain events can produce riverine flooding. These floods can be slow or fast-rising, but generally develop over a period of days.[1]

Hazard Identification

Community-wide hazard identification is the basis of flood hazard assessment. It is the process of estimating the geographic extent of the hazard, its intensity, and its probability of occurrence.[2] This process usually results in a hazard map, such as the Flood Insurance Rate Map (FIRM) used in this plan. The FIRM map for the Siletz River basin outlines the area covered by this plan. The western boundary of the plan begins near the community of Kernville where coastal highway 101 crosses the Siletz. The eastern boundary is defined by where the tidal effect on the river ends and Cedar Creek runs into the Siletz.

Vulnerability Assessment

As of July 2000, there was approximately $19,343,240 of improved market value within the study area of the plan. Of this appraised value, $1,760,910 is represented by mobile homes, which are particularly susceptible to flood damage. As a result of elevation projects funded by federal mitigation money allocated after the 1999 flood event, approximately $1,224,470 in structure value will be elevated one foot or greater above the "100-year" base flood level. Without taking account the previously mentioned variables, this leaves roughly $18,118,770 in property value vulnerable to "100-year" flood levels.[3]

Risk Analysis

Risk analysis is the final and most advanced level of flood hazard assessment. It involves estimating the damage and costs likely to be experienced in a geographic area over a period of time.[4] 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. Lincoln County is in the process of developing its GIS system at the time of this plan's development. Therefore, a risk analysis of flooding events other than the standard "100-year event" has been added as a possible activity for future flood mitigation.

Flood Hazard Mitigation Goals and Activities

Flood hazard mitigation goals can be reached through a variety of flood mitigation activities. The goals and activities listed in Table S-1 are derived from the review of flood plans and planning literature (including FEMA's *Flood Mitigation Assistance: Program Overview and Guidance for Planning Grants*), contacting area specialists, and public input. The goals and activities were ranked during a public meeting held for the lower Siletz River basin. Results from this meeting and additional public comment are located in the *Public Prioritization* section of Chapter 5 and in Appendix A. The process of defining and ranking goals was done with the understanding that plans and actions based on set goals are more likely to succeed at meeting community needs. The flood mitigation plan also describes current mitigation activities, which either have been implemented in the lower Siletz River basin or are being implemented at the time of this plan's development.

Table S-1
Flood Hazard Mitigation Goals and Activities

Goal 1: Protect individual properties *(property protection activities)* Insurance Elevation Acquisition/Relocation
Goal 2: Guide development and use of the floodplain for flood protection *(preventative activities)* Planning Open Space Preservation Stormwater Management
Goal 3: Preserve or restore natural areas to establish the natural functions of the floodplain *(watershed treatment activities)* Erosion and sediment control Wetlands protection Headwater Protection
Goal 4: Enhance emergency services *(emergency service activities)* Flood warning Flood response
Goal 5: Increase public awareness *(public information activities)* Information Dissemination Outreach projects Real estate disclosure Risk Analysis

Evaluation, Implementation and Recommendations

Results gathered from the public meeting form a basis for the recommendations in this plan. Table S-2 illustrates the overall prioritization of flood mitigation goals.

Table S-2
Public Prioritization of Goals

1st Choice: To protect individual properties
2nd Choice: Preserve or restore natural areas to establish natural functions of the floodplain
3rd Choice: To guide development and use of the floodplain for flood protection
4th Choice: Increase public awareness
5th Choice : Enhance emergency services

Recommendations for Property protection activities

- General information on the National Flood Insurance Program (NFIP), Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA) should be made available to the residents and property owners of the Siletz watershed. This might be done through a mailing process or through the compilation of resources in an accessible central location.

- Funding processes for disaster assistance, both at the national and local level, should be made clear to residents and property owner's affected by flooding.

Recommendations for Watershed activities

- An informational/educational meeting regarding watershed issues would be a valuable event for Siletz residents and property owners in the Siletz watershed. A beneficial future meeting might include the direct participation of representatives from organizations such as Oregon Department of Forestry (ODF), United States Fish and Wildlife Service (USFW), Army Corps of Engineers, and timber companies.

- The lower Siletz River basin could benefit from the formation of a citizen-based watershed organization focusing specifically on Siletz River issues. It was evident throughout this planning process that there is a great deal of public energy to be captured and focused on flood mitigation. Community members in the lower Siletz could take a step towards mitigation by organizing their energy and ideas to address watershed issues. A community-based organization could serve as a valuable resource for flood mitigation activities in general, but there would need to be public and/or private groups willing to take initiative on developing this kind of entity.

Recommendations for Preventative activities

- Stormwater management was a clear priority for preventative activities during the plan's public meeting. However, many comments regarding stormwater management called for dredging of the Siletz Bay, which is not a traditional stormwater management activity. The above recommendation for watershed treatment activities is again appropriate here. An additional public meeting focusing on issues of watershed health and including participants with technical expertise would be a valuable organizational step towards mitigation.

Recommendations for Public information activities

- Individuals, agencies, and organizations interested in public information activities for flood mitigation activities may benefit from reviewing public comments listed in Appendix A of this plan. In reviewing these comments, information suppliers can assess the informational needs of property owner's and residents of the lower Siletz River basin.

Recommendations for Emergency service activities

- Considering public comment as a whole and additional comment from county staff, emergency service activities can best be enhanced through increased data availability. There is one gage supplying water level information on the Siletz River. This gage is located at a significant distance upstream from this plan's study area. Prediction of flood behavior could be enhanced by an additional gage (or some sort of monitoring mechanism) positioned in the lower reaches of the Siletz watershed.

Further Evaluating Flood Mitigation Goals and Activities

CPW has developed a methodology for in-depth analysis of 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. This methodology is described in Chapter 5, with tables for the analysis of these five criteria in Appendix D. Planning officials, agencies, and organizations wishing to implement goals and activities recommended in this flood mitigation plan can use this step-by-step evaluation process. This evaluation can be used to compare potential projects to local resources in order to determine project feasibility.

Lower Siletz River Flood Mitigation Action Plan
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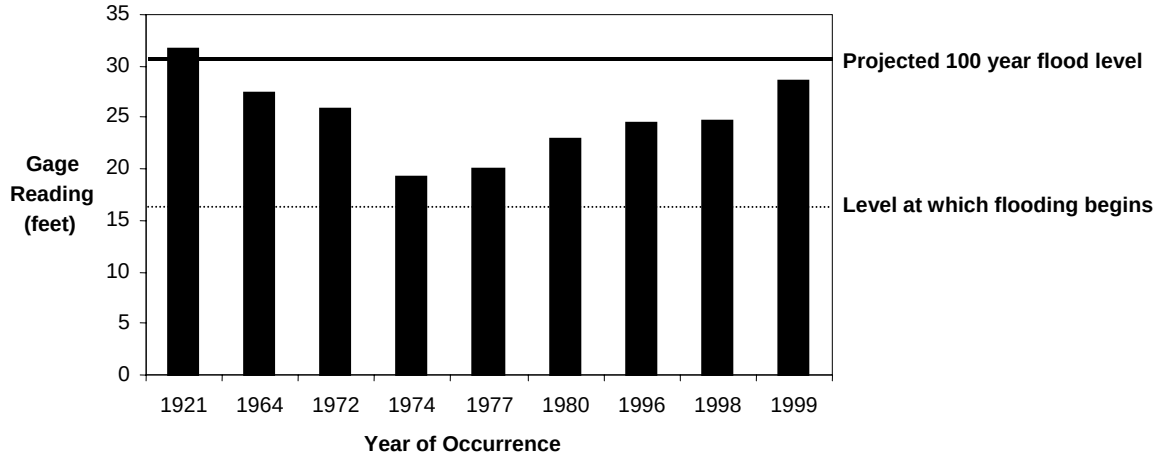
Chapter 1: Introduction

Background

In February 1996, December 1998, and November 1999 Lincoln County experienced damaging flood events. The 1996 flood event affected communities throughout western Oregon, with floodwater exceeding the "100-year" level in a number of locations. In Lincoln County, however, the 1996 event was of a lower magnitude, with floodwater reaching a level of 24.5 feet on the Siletz River gage (located upstream from the area addressed by this plan). The Siletz 100-year event level is 30.5 feet. The Army Corps of Engineers estimated the recurrence interval of the 1996 Siletz event at 12-15 years, meaning approximately a six percent to eight percent probability of occurrence in any year. The December 1998 event, similar to the 1996 flood, was gauged at level of 24.7 feet. Accounts from property owners indicate that flood levels in 1998 were as much as one foot higher on the lower Siletz River than in 1996, probably due to the influence of coinciding high tides in Siletz Bay.

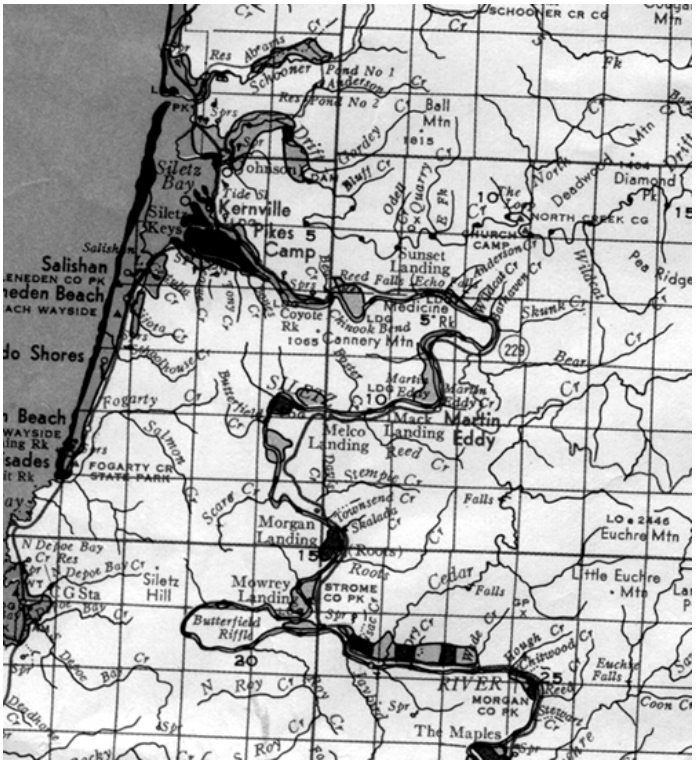
The November 1999 flooding of the Siletz River, significantly larger in magnitude than either the 1996 or 1998 events, was gauged at a level of 28.5 feet. This was the highest gage reading in 80 years, yet this event did not reach the 100-year flood level. Again, the 100-year flood elevation projected by the region's Flood Insurance Rate Map (FIRM) flood study is approximately 30.5 feet on the Siletz Gage, or roughly two feet higher than the November 1999 event. The highest recorded event on the Siletz River was in 1921 was estimated at 31.6 on the gage, with an estimated recurrence interval of slightly more than 100-years or one percent probability of occurrence in any year. Figure 1-1 illustrates the relative levels attained on the Siletz gage by recorded flood events. It is notable that floodwaters below the "100-year" level have caused considerable damage. The level at which flooding begins is 16 feet on the Siletz gage.

Figure 1-1
Siletz River Flood Events



Within the Siletz River Basin, most existing development subject to flood damage is concentrated along the lower Siletz River below Cedar Creek (see Map 1-1). Areas of the floodplain on both sides of the river, accessed by Highway 229 and Immonen Road (County Road 294) were subdivided during the 1950s through the 1970s for riverfront residential development. The largest share of existing development in these areas was constructed prior to FIRM mapping (or pre-FIRM), and before the adoption of the county's flood hazard area regulations. Therefore, structures in the study area are generally not constructed to elevation standards that protect against larger magnitude flood events. Residential structures are concentrated in the areas of Fun River, Windy Bend, Ballard Acres, Lemon Acres, Monroe Acres, Calkins Acres, and several other similar unnamed developments. Other, more scattered residential development is also present at various locations along the river.

Map 1-1
The Siletz River Basin Study Area



Purpose of the Plan

The lower Siletz River basin sustained major damage as a result of 1996, 1998, and 1999 flooding. These events, combined with past floods in the Lower Siletz watershed, underscored the need for the *Lower Siletz River Flood Mitigation Action Plan.* As a result of 1999 flood damage, Lincoln County 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 plan, and administrative costs.

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 no one "cookbook" solution for fixing a problem.[5] Therefore, this plan uses FEMA's recommended planning framework, modified to address the specific issues faced in the lower Siletz River basin. The rural character of the lower Siletz has reinforced the necessity for a watershed approach to planning, because focusing on urban boundaries in this area would exclude rural residents affected by flooding. Consistent with FEMA planning process guidelines, the purpose of this plan is to:

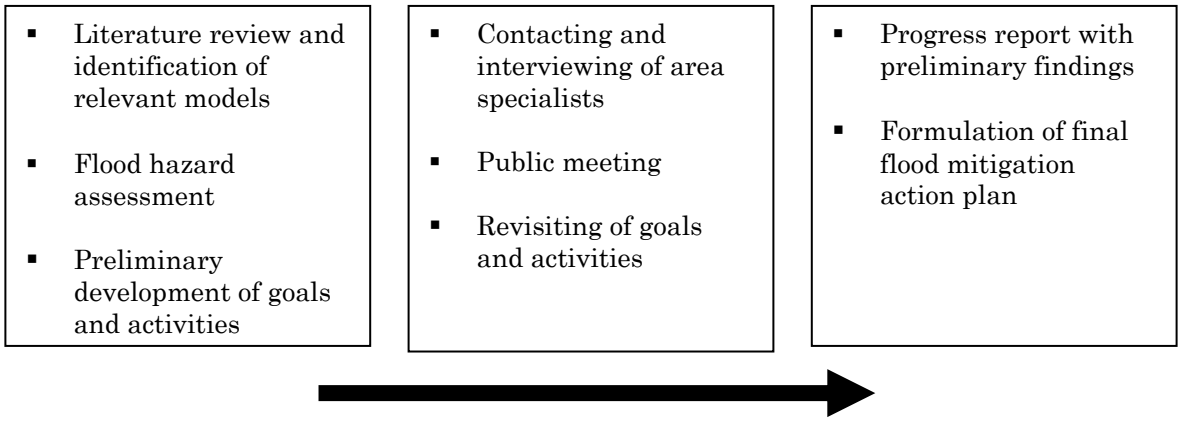
- Ensure that all possible flood risk reduction activities are considered so that the local flood problem may be addressed by the most appropriate and efficient solutions;
- Link floodplain management policies to flood risk reduction activities;
- Ensure that flood risk reduction activities are coordinated 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;
- Fulfill planning requirements for state and federal assistance programs; and
- Facilitate implementation of floodplain management activities.

Methodology

While Community Planning Workshop (CPW) focused on creating a plan that recognized the unique situation presented by the lower Siletz River basin, we realized that this plan would benefit from the structure of existing methodologies. A framework for the *process* of this plan was developed with the assistance of existing planning research. To avoid a "cookie-cutter" approach to planning, existing methodologies were modified to fit the unique situation presented by the plan's study area. Issues and content of the plan are specific to the lower Siletz River basin.

FEMA's *Flood Mitigation Assistance: Program Overview and Guidance for Planning Grants* served as a principal model for developing the methodology used for this plan. We also consulted Wisconsin's *Community Flood Mitigation Planning Guidebook*[6], Massachusetts' *Flood Hazard Mitigation Planning: A Community Guide* [7], and a number of Oregon hazard mitigation plans. Figure 1-2 summarizes the planning process used for the *Lower Siletz River Flood Mitigation Action Plan*.

Figure 1-2
Lower Siletz River Flood Mitigation Action Plan Process



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

For the above reasons, efforts were made to coordinate this plan with floodplain planning and development guidelines as outlined by the Department of Land Conservation and Development (DLCD). Community Planning Workshop approached the plan with the understanding that flood mitigation efforts must address the Land Conservation and Development Commission's Statewide Planning Goals. Hazard risk reduction activities listed in the plan help implement the objectives of Goal 7 (Areas Subject to Natural Disasters and Hazards), Goal 5 (Open Spaces, Scenic and Historic Areas, and Natural Resources), and Goal 6 (Air, Water, and Land Resources Quality).

The lower Siletz River Basin is part of the geographic area covered by the *Regional All Hazard Mitigation Plan for Benton, Lane, Lincoln, and Linn Counties*. Efforts were made to coordinate with this plan where applicable. One principle of the multi-county plan is that the mitigation planning approach is based upon quantitative assessment of risk.[8] This plan uses the hazard assessment model outlined in DLCD's *Planning for Natural Hazards Technical Resource Guide* to perform this quantitative assessment.

Organization of the Plan

The plan is organized as follows:

Chapter 1

Chapter 1 presents a historical perspective to flooding and the Siletz watershed, familiarizes the reader with the plan's study area, and explains the plan purpose and process.

Chapter 2

Chapter 2 examines the causes of the November 1999 Siletz River flood event and provides an assessment of damage in the lower Siletz River basin from the 1999 flood, including an evaluation of vulnerability to future flooding.

Chapter 3

Chapter 3 provides an explanation of the flood hazard type presented by the Siletz River and a flood hazard assessment for the plan's study area. The three components of a hazard assessment are hazard identification, vulnerability assessment, and risk analysis. These components establish what the hazard is and what it can affect. Flood hazard assessment is done to give those who use this document a better understanding of what is at stake.

Chapter 4

Chapter 4 addresses flood hazard mitigation goals for the lower Siletz River basin, along with possible activities to achieve those goals. Included here are an explanation of goals and activities, a list of existing activities, and the results of a public prioritization of both goals and activities.

Chapter 5

Chapter 5 summarizes the findings of the planning process and recommends additional steps for implementation of effective mitigation activities in the lower Siletz River basin.

Appendices

Four appendices address the following topics:

- **Appendix A** -questions, comments and suggestions submitted by the public.
- **Appendix B** -a definition of terms used in this plan.
- **Appendix C** -information on flood mitigation programs.
- **Appendix D** -a strategy for in-depth analysis of flood mitigation goals and activities

Chapter 2: November 1999 Flooding

This chapter begins by examining the causes of the November 1999 Siletz River flood event. The section on cause is followed by an assessment of damage in the lower Siletz River basin from the 1999 flood, including an evaluation of vulnerability to future flooding.

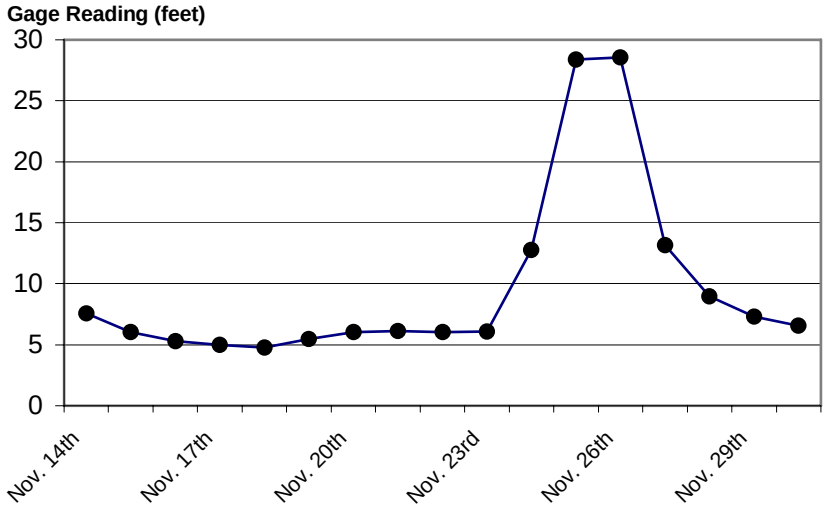
Causes

The flooding event of November 24-25, 1999 affected regions of Lincoln and Tillamook counties, including the lower Siletz River basin. A principal cause of the flooding was an intense rainstorm created by warm, moist ocean airflow out of the southwest. This rainstorm struck Oregon one day before the Thanksgiving holiday, marking the first intense storm of the winter season. The event followed a relatively dry and mild fall for most of Oregon.

Rainfall from the storm was heavy and intense. Newport, located near the Siletz River watershed, recorded 3.07 inches of rain within a 24-hour period.[9] The Hatfield Marine Science Center in Newport tracked hourly precipitation, producing a cumulative two-day total from data collected on their National Weather Service gauge. The highest rainfall intensities occurred late in the period, and the two-day total amounted to more than 10 inches. This intense rainfall produced localized flooding throughout Oregon and Washington.

The Siletz River was severely effected by this flooding event. Floodwater rose rapidly over the two-day period, causing significant property damage within the lower basin. The daily river gage plots for the Siletz show how quickly and how high the river level rose (Figure 2-1).

Figure 2-1
Siletz River Hydrograph, November 1999



Damage Survey

Shortly after the November 1999 flood event, personnel from Lincoln County's Department of Planning and Development traveled through the lower Siletz River basin to assess the accuracy of the county's Flood Insurance Rate Maps (FIRMs). Approximately 80% of damaged homes were visited over a two-day period. The FIRM maps were shown to be accurate, as structures elevated above the base flood level avoided damage. While the November 1999 flooding did not

reach "100-year" flood event levels, the severity of the flooding event allowed for verification of FIRM map accuracy.

The second, more comprehensive phase of the damage assessment came early in the year 2000. FEMA and the State of Oregon asked Lincoln County to survey substantially damaged homes within the study area to determine the necessity for structure elevation projects (as required by the National Flood Insurance Program). The assessment was performed with the assistance of two FEMA representatives and the Department of Land Conservation and Development's State Floodplain Coordinator. Of the 133 properties addressed by the damage survey, approximately 61 percent were insured under the National Flood Insurance Program. It was primarily from these insured properties that monetary damage was reported and could be assessed.

By calculating the average amount of monetary damage reported per property (including those properties receiving no monetary damage) an estimate for total damage to all properties from the November 1999 flooding event can be extrapolated. Again, these numbers reflect only an estimate of total damage. Table 2-1 shows the results of the damage assessment.

Table 2-1
Estimated Damage, 1999 Siletz River Flood

Type	Amount
Reported Damage	
Reported damage to buildings	$1,118,380
Total reported damage (both buildings and other possessions)	$1,271,732
Estimated Total Damage	
Estimated damage to buildings	$1,677,570
Total estimated damage (both buildings and other possessions)	$1,907,598

Source: Lincoln County Planning Department

Of the properties damaged, only 34 percent were those of primary residents. Non-primary residences (second homes and seasonal residences) accounted for 88 of the 133 properties affected by flood damage. Much of the development in the lower Siletz River basin consists of second homes or cottages used by people living primarily outside of the watershed. There are no critical facilities (hospitals, water treatment facilities, fire stations, etc.) or commercial properties located in the plan's study area.

1999 Flood Summary

The flooding event of November 1999 caused a severe amount of monetary and emotional damage in the lower Siletz River basin. Despite the significant amount of damage, the November 1999 event was not a "100-year" flood event, nor were the floods of 1996 or 1998. The prediction and assessment of damage caused by flooding events is not a precise science. It is sufficient to say that the November 1999 flooding event caused a significant amount of destruction, and residents, property owners, and Lincoln County agencies would like to avoid this scenario in the future. Because this type of flood magnitude could occur again in the lower Siletz River basin at some point in the near future, mitigation activities are needed to reduce flood hazard risk. This plan should be viewed as the first step in the direction of comprehensive risk reduction for the lower Siletz region.

Chapter 3: Flood Hazard Assessment

This chapter provides an explanation of the flood hazard type presented by the Siletz River and a flood hazard assessment for the plan's study area. The three components of a hazard assessment are hazard identification, vulnerability assessment, and risk analysis. These components establish what the hazard is and what it can affect. Flood hazard assessment is done to give those who use this document a better understanding of what is at stake.

Potential Flood Type

Of the various types of flood events, the Siletz River is most susceptible to riverine floods. This type of flood, the overbank flooding of rivers and streams, is 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. In coastal Oregon, winter season rain events can produce riverine flooding. These floods can be slow or fast-rising, but generally develop over a period of days.[10]

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. 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.[11] Almost every county and community in Oregon experiences riverine flooding. In fact, Oregon has over 250 flood prone communities.

Hazard Identification

Community-wide hazard identification is the basis of flood hazard assessment. It is the process of estimating the geographic extent of the hazard, its intensity, and its probability of occurrence.[12] This process usually results in a hazard map, such as the Flood Insurance Rate Map (FIRM) used in this plan. Such maps are effective in providing public information and building commitment among elected officials in a format that is easy to interpret.

The FIRM map for the Siletz River basin outlines the area covered by this plan. The western boundary of the plan begins near the community of Kernville where coastal highway 101 crosses the Siletz. The eastern boundary is defined by where the tidal effect on the river ends and Cedar Creek runs into the Siletz.

Vulnerability Assessment

Community wide vulnerability assessment is the second level 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.[13]

Lincoln County's Department of Planning used data from the County Assessor to estimate property values within the study area. Within the affected study area, county assessor's data was matched with FIRM boundaries to assess vulnerability. The assessment includes all tax lots that had any portion fall within the 100-year floodplain. The Assessor keeps data on the market value of land and improvements on all tax lots in Lincoln County. 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.

The estimate does not account for elevation projects that may have reduced the amount of property value vulnerable to a "100-year" flood event. A final variable for consideration involves the location of structures on tax lots. Some tax lots that overlay the 100-year floodplain may contain structures outside the floodplain boundaries. With Geographic Information System (GIS) database development, these variables should become easier to assess in future analysis. The estimate communicates the total vulnerability of improved property in the lower Siletz flood hazard area. This number is a baseline of the assessed risk the area faces. Future analysis may be able to use this number to determine the effectiveness of flood reduction activities by removing the improved values that have been mitigated against the hazard.

As of July 2000, there was approximately $19,343,240 of improved market value within the study area of the plan. Of this appraised value, $1,760,910 is represented by mobile homes, which are particularly susceptible to flood damage. As a result of elevation projects funded by federal mitigation money allocated after the 1999 flood event, approximately $1,224,470 in structure value will be elevated one foot or greater above the "100-year" base flood level. Without taking account the previously mentioned variables, this leaves roughly $18,118,770 in property value vulnerable to "100-year" flood levels.[14]

Table 3-1
Property Value Vulnerability

	Amount
Improved value in plan study area	$19,343,240
1999 flood event elevation projects	$1,224,470
Current vulnerable property value (excluding mentioned variables)	$18,118,770

Source: Lincoln County Planning Department

The prediction of flood event behavior is not an exact science. Some areas of a watershed may receive severe floodwater from an event, when other areas in the same region are less affected. Some structures may survive a flood event undamaged while a neighboring development is damaged. Based on our analysis of assessment data it is clear that there is a large amount of property within the lower Siletz River basin vulnerable to severe flooding. This provides impetus to increase flood risk reduction activities in the area.

Risk Analysis

Risk analysis is the final and most advanced level of flood hazard assessment. It involves estimating the damage and costs likely to be experienced in a geographic area over a period of time.[15] 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. Lincoln County is in the process of developing its GIS system at the time of this plan's development. Therefore, a risk analysis of flooding events other than the standard "100-year event" has been added as a possible activity for future flood mitigation.

Chapter 4: Flood Hazard Mitigation Goals and Activities

This chapter addresses flood hazard mitigation goals for the lower Siletz River basin, along with possible activities to achieve those goals. Included here are an explanation of goals and activities, a list of existing activities, and the results of a public prioritization of both goals and activities.

Goals and Activities

Flood hazard mitigation goals can be reached through a variety of flood mitigation activities. The goals and activities listed here are derived from the review of flood plans and planning literature (including FEMA's *Flood Mitigation Assistance: Program Overview and Guidance for Planning Grants*), contacting area specialists, and public input. The goals and activities were ranked during a public meeting held for the lower Siletz River basin. Results from this meeting and additional public comment are located in the *Public Prioritization* section of this chapter and Appendix A. The process of defining and ranking goals was done with the understanding that plans and actions based on set goals are more likely to succeed at meeting community needs.

Although each set of activities lists potential entities to carry out the actions, this should not be taken to mean the activities are limited to just those entities. Flood risk reduction activities may be influenced by any party with the resources and energy to act. Some activities are already being implemented to some degree in the lower Siletz River basin and are mentioned below in the *Existing Activities* section of this chapter.

Goal 1: Protect individual properties (property protection activities)
Property protection focuses resources on activities involving individual property owners. The goal stresses measures that landowners can take to protect their homes, structures or property from high water. *Property protection activities* primarily protect structures in flood hazard areas. Property owners usually undertake them on a building-by-building or parcel basis. These may include:

Insurance
Insurance is a mechanism for spreading the cost of losses both over time and over a relatively large number of similarly exposed risks. Until 1969, insurance against flood losses was generally unavailable. Under the National Flood Insurance Program, 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 (refer to Appendix C for more CRS information). The incentive is a reduction in flood insurance premiums for policyholders within communities that take approved actions to reduce flood losses.

Elevation
Elevating buildings to the desired flood protection elevation is a common 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. The National Flood Insurance Program (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 (BFE), or 100-year flood level as identified on a community's Flood Insurance Rate Map (FIRM). Although the minimum is one foot, elevation projects may reduce risk additionally by exceeding that minimum.

Acquisition/Relocation
Acquisition/relocation or acquisition/demolition projects offer reliable mitigation measures, particularly for residents facing severe repetitive flooding. Since relocation involves moving structures out of hazard areas, it effectively negates future flood losses. However, relocation or demolition of structures may be constrained by a number of variables, both financial and otherwise.

Goal 2: Guide development and use of the floodplain for flood protection (preventative activities)
Guiding development and use of the floodplain presents a straightforward method of preventing flood damage. If structures are organized to prevent flood damage, the amount of hazard risk decreases. And, if there are no structures or important agricultural areas in the floodplain, there is minimal risk of damage from floods. Of course, 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
The term "planning" can represent a broad range of activities. Lincoln County addresses its National Floodplain Insurance Program requirements through overlay zone floodplain regulations as discussed further in *Existing Activities*. Two examples of planning activities that affect flood risk reduction are listed below.

- Zoning- A community's comprehensive plan is implemented in large part by 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.[16] 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.[17]

- 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. 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 approval for the development is given by the local government. 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 to eliminate future flood hazards. This eliminates the need for local, state and federal governments to expend additional time, effort, and money protecting citizens and property.

Typically the 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. One option is to encourage local governments 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.[18]

Stormwater Management
Stormwater management focuses on the problems associated with surface water runoff. Filling or blocking drainageways can lead to backup of runoff that can increase flood

damage. Responsibility lies with the landowner, developer, and local officials to identify and maintain natural and constructed drainageways. There are a variety of methods for addressing stormwater.

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.

Goal 3: Preserve or restore natural areas to establish the natural functions of the floodplain (watershed treatment activities)

A flooding river cannot be analyzed apart from the characteristics of its watershed, and since the 1970s it has become increasingly understood that the preservation of the natural functions of the floodplain is crucial for flood control.[19] Activities to reach this goal not only act as a safeguard for flood protection, but also protect and enhance fish and wildlife populations. *Watershed treatment activities* preserve or restore natural areas or the natural functions of floodplain and watershed areas. Conservation agencies or organizations may help implement watershed treatment activities. Watershed treatment activities include:

Erosion and sediment control

Streambank stabilization and retention of sediment are two recognized methods for dealing with 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 use 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, each year's high water wears away a greater amount of soil than would be the case if vegetation were present. A common method for achieving erosion and sediment control is allowing for a setback of development and/or agricultural activities from water bodies to preserve riparian areas.

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

Wetlands protection

Wetlands provide a number of important functions in the floodplain. Wetlands can store large amounts of water and slow water velocity. Wetlands also 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 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.

Headwater Protection
The headwater areas of a river refer to its source waters, usually located in upper elevations of the watershed. Adverse changes in headwater areas can have dramatic effects on the river system as a whole. Hydrological problems in the headwater area of a watershed can change the patterns of flooding, sedimentation, and river flow miles downstream.[20] Elements of headwater protection can include items such as the erosion and sediment control, and open space preservation

Goal 4: Enhance emergency services (emergency service activities)
Emergency services provide what can be viewed as the last line of defense against flood damage. To reach this goal additional resources would be focused 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 emergency management staff and emergency response personnel usually administer these measures. Emergency service activities include:

Flood warning
Flood warning systems give community residents' organized notification of impending flood danger. The National Weather Service (NWS) provides flood forecast and warning data utilized by many communities that have local warning systems.

Through a network of satellite monitoring equipment and volunteer weather spotters, the NWS tracks storm activity, rainfall, and storm potential. This information is analyzed along with data from river gages, 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. The next step is to inform residents. Flood warnings can be disseminated by sirens, radio, TV, public address announcement, telephone trees, and door-to-door contact.

Flood response
Taking action to minimize damage during a flood event is perhaps the final flood damage prevention measure. An updated and comprehensive emergency response plan is one way to achieve this. An emergency response plan identifies responsibilities in the event of a flood and provides a template for various parties to go about organizing 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.

Goal 5: Increase public awareness (public information activities)
The risk of flooding can be reduced indirectly through increased public awareness. If residents and property owners are knowledgeable about mitigation opportunities, floodplain functions, emergency service procedures, and potential hazards, there will be more support for risk reduction efforts. *Public information activities* advise property owners, potential property owners, and visitors about the hazards, ways to protect people and property from the hazards, 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
The purpose of information dissemination is to provide community residents with knowledge about the flood hazard in their area and possible activities for mitigation. A variety of agencies can participate in information dissemination. Some possible items for distribution include the following:

- 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

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
Current homeowners and potential homebuyers are notified about flood hazard risk. Requirements for disclosing hazard risk in real estate transactions are made with the idea that the more knowledgeable homeowners and homebuyers are about flood risk, the more risk reduction efforts will occur.

Risk Analysis
With advances made in Geographic Information System (GIS) technology, it is becoming increasingly easy to analyze the risk of various flood events. This analysis, of course, depends on the availability of data relating to building location and value and flood recurrence. Performing multiple risk analyses helps to increase public understanding of a river's flooding potential. Often, risk is understood only at the "100-year" level, because this forms the basis for Flood Insurance Rate Maps.

Existing Activities

Existing mitigation activities, which either have been implemented in the lower Siletz River basin or are being implemented at the time of this plan's development, include those listed below. For further explanation of activities, refer to the Activity Definitions section of the plan.

Property protection activities

- **Elevation** – Using federal mitigation funds received as a result of November 1999 flooding, over twenty homes are being elevated in the lower Siletz River basin. A number of homeowners have chosen to elevate structures using personal funds.
- **Insurance** – Lincoln County is a participant in the National Flood Insurance Program (NFIP) which is explained in the Activity Definitions portion of this plan. As a result of county efforts to guide sound development in the floodplain, county 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). Lincoln County is not currently enrolled in the CRS program (for more information on the CRS program, see Appendix C).

Preventative activities

- **Planning** – As part of the Lincoln County Code's chapter on land use, the flood hazard overlay zone (Chapter 1.1395) outlines the county's floodplain management guidelines. This chapter, along with the Code, is available at http://www.co.lincoln.or.us, at the Lincoln County Planning offices, or at the Newport Public Library. 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 Siletz Bay National Wildlife Refuge accomplishes both open space preservation and wetland protection through land acquisition and conservation easement processes. The wildlife refuge overlaps with the western end of the plan area, encompassing parts of the floodplain east of Highway 101 and adjacent to the Kernville Highway.
- **Stormwater management** – Adopted by Lincoln County, the Oregon State Building Code provides statewide standards for building construction. The One and Two Family Dwelling Code and the Structural Specialty Code contain requirements for floodproofing, underfloor drainage, and directing stormwater away from buildings.

Watershed treatment activities

- **Wetland Preservation** – A portion of the Siletz Bay National Wildlife Refuge is located at the western end of the plan area. The refuge protects an area of coastal wetlands for wildlife habitat purposes.

Emergency service activities

- **Flood forecasting/warning** – Lincoln County maintains a flood warning system including both notification of residents by phone (by the Emergency Services office) and door to door notification (by fire department services). The system relies on real time satellite National Weather Service information acquired through the Data Transmission Research Corporation. The system also relies on the United States Geological Survey gage on the Siletz River to warn of impending flood danger.
- **Emergency Flood Response** – The county maintains an emergency flood response plan as an annex to the Lincoln County Emergency Operational Plan. This plan guides the emergency response services of fire and rescue personnel. Task forces are currently being developed at the county level, targeting flood response teams to specific locations.

Public information activities

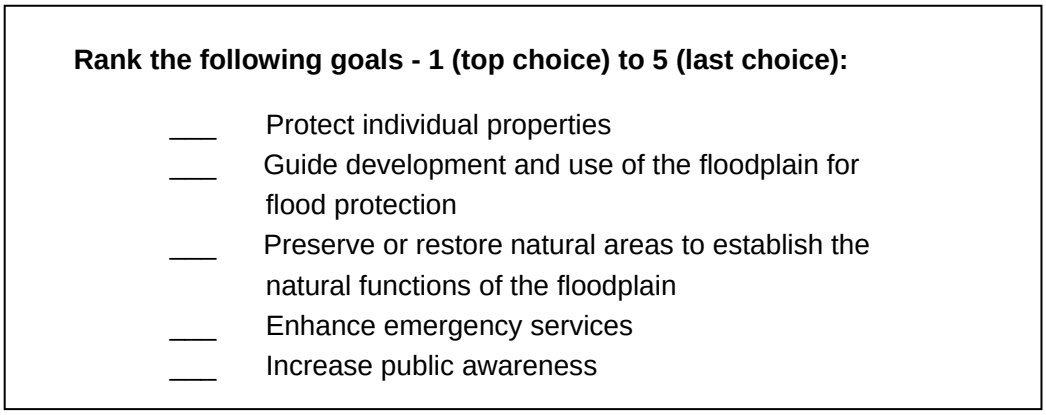
- **Information dissemination** – The Lincoln County Planning department has distributed information regarding the National Flood Insurance Program and available funding for hazard mitigation in the wake of November 1999 flooding. Lincoln County Emergency Services gives annual newspaper reminders for the coming of potential flood season.

Public Prioritization

As part of the process for this plan, goals and activities were ranked during a public meeting on August 9th, 2000 at the Gleneden Beach Fire Hall. The event had a large turn out, with over 120 people attending. A presentation on goals and activities for flood risk reduction began the meeting, followed by a question and answer period. Those who stayed to participate then broke into five separate groups in order to prioritize goals and activities and make any additional comments or suggestions.

During the small group prioritization portion of the meeting, participants ranked goals and activities using a number of forms similar to the one shown here. Each set of activities (property protection, preventative, etc.) had a corresponding sheet for prioritization (Figure 4-1).

Figure 4-1
Example Prioritization Sheet



Results of the small group prioritization process are listed in the following chapter and, additionally, in Appendix A. Activities not originally considered for prioritization, such as structural activities and dredging, were suggested. Public concern for these activities is reflected in Appendix A.

The public prioritization meeting ended with a question and answer period on items indirectly related to the plan. These questions were fielded by representatives from various departments and agencies including: Oregon State Police- Office of Emergency Management (OEM), Department of Land Conservation and Development (DLCD), Federal Emergency Management Agency (FEMA), and Lincoln County Planning Department. Some questions about flooding in the lower Siletz River remained unanswered, because they were outside the expertise of those in attendance. A future meeting would be enhanced by the participation of additional representatives from departments and organizations dealing with watershed issues of forestry, wildlife habitat, and river dynamics.

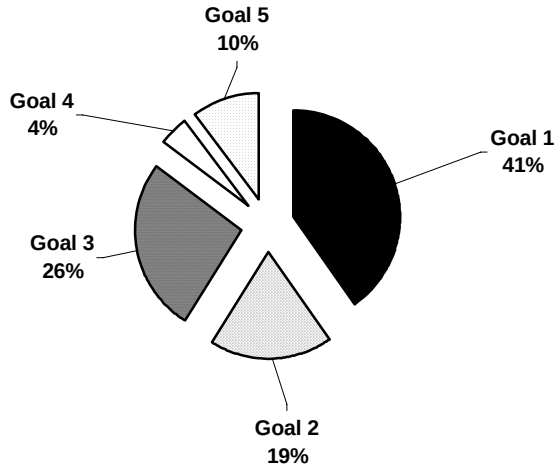
Chapter 5: Evaluation, Implementation, Recommendations

The process of defining and prioritizing goals and activities helps to ensure that all possible alternatives receive consideration. Through this planning process it was apparent that this plan is a necessary first step in a larger mitigation program. This chapter summarizes the findings of the planning process and recommends additional steps to be taken for effective mitigation to be implemented in the lower Siletz River basin.

Results gathered from the public meeting forms a basis for the recommendations presented in this chapter. Those results have been supplemented with information from area specialists and our analysis. The percentage values presented in this chapter reflect the data submitted during the meeting. Some meeting attendees prioritized goals and activities in a unique manner, such as listing all activities as being a first choice or simply listing first and second choices. Therefore, percentages of response will not always reach an exact sum of 100 percent.

The chart (Figure 5-1) and table (Table 5-1) below illustrate the overall prioritization of flood mitigation goals. The goal given top priority by most meeting participants was to protect individual properties. The goal of preserving or restoring natural areas to establish the natural functions of the floodplain received the second highest percentage of top priority votes followed by the goals of; guiding development and use of the floodplain for flood protection, increasing public awareness, and enhancing emergency services.

Figure 5-1
Top Prioritization of Flood Mitigation Goals



Goal 1: To protect individual properties - **41%**

Goal 2: To guide development and use of the floodplain for flood protection -**19%**

Goal 3: Preserve or restore natural areas to establish natural functions of the floodplain – **26%**

Goal 4: Enhance emergency services – **4%**

Goal 5: Increase public awareness – **10%**

Table 5-1
Public Prioritization of Goals

Public Prioritization	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
1st choice	41.5%	19.1	26.9	4.6	10.6
2nd	21.5	29.4	23.9	20.0	13.6
3rd	20	29.4	20.9	15.4	10.6
4th	6.2	16.2	11.9	49.2	15.2
5th	10.8	5.9	16.4	10.8	50

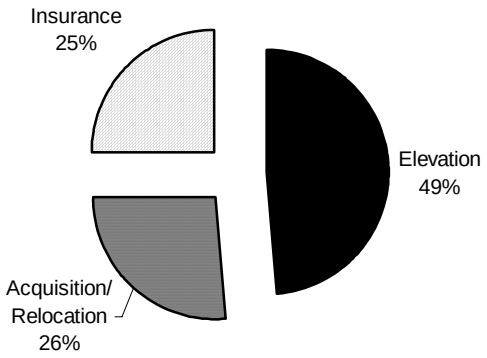
The remainder of this chapter examines activities for reaching flood mitigation goals. The organization of the chapter reflects public prioritization of the goals by beginning with property protection activities and following through to emergency service activities.

Property protection activities

Evaluation

The goal given top priority by most meeting participants was to protect individual properties, with over forty percent of meeting participants ranking it as their top choice. Activities listed for reaching that goal included insurance, elevation, and acquisition/relocation. Figure 5-2 represents the percentage of times each property protection activity was prioritized as a top choice.

Figure 5-2
Top Prioritization of Property Protection Activities



Elevation projects, given top priority as a property protection activity by most meeting attendees, have increased in the plan's study area. These projects are due in a large part to funding made available after the November, 1999 flood event. Interest in the National Flood Insurance Program (NFIP) has also increased, as evidenced by insurance related questions fielded at the plan's public meeting.

Implementation Considerations

A principal concern for the implementation of elevation projects is cost. Funding for structure elevation in the plan's study area has been available mainly through limited federal flood mitigation money[21], though the planning process undertaken for the lower Siletz River may also

increase the opportunity to acquire mitigation funding prior to another flood event. While it would be desirable to elevate all structures in the plan's study area above the 100-year flood level, the money to do so is not readily available.

The traditional method of funding the property protection activity of elevation comes with considerable administrative burden. Application for funding, notification of available funding, and the distribution of funds all require time and effort of governmental agency personnel. The coordination of insurance also demands administrative effort from a number of diverse parties. Acquisition/relocation is the most costly property protection activity, with limited funding sources available.

Recommendations

- General information on the National Flood Insurance Program (NFIP), Hazard Mitigation Grant Program (HMGP), and Flood Mitigation Assistance (FMA) should be made available to the residents and property owners of the Siletz watershed. This might be done through a mailing process or through the compilation of resources in an accessible central location.

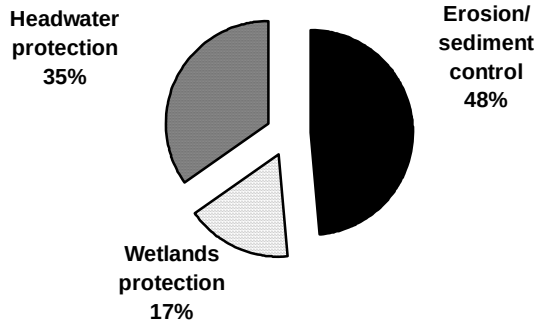
- Funding processes for disaster assistance, both at the national and local level, should be made clear to residents and property owner's affected by flooding.

Watershed activities

Evaluation

Approximately twenty-seven percent of meeting participants listed the goal to preserve or restore natural areas to establish the natural function of the floodplain as their top priority. Activities listed for reaching that goal include erosion and sediment control, wetlands protection, and headwater protection. Figure 5-3 represents the percentage of times an individual watershed treatment activity was prioritized as a top choice.

Figure 5-3
Top Prioritization of Watershed Treatment Activities



Public comments submitted for this plan indicate that broad watershed issues are an area of intense concern. Appendix A reflects the amount of public concern over watershed health and the impact of forestry practices within the region. Erosion and sediment control was given top priority as a watershed treatment activity by meeting attendees, followed by the activity of headwater protection. Wetlands protection activities are occurring in the watershed's lower portion through the Siletz Bay National Wildlife Refuge, which may have been a factor in prioritization.

Implementation Considerations

Watershed treatment activities are not mutually exclusive. A common method of carrying out erosion and sediment control and headwater protection is through the enforcement of riparian buffer zones throughout the watershed. Enforcement of such zones requires a concerted administrative effort, and the rules and regulations regarding such riparian areas are complex. Currently, riparian forestry rules are in place for the Siletz watershed. Administration of these rules depends on the effort of various groups, including property owners and Oregon Department of Forestry (ODF).

Recommendations

- An informational/educational meeting regarding watershed issues would be a valuable event for Siletz residents and property owners in the Siletz watershed. A beneficial future meeting might include the direct participation of representatives from organizations such as Oregon Department of Forestry (ODF), United States Fish and Wildlife Service (USFW), Army Corps of Engineers, and timber companies.

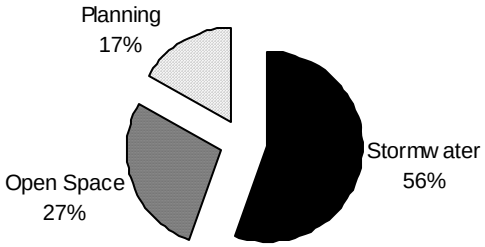
- The lower Siletz River basin could benefit from the formation of a citizen-based watershed organization focusing specifically on Siletz River issues. It has been evident throughout this planning process that there is a great deal of public energy to be captured and focused on flood mitigation. Community members in the lower Siletz could take a step towards mitigation by organizing their energy and ideas to address watershed issues. A community-based organization could serve as a valuable resource for flood mitigation activities in general, but there would need to be public and/or private groups willing to take initiative on developing this kind of entity.

Preventative activities

Evaluation

The goal given top priority by approximately 19 percent of meeting participants (the third highest number of top priority votes) is to guide development and use of the floodplain for flood protection. Activities listed for reaching that goal include planning, open space preservation, and stormwater management. Figure 5-4 represents the percentage of times an individual preventative activity was prioritized as a top choice.

Figure 5-4
Top Prioritization of Preventative Activities



The public prioritization of the preventative activities indicates that stormwater management is an area of concern for many meeting participants. Submitted written comments, however, suggest that stormwater management was not adequately defined during the meeting's presentation on flood mitigation goals and activities. Numerous comments regarding dredging of the Siletz Bay indicate that there may be a misunderstanding of flood mitigation areas that stormwater management can actually address.

Implementation considerations

Stormwater management is often a concern for rapidly developing areas, where increased impervious (not porous) surface keeps water from draining into soils and exacerbates flooding. Stormwater management is often implemented through building code requirements and the adoption of "best management practices" (construction practices to reduce the negative effects of stormwater). Currently, stormwater management in the lower Siletz River basin is addressed through the Oregon State Building Code, adopted by Lincoln County, and requires the administrative effort of building inspection.

Open space preservation is accomplished through land acquisition or conservation easement processes. Implementation of this flood mitigation activity can be enhanced by the involvement of a land trust organization. Such organizations are familiar with the administrative steps necessary for effective and uncontroversial open space preservation. Open space preservation in the 100-year floodplain is an indirect result of Siletz Bay National Wildlife refuge activities.

Planning for flood mitigation is currently implemented through Lincoln County's "flood hazard overlay zone". The zone meets floodplain management requirements necessary for participation in the National Flood Insurance Program (NFIP) and involves the administration of permits and building inspections.

Recommendations

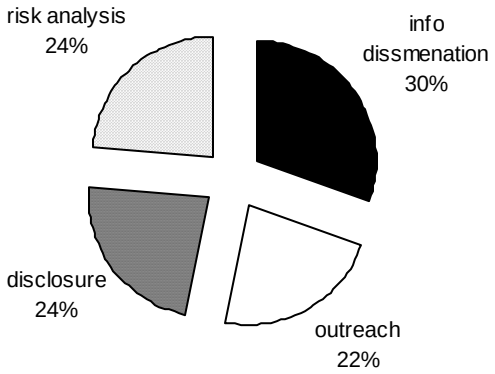
- Stormwater management was a clear priority for preventative activities during the plan's public meeting. However, many comments regarding stormwater management called for dredging of the Siletz Bay, which is not a traditional stormwater management activity. The above recommendation for watershed treatment activities is again appropriate here. An additional public meeting focusing on issues of watershed health and including participants with technical expertise would be a valuable organizational step towards mitigation.

Public information activities

Evaluation

Approximately 11 percent of meeting participants gave top priority to the goal of increasing public awareness. Activities listed for reaching that goal included information dissemination, outreach projects, real estate disclosure, and risk analysis. Figure 5-5 represents the percentage of times an individual public information activity was prioritized as a top choice.

Figure 5-5
Top Prioritization of Public Information Activities



The ranking of public information activities reflects a relatively uniform need for these activities. Information dissemination was given top priority by a slight margin among the listed activities. This may reflect the activities far reaching scope, as information dissemination can play a role in each of the listed activities.

Implementation considerations

Any number of individuals, agencies, and organizations can administer public information activities. Information dissemination relating to Siletz River flooding has included flood insurance mailings by the Lincoln County Planning Department, newspaper announcements relating to flood safety by Lincoln County Emergency Services, and the on-going local administration of the FEMA floodplain program. Outreach projects may include technical assistance regarding such issues as flood insurance, elevation, erosion and sediment control, or emergency preparedness. With such a diverse number of topics that can be addressed, public information activities can involve various participants.

Risk analysis is a developing informational activity that benefits from Geographic Information System (GIS) technology. With Lincoln County currently developing its GIS capabilities, analysis of the risk posed by various flood levels (not simply the 100-year flood event) may be more easily calculated in the future.

Recommendations

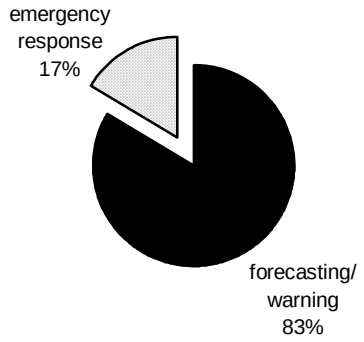
- Individuals, agencies, and organizations interested in public information activities for flood mitigation activities may benefit from reviewing public comments listed in Appendix A of this plan. In reviewing these comments, information suppliers can assess the informational needs of property owner's and residents of the lower Siletz River basin.

Emergency service activities

Evaluation

Under five percent of meeting participants chose enhancing emergency services as their top goal choice. Activities listed for reaching that goal included flood forecasting/warning and emergency flood response. Figure 5-6 represents the percentage of times an activity was given top priority.

Figure 5-6
Top Prioritization of Emergency Service Activities



Of the flood mitigation goals, enhancing emergency services was given top priority by the fewest number of meeting participants. Flood forecasting/warning received a higher prioritization than flood emergency response.

Implementation considerations

Flood forecasting/warning is administered by Lincoln County Emergency Service personnel and depends on satellite weather information and river gage data (as described in this plan's previous chapter). Because flood forecasting/warning is a flood mitigation activity administered in the time period immediately before a severe flooding event, it is logically a challenging administrative task. Flood emergency response is administered through county fire and rescue personnel. From a pre-event preparedness or mitigation standpoint, emergency response is addressed through an annex of the county's Emergency Operational Plan.

Recommendations

- Considering public comment as a whole and additional comment from county staff, emergency service activities can best be enhanced through increased data availability. There is one gage supplying water level information on the Siletz River. This gage is located at a significant distance upstream from this plan's study area. Prediction of flood behavior could be enhanced by an additional gage (or some sort of monitoring mechanism) positioned in the lower reaches of the Siletz watershed.

Further Evaluating Flood Mitigation Goals and Activities

Dwight D. Eisenhower once made the statement that: "Plans are worthless. Planning is essential." His words refer to the *process* of planning. The value of a plan is directly related to the process used to identify the issues, formulate the goals and actions, and structure implementation. This section provides a process for in-depth evaluation of goals and activities prior to implementation.

CPW has developed a methodology for in-depth analysis of 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. Tables for the analysis of these five criteria are located in Appendix D.

Planning officials, agencies, and organizations wishing to implement goals and activities recommended in this flood mitigation plan can use the following step-by-step evaluation process. This evaluation can be used to compare potential projects to local resources in order to determine project feasibility.

Step 1: Project Costs

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

Step 2: Administrative Burden

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

Step 3: Implementation

Implementation criteria are based on the tasks required by county 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. List the community partners and resources needed to implement the goal/activity.

Step 4: Monitoring and Evaluation

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

Step 5: Community Priority

The community priority rating is based on the ranking conducted during the public meeting. Review the priority of the goal/activity given by the community. 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

After the goals/activities have been evaluated, each of the criteria can receive a rating of low, medium, or high. Table 1-1 shows the rating system to evaluate the five criteria for the flood mitigation goals and activities.

Table 5-2
Evaluation Criteria

Criteria	**Rating** 1 = Low 2 = Medium 3 = High	**Total Cost/Resources Needed**
Cost		Start-up and operational costs:
Administrative Burden		Hours spent by county staff to implement the program(s):
Implementation		Community coordination and resources needed:
Monitoring and Evaluation		Hours spent to monitor and evaluate goals/activities:
Community Priority		Rating given during the public meeting:

Appendix A: Public Comments

As explained in the plan document, flood mitigation goals and activities were prioritized during a public meeting for the lower Siletz. Persons attending the meeting had the opportunity to submit any additional activity ideas or concerns by writing on the backs of their prioritization cards. Additionally, a number of persons not attending submitted comments prior to the meeting.

The material submitted has been organized to form this appendix. Comments not pertaining to the prioritization card on which they were submitted have been regrouped under appropriate headings. For example, a comment regarding insurance submitted on an "emergency service activities" prioritization card will now be located under the "property protection activities" heading.

Goals
Comments received on the back of goal prioritization cards related directly to activity areas and have been located under activity headings. For example, a goal comment emphasizing the need for more educational activities will be found underneath the Public Information Activities heading.

Property protection activities

Questions

- Question, homeowner is handicapped and concerned about access (for elevation projects).
- Relocate to where?
- How many times can we insure through FEMA?
- How many times will they pay off on flood insurance?
- How to raise a home (expense)?
- How does one get assistance or qualify for insurance?

Comments

- My highest priority would be to have our property acquired for a fair price.
- Acquiring property for X amount of money will not do anything to people who live and want to stay on the river.
- Insurance too expensive and deductible is too high. Premium too high!
- I would like to be able to afford or be assisted in purchasing insurance.
- Insurance is too costly for some incomes.
- Elevation would be fine. It would have to go hand in hand with insurance though.

Suggestions

- Provide opportunity for insurance for current homeowners.
- Speed up insurance process, adjuster came out ten days after flood.
- (Improve) ability to get insurance.
- Use easy access funding.

- More advertisement of it (funding) coming.
- Get Fed help (in providing) information for insurance.
- Provide low cost loans for elevation work.
- All houses on pilings and no appliances, etc. on ground level.
- No acquisition without permission.
- Allow property owners to deal with raising homes without the impossible restrictions, limits, and unreasonable logic.

Preventative activities

Questions

- Would planning include timberland management?
- Stormwater management is kind of irrelevant when trees already cut.
- How can stormwater runoff be managed in an area this size?
- Creek flooding is a problem near lots 101, 102, and 103.

Comments

- Plans are in place, where is the enforcement?
- Acquisition is key to restoring the natural watershed function.

Suggestions

- (Address) campers.
- Do not allow campgrounds to inhabit November to April. Close them down. It's not fair to the people in the campgrounds when they lose everything. Keep them out between November and April.
- Vacation R.V.'s only April 1st through October 31st.
- Prevent further construction in flood area.
- Better enforcement of current regulations (county, forest practices act, removal-fill law, etc.)

Watershed treatment activities

Questions

- Is the river shallower?
- Is the bay shallower?

Comments

- It's hard to guess which is more important, all three (listed activities) are necessary.
- Clear-cuts are a bad thing for erosion and silting in of the river and bay.
- Buffer zones are not being enforced.
- There is clear-cutting to the water's edge.
- Who gives property to the loggers to cut trees? They buy land, cut it, then silt sinks in.
- For twenty years we had no damage. Then, four years ago, with clear-cutting it started.
- There is a lack of blocking off logging roads.

- You need to contact Oregon Department of Forestry concerning harvest rules and information dissemination. There is a lack of understanding concerning logging and its effects.
- None of the above.
- There will always be trouble until trees are replanted.
- If some trees are not cut on the banks and grow too large and heavy, they carry away great globs of stream banks.

Suggestions

- Protect headwater areas from clear-cutting and logging practices (roads, etc.) that destroy all vegetation.
- River is too shallow to fill up with more sediment- needs to be controlled and trees need to be left at headwaters.
- Need to stop unsustainable logging practices.
- Timber practices should be monitored to reduce runoff and erosion.
- Enforce existing forest management regulation.
- (Address) forestry
- Assess fines for not reforesting.
- Timber management guidelines need to be followed.
- Restore wetland function, reduce clear-cutting, disallow berms, rip-rap, etc.
- Stop clear-cuts along the Siletz.
- Stop clear-cutting.
- Enforce riparian zones.
- Make sure riparian areas are installed and kept in place!
- Maintain riparian vegetation along riverbank areas.
- Establish and enforce riparian setbacks for all development.
- Stop clear-cut logging.
- Require reforestation.
- Stop the timber slashing to prevent the filling in of the river.
- Stop clear-cutting and (implement) selective logging, leaving small trees to mature.
- (Address) silt, clear-cutting, and trash.
- Stop clear-cutting.
- Clean the logging trash out of the rivers and creeks.
- Trash control up river, logs, brush debris.
- Keep debris from river.
- Send out restriction on dumping tree trimmings, grass, etc. in river.
- Removal of logging debris from rivers.
- Do not allow clear-cutting. If allowed, make companies burn and clean up the slag.
- Require removal of logging slash that gets in any tributary streams.
- No more logging on residential roads!!!

- Why not stop logging on the hills by the river, the mud slides in the river.
- Forest replanting.
- Forest management, clear-cutting risks.
- Better riparian control of logging.
- Logging roads need to be blocked, otherwise they serve as conduits for water.
- Riparian buffers needed on all streams.
- Natural flood plan to take care of surface run-off!
- Stop erosion.
- Erosion needs to be stopped, of course.
- Need more research on how clear-cutting has influenced erosion.
- No more logging
- The timber companies should be held responsible for this water run-off. It's muddy water and full of clay.
- The loggers give money to the state. They have the forestry department in their pockets.
- Enjoin all clear-cutting
- Enjoin further commercial clear-cuts in the Siletz watershed.
- Maybe salmon restoration could be used as a factor.
- Federal master plan for Salishan Spit.
- Stop dumping toxic waste into the river, i.e. oil, sewage, pesticides, and hydrocarbons with radioactive qualities!

Emergency service activities

Questions

- We have had water (over two feet) in our home three times in the 1990's and have never been notified in advance. 15 miles up HWY 229 is an ignored area. I believe the level gage was moved since the 100-year floodplain. Was the level transferred to the new gage?

Comments

- Flood warnings are given as to when river will crest and at what height. But it takes 12 hours for the crest to come on down river which some people don't realize.
- Thank you for warning in 1999.
- Never heard a thing last three floods.
- We were in two floods, the county gave adequate notice.
- We have never had any warning. Hear more about flooding from relatives who heard the Portland news. Phones go out. We only had someone go by because the sheriff lives past us. Local radio says nothing.
- Thanks for the fantastic job on both (activities) that has been done in this area in the past. We would appreciate more prompt flood warning in the Junction City/Eugene area when a flood is expected on the Siletz.

Suggestions

- Install monitor at 8 mile area to gather info for better forecasting the lower river flood levels.
- Lower river water gage.
- Better notification system.
- Emergency management personal need to knock on each door and give adequate warning so people can safely get their belongings and pets out of harm's way.
- Emergency local forecasting (with) radio/siren.
- Loudspeakers going through area to warn homeowners! Also, radio crystal warning systems.
- More (frequent) and louder forecasting. Loud warning, car going through neighborhood with sirens.
- Need a contact to get good, accurate information.
- Have a better warning system other than a phone. Our phone has been out all three times before there was any water in the yard.
- Use something other than phones to warn people. The phones are the first to go out.
- Need to have more notification in the valley, radio/television.
- Website (with) flood gage, warnings, history.
- Flood warning should look at the landslide warning system in effect.
- Better warnings.
- (Address) the availability of housing, food, and transportation to residents within 24 hours of the event.
- Road maintenance to protect access to residencies.

Public information activities

Questions

- Elevation question, how high?

Comments

- Main concern is current property owners- not future potential owners. (comment regarding real estate disclosure)
- Risk analysis should lead to changes in policy that exacerbate the problem: poor timber practices and river management to reduce soil erosion.

Suggestions

- Homeowner's associations need to notify non-resident homeowners about flooding events.
- Need a meeting with people who have technical expertise to answer technical questions.
- Information gathered at this meeting needs to be disseminated to the public and property owners through the report; media, etc.
- A list of names, positions, and agencies should be distributed at future meetings.
- Elected county officials should be at meetings (related to flood events).

- Educate people about what a functional watershed is and how they can contribute to that end.
- Educate people!
- Information dissemination- what is the flood history of the river, how has it changed, what are the forecasted weather patterns, how does logging affect this.
- Mark and display all known high water levels.
- Disseminate information about the value of undeveloped floodplains to watershed health and reduction of flood hazard.
- Have more of these meetings to inform and resolve situations, one or two is not enough!
- (Informational activities are a) waste of time. Everyone at this meeting is aware of flooding already.
- List of attendees to all participants.
- Any house and land damaged by flooding should be notified of all meetings and help.
- Information pamphlets to victims for available assistance from county, state, and federal level, i.e. differences in declarations. (Address) what programs are available and getting the information out promptly.

Additional questions, comments, and suggestions

Questions

- Why can't we try to save our banks with rock or cement?
- Siletz Bay Wildlife refuge- can the rules and regulations they established be changed to allow dredging due to excess sediment because of excessive logging?
- Is dredging of the river and/or the bay a realistic potential solution?

Comments

- Siletz Bay was silted in by 1996 flood due to over-logging. Floods will continue, I believe, until the Siletz Bay is dredged out.
- Siletz Bay Wildlife Refuge is protected from dredging.
- My goal is to sell!
- Abandoned houses in portions of the watershed are health and groundwater threats.
- Abandoned houses are a hazard.
- Some of us came from long distances and our summer home is important.
- Salishan spit development and coastal ocean currents!

Suggestions
(structural activities)

- Place bunker along 229 to help stop slide areas.
- Breach dikes wherever they are no longer needed.
- Concrete wall along property to keep property from eroding and filling river with soil.
- Loosen county rules on beams to protect property.
- Allow rip-rap to be placed in front of existing structures on the river to control further bank erosion.

- Fund materials and labor for rip-rap
- Only bio-engineered bank stabilization.
- Build flood control dam.
- Maybe logging companies (rich logging companies) could help pay for the dam we need?
- We need a dam!
- How about a dam?
- Flood control dam.

(dredging)

- Determine why the frequency of flooding has increased so much and consider dredging or other hydraulic flood control measures (check dams, etc.). Temporary repairs make little sense.
- The river and the bay need to be dredged.
- Must dredge river and/or bay to remove silt to allow flooding to flow within banks.
- Dredge the bay out to where it was at during the 1960's when boating was allowed. Not a mudflat with silt/runoff.
- Dredge the mouth.
- They need to dredge bay and wildlife refuge.
- Need to dredge bay and/or river. Look at natural floodplain and remove silt and build up.
- The bay needs to be dredged for proper run-off.
- Need research on possibility of dredging river to help sediment control.
- Dredge the bay and mouth of the river.
- Clean out the sediment that has built up in the river.
- Restore Siletz Bay to the deep water area that it was!
- Having a place for nature fauna is fine, but people are more important. The Siletz Bay estuary should be dredged occasionally. The whole river should be dredged.
- Clean river base out so that water has a place to go.
- Dredge out Siletz Bay.
- Dredge bay channel to provide for high water flow.
- More dredging.
- Need to open the jaws of Siletz Bay so more water can more quickly be diverted from the river.
- Dredge bay.
- Dredge the bay. (My understanding is Army Corps of Engineers will not even consider this as Siletz Bay is not a harbor.)
- Dredge silt from waterways (from logging run-off) that is clogging up the lower river and bay.
- Work on cleaning the bay, maybe widening passage to the ocean.
- Dredge bay.
- Dredge existing run-off area in the estuary.

- Dredge the Siletz Bay to better deal with flooding.
- Dredge the lower Siletz.
- River and bay dredging
- Dredge bay.
- Dredge the bay.
- Dredge mount of river to allow high tides and high water to get away unimpeded.
- Dredge the river instead of spending money on things that don't count.
- Bay dredging.
- How about dredging the river?

(property values and taxation)

- We want OUT, a fair price for the value of the property.
- We the residents of Calkin Acres should have our property taxes reduced.
- Please lower our property taxes in Calkin Acres.
- Adjust property values for taxing purposes.
- Adjust land values for tax purposes to reflect property value loss.
- Adjust property values for taxing purposes.
- Long term property evaluation to personal economics.
- We pay taxes that have not been reduced.
- Economic value evaluation for purpose of taxation and evaluation of insurance funds for damage.

(miscellaneous)

- State control of the river, not federal government.
- Check to see if Feds own riverbanks.
- Find out who is the authority for control of the riverbank, the federal government or state?
- Look at these land use codes. Also, their impact on private persons.
- Update floodplain maps to reflect reality.
- Update FEMA maps.
- (Address) silt filling of lower Siletz Bay and River basin.
- Prevention is much cheaper than repair. Fix or prevent the run-off problems and you lessen the need for insurance.

Appendix B: Glossary

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

Anadromous- A term describing fish species that ascend rivers from the sea for breeding.

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 C.

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- When defined by planners and engineers, 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- Any sustained long-term measures designed to reduce or eliminate impact from natural hazards.

One-hundred year flood (see 100-year flood)

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 C: Technical Resource Guide Supplement

Information in this appendix comes directly from the Flood Technical Resource Guide in *Planning for Natural Hazards: Oregon Technical Resource Guide*, published by the Department of Land Conservation and Development in 2000.

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 NFIP is administered by the Federal Emergency Management Agency (FEMA). 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.[22]

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".[23]

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:
4) The location of the structure (tax parcel number, legal description) and use of the building.
5) The Flood Insurance Rate Map panel number and date, community name and source of base flood elevation date.
6) Information on the building's elevation.
7) Signature of a licensed surveyor or engineer.

The National Flood Insurance Program's Community Rating 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 1, below. CRS handbooks are available from your local FEMA representative or by calling 1-800-427-4661.

Table A-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, 16 (based on the following table) Oregon jurisdictions are participating in the CRS program.[24] 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.[25]

Table A-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*

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 professionals 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.

Army Corps of Engineers Permit Program

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 these activities are issued jointly by the Oregon Division of State Lands (DSL) and the U.S. Army Corps.

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.[26]

The Oregon State Police- Office of Emergency Management (OEM) is the state agency responsible for administering the HMGP.

Flood Mitigation Assistance Program (FMA)

The Flood Mitigation Assistance (FMA) program funds are made available by FEMA to states on an annual basis. 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. [27]

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.[28]

Oregon Watershed Enhancement Board (OWEB)

The Oregon Watershed Enhancement Board (OWEB) administers two grant programs that provide funds for mitigation and improvement projects that approach natural resources management from a whole-watershed perspective. Floodplain management fits that profile. OWEB encourages projects that foster interagency cooperation, include other sources of funding, provide for local stakeholder involvement, include youth and volunteers and promote learning about watershed concepts. OWEB's goal is to help Oregonians improve the state's watersheds. The primary functions of OWEB are to provide technical assistance, administer a grant program, promote education and public awareness about watershed enhancement benefits, concepts and techniques, and to support the work of local watershed councils.[29]

Appendix D: Implementation Evaluation Strategy

Goal: Protect individual properties

Project Costs:
Administrative Costs
Implementation Requirements:
Monitoring and Evaluation:
Community Priority:
General Rating:

Activity: The use of flood insurance available through the National Flood Insurance Program (NFIP)		
Criteria	**Rating**	**Total Cost/Resources Needed (Explanation of Rating)**
Cost		
Administrative Burden		
Implementation		
Monitoring & Evaluation		
Community Priority		
Activity: **Elevation- elevation of structures to keep them above high water levels**		
Criteria	**Rating**	**Total Cost/Resources Needed (Explanation of Rating)**
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		
Activity: **Acquisition of structures in flood hazard areas for demolition or relocation**		
Criteria	**Rating**	**Total Cost/Resources Needed (Explanation of Rating)**
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		
Activity: **Floodproofing- modification of structures as an attempt to reduce flood damage**		
Criteria	**Rating**	**Total Cost/Resources Needed (Explanation of Rating)**
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Goal: Control development and use of the floodplain for flood protection

Project Costs:
Administrative Costs
Implementation Requirements:
Monitoring and Evaluation:
Community Priority:
General Rating:

Activity: Planning- zoning, incorporation of flood risk reduction into subdivision regulations, or other implementing measures.

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring & Evaluation		
Community Priority		

Activity: Open space preservation- the purchase of conservation easements, or flood-prone land purchased to be held in perpetuity as open space or greenways

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Activity: Regulations specific to the floodplain, can overlap with planning activities

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Activity: Stormwater management- the management of surface water runoff

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Goal: Preserve or restore natural areas to establish the natural functions of the floodplain

Project Costs:
Administrative Costs
Implementation Requirements:
Monitoring and Evaluation:
Community Priority:
General Rating:

Activity: Erosion and sediment control- implementation of streambank stabilization and sediment retention techniques

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring & Evaluation		
Community Priority		

Activity: Wetlands protection- acquisition or conservation of wetland areas

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Activity: Headwater protection

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Goal: Enhance emergency services

Project Costs:
Administrative Costs
Implementation Requirements:
Monitoring and Evaluation:
Community Priority:
General Rating:

Activity: Flood forecasting/warning- warning systems to give community residents organized notification of impending flood danger

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring & Evaluation		
Community Priority		

Activity: Emergency flood response- emergency actions taken during and immediately after a flood

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Goal: Increase Public Awareness

Project Costs:
Administrative Costs
Implementation Requirements:
Monitoring and Evaluation:
Community Priority:
General Rating:

Activity: Information dissemination- distribution of flood-related information

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring & Evaluation		
Community Priority		

Activity: Outreach projects- technical assistance projects for floodplain activities

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Activity: Real estate disclosure- notifying potential homebuyers of flood hazard risk

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

Activity: Analysis of development risk for flood events other than the “100 year” flood

Criteria	Rating	Total Cost/Resources Needed (Explanation of Rating)
Cost		
Administrative Burden		
Implementation		
Monitoring and Evaluation		
Community Priority		

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